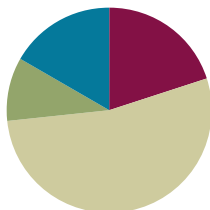# Lesson 10

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)

  Total Time   **(60 minutes)**

Application Problem (6 minutes)

Moses sold 24 raffle tickets on Monday and 4 fewer tickets 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 lesson's Concept Development.

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 exercise reviews the mental math strategy taught in Lesson 4, which was 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 = _____.) 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.

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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 journal or paper

The goal of place value models is to help students understand the quantities involved in vertical form. 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 algorithm. It anticipates that students will grasp this understanding at different rates. As students demonstrate proficiency (i.e., as they are able to explain why they composed a ten using place value language), encourage them to dispense with the models.

NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

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

MP.3

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: Now draw a chip model to solve. As you work through the algorithm with the model, record each change in vertical form.

T: When you're finished, check your work with a partner, and use place value language to explain how your model and numbers show the algorithm.

NOTES ON MULTIPLE MEANS OF REPRESENTATION:

For students who need additional support with vertical form, provide lined paper, so that 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.

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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 vertical form. (Choose a student.)

Repeat the procedure for the original activity in which students solve 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.

MP.3

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 images at right.)
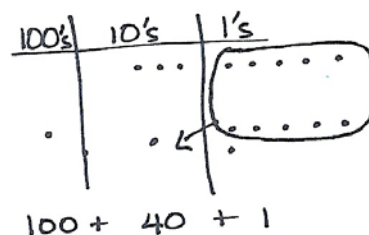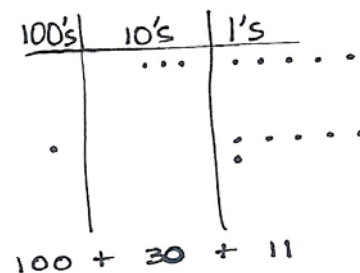
Continue to support students who need assistance. Release students who demonstrate proficiency with the models and vertical form to work on the Problem Set independently.

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 should solve these problems using the RDW approach used for Application Problems.

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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, Part (a), how did you know whether or not to bundle a new unit of ten?
- For Problem 1, Part (b), where did you write the new ten in vertical form? 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, Part (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, Part (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.

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 presented in the lesson today and plan more effectively for future lessons. You may read the questions aloud to the students.

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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 =	

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 =	

Name _____   Date _____

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

hundreds	tens	ones

a. 127 + 18 = _____

hundreds	tens	ones

b. 136 + 16 = _____

hundreds	tens	ones

c. 109 + 41 = _____

hundreds	tens	ones

d. 29 + 148 = _____

hundreds	tens	ones

COMMON CORE

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e. 79 + 107 = _____

hundreds	tens	ones

Before bundling a ten   _____ hundreds   _____ tens   _____ones

After bundling a ten   _____ hundreds   _____ tens   _____ones

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?

hundreds	tens	ones

b. On Sunday, Colleen earned 2 ten-dollar bills and 16 one-dollar bills. How much money did she earn on both days?

hundreds	tens	ones

COMMON CORE

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Name _____   Date _____

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

    27 + 137

hundreds	tens	ones

2. Using the previous problem, fill in the blanks. Use place value language to explain how you used bundling to rename the solution.

    Before bundling a ten   _____ hundreds   _____ tens   _____ones

    After bundling a ten   _____ hundreds   _____ tens   _____ones

    <u>Explanation</u>

COMMON CORE™

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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

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2. Jamie started to solve this problem when she accidently dropped paint on her sheet. Can you figure out what problem she was given and her answer by looking at her work?

1⬛ = _____

_____ + _____ = _____

100's	10's	1's

__ hundreds   __ tens   __ones

3. 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?

hundreds	tens	ones

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?

hundreds	tens	ones

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