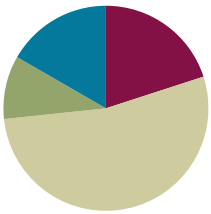
Lesson 9

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

Suggested Lesson Structure

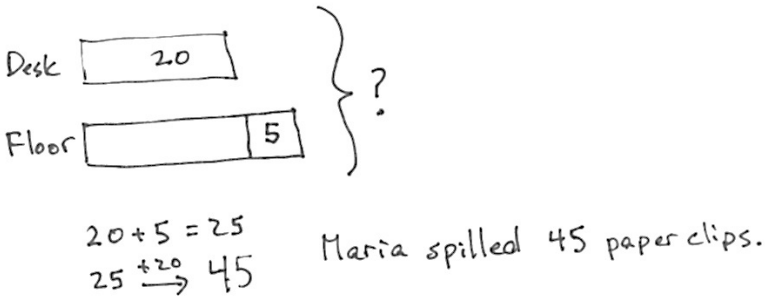


Application Problem	(6 minutes)
Fluency Practice	(12 minutes)
Concept Development	(32 minutes)
Student Debrief	(10 minutes)
Total Time	**(60 minutes)**

Application Problem (6 minutes)

Marla spilled a box of paper clips. They landed on her desk and on the floor. 20 of them landed on her desk, and 5 more fell on the floor than landed on her desk. How many paper clips did she spill?

Note: Guide the students through the use of a double bar model to represent this problem. First solve to find the number picked up from the floor, and then add the two amounts. Remember that if possible, Application Problems can be done at a different time of day apart from the regular math time if they do not directly flow into the lesson, as is the case here.



Fluency Practice (12 minutes)

- Place Value Practice **2.NBT.3** (3 minutes)
- Sprint: Sums to the Teens **2.NBT.5** (9 minutes)

Place Value Practice (3 minutes)

Note: This fluency reviews place value concepts from Module 3 to prepare students for the lesson's content.

T: (Write 352 on the board.) Say the number in standard form.

S: 352.

T: Say the number in expanded form.

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S: 300 + 50 + 2.

T: Say the number Say Ten way.

S: 3 hundreds 5 tens 2.

T: What is 20 more than 352?

S: 372.

Continue with the following possible sequence: 20 less? 100 more? 100 less? 102 less? 220 less? 510 more?

NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

For students who need support drawing rows, columns, and dots, provide graph paper, and encourage them to place one dot into each grid square.

Sprint: Sums to the Teens (9 minutes)

Materials: (S) Sums to the Teens Sprint

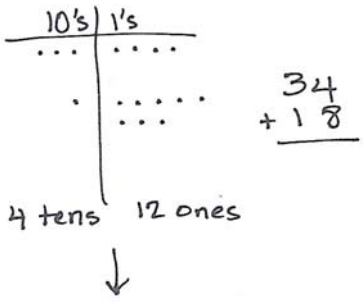
Note: This Sprint reviews crossing ten when adding.

Concept Development (32 minutes)

Materials: (S) Math journals or paper

As students learn to make math drawings to represent a written vertical method, it is important to teach precision: aligning digits in their proper place, drawing number disks in clear 5-groups, showing new groups below in the correct place. For this reason, in the beginning, students should use pencil and paper, which allows greater precision than a white board marker.

Problem 1: 34 + 18



T: Write 34 + 18 the vertical way on your paper.

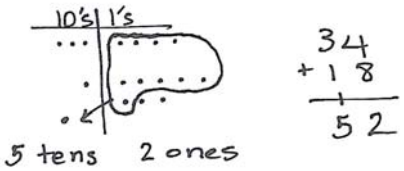
T: Now we'll model it by drawing a place value chart. Draw your chart like mine. (Draw tens and ones chart.)

T: This time, label the tens place and the ones place. This means we don't have to label the disks, because a disk in the ones place is a one, and a disk in the tens place is a ten. The place tells us the value, or how much the disk is worth.

MP.6

T: Now let's draw a model of each addend. Since we don't need to label the disks, we'll just draw dots. That's easier and takes less time!

T: Whisper count as you draw your model. (Draw chip model of 34 + 18. See image at right.)



S: (Make chip model.) 10, 20, 30, 31, …34. 10, 11, 12, …18.

T: Use place value language to tell your partner how your model matches the written addition.

S: 3 dots in the tens place is 30 and 4 dots in the ones place is 4, so my picture is the same as 34. → 1 ten 8 ones is 18, and that's what I drew on my model.

T: What is 4 ones + 8 ones?

S: 12 ones!

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T: The Say Ten way?

S: Ten 2.

T: The written addition way is also called an **algorithm**. An algorithm is a way to solve problems using steps that help us work more quickly. Tell your partner what to do on your model and using the algorithm.

S: We made a ten. Circle it! → Bundle ten ones and put a ten in the tens place. → Show the new unit on the line below the tens place.

T: Yes! You have a new unit of ten. We're renaming 12 ones as 1 ten 2 ones. Let's show that on our models and using the algorithm.

S: (Circle 10 ones, draw an arrow to the tens place and add a dot, write 1 on the line below the tens place, and add the tens digits. See image above.)

NOTES ON MULTIPLE MEANS OF REPRESENTATION:

For students performing below grade level, use manipulatives such as straws to model rebundling with three-digit addends. Once the student understands the concept of creating a new unit, move to the disks and chip model, connecting them to the written addition.

T: Partners, check each other's work to be sure it matches my model and the algorithm.

T: On the algorithm, you have written a 1 on the line. On your mat, point to what the 1 stands for. Who can tell us? (Choose a volunteer.)

S: (Point to the new ten on the model.) It's this new ten we drew in the tens place.

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T: Yes! (Point to each part.) 4 ones + 8 ones is 12 ones, so we write the 1 new ten on the line below the tens place, and we write 2 ones below the line in the ones place. What do we do next?

S: We add 3 tens + 1 ten + 1 ten = 5 tens. So 34 + 18 equals 52.

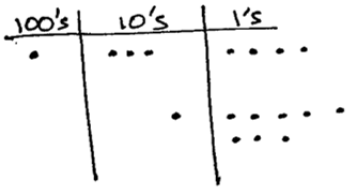
T: Yes! We renamed 4 tens 12 ones as 5 tens 2 ones.

Problem 2: 134 + 18

T: Let's look at this problem. Write 134 + 18, like this. (Write 134 + 18 vertically.) Be sure you line up the ones and tens.

T: What is different about this problem, and how can I show this on a place value chart?

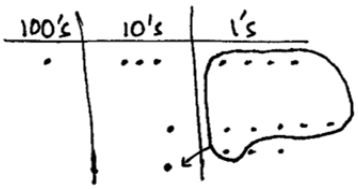
S: We're adding the ones and the tens the same way we just did, but now we also have hundreds.

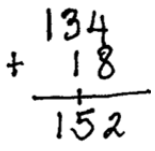


T: Let's show it. (Draw a place value chart with hundreds, tens, and ones.) Draw a chart like mine.

T: Now my place value chart has hundreds, tens, and ones. Count with me as we model 134 + 18. (See image at right.)

S: (Count as they draw.) 100, 110, 120, 130, 131, …134. 10, 11, 12, …18.





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T: Again, use place value language to tell to your partner how your model matches the algorithm. (Allow about one minute.)

T: (Point to the ones on the model.) We see our 12 ones, which become a new ten and 2 ones. Let's show that on our models. (Circle 10 ones, draw an arrow into the tens place, and draw a dot for the new ten. See image at right.)

T: How do we show the new ten and 2 ones using the algorithm?

S: Write a 1 on the line below the tens place, and write 2 under the line below the ones place.

T: Correct! Let's show that. (Model the change on the written addition.)

T: Now we add the tens. 3 tens + 1 ten + 1 ten is 5 tens, so we record 5 below the line in the tens place. (Record it.)

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T: And we have 1 hundred. We're not adding anything to it, so we record 1 below the line in the hundreds place. (Record it.)

T: 134 + 18 is?

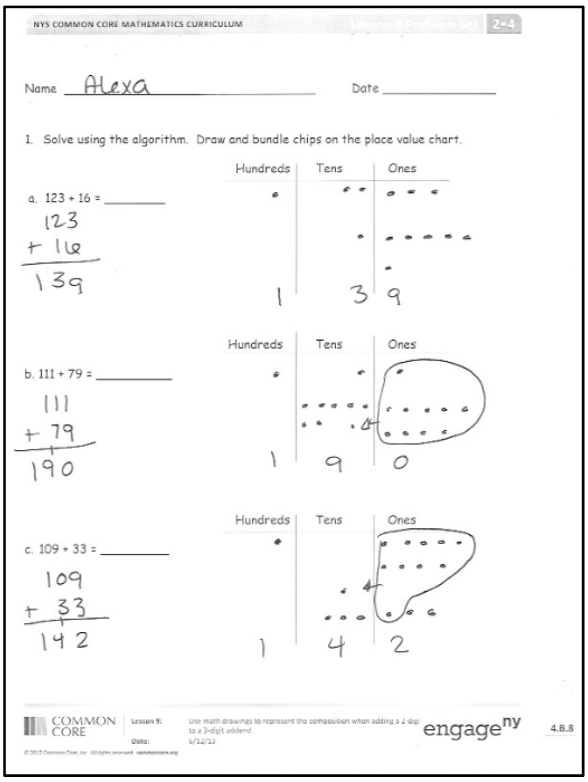
S: 152!

T: Talk with your partner. How does having a hundred change how you solved the problem?

S: We had to draw a hundreds place on our charts. → We solved the same way; we added the ones and tens like before, and then we just added in the hundred.

Follow the procedure above to guide students as they write, model, and solve 107 + 63. At each step, remind students to be precise in aligning the digits and in drawing their dots in neat 5-groups. Have them share how each step in the drawing matches each step in the algorithm.

Continue with the following possible sequence: 114 + 37, 158 + 26, 163 + 29, and 48 + 147. Continue to support students who struggle, but as students demonstrate proficiency, instruct them to work on the Problem set independently.


NYS COMMON CORE MATHEMATICS CURRICULUM Lesson 9 Problem Set 2•4

Name Alexa Date

1. Solve using the algorithm. Draw and bundle chips on the place value chart.

a. 123 + 16 = _____

123
+ 16
139

Hundreds | Tens | Ones
1 | 3 | 9

b. 111 + 79 = _____

111
+ 79
190

Hundreds | Tens | Ones
1 | 9 | 0

c. 109 + 33 = _____

109
+ 33
142

Hundreds | Tens | Ones
1 | 4 | 2

COMMON CORE Lesson 9: Use math drawings to represent the composition when adding a 2-digit to a 3-digit addend. Date: 4/14/14 engage^ny 4.B.8

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.

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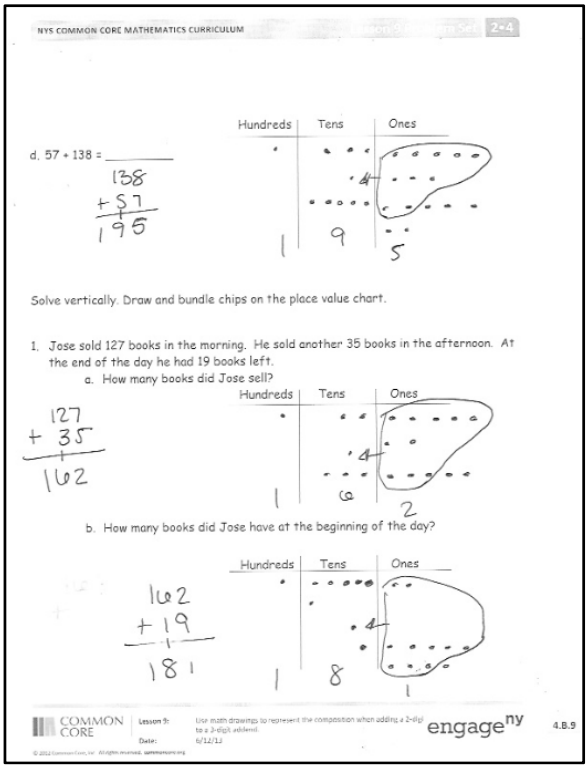
Student Debrief (10 minutes)



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.

- Explain to your partner how you solved Problems 1(a) and (b). What significant differences do you notice about the place value charts for these two problems?
- For Problem 1(c), use place value language to explain to your partner how your model matches the **algorithm**.
- One student's answer for Problem 1(d), 57 + 138, was 285. What mistake did he make in the algorithm?
- For Problem 2, how did having a three-digit addend (as opposed to two-digit) change the way you solved the problem?
- How are your math drawings today different from the ones you made yesterday? How are the written addition problems different?

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.

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A # Correct _____

Add.

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

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B Improvement _____ # Correct _____

Add.

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

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Name _____ Date _____

1. Solve using the algorithm. Draw and bundle chips on the place value chart.

a. 123 + 16 = _____

Hundreds	Tens	Ones

b. 111 + 79 = _____

Hundreds	Tens	Ones

c. 109 + 33 = _____

Hundreds	Tens	Ones

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d. 57 + 138 = _____

Hundreds	Tens	Ones

Solve vertically. Draw and bundle chips on the place value chart.

2. Jose sold 127 books in the morning. He sold another 35 books in the afternoon. At the end of the day he had 19 books left.
   a. How many books did Jose sell?

Hundreds	Tens	Ones

   b. How many books did Jose have at the beginning of the day?

Hundreds	Tens	Ones

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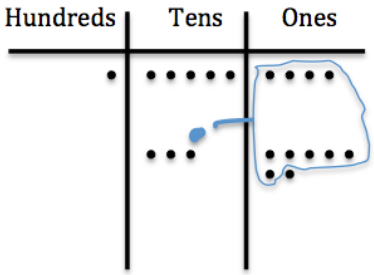
Name _____ Date _____

1. Solve using the algorithm. Write a number sentence for the problem modeled on the place value chart.



2. Solve using the algorithm. Draw and bundle chips on the place value chart.

136 + 39 = _____

Hundreds	Tens	Ones

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Name _____ Date _____

1. Solve using the algorithm. Draw and bundle chips on the place value chart.

a. 127 + 14 = _____

Hundreds	Tens	Ones

b. 135 + 46 = _____

Hundreds	Tens	Ones

c. 108 + 37 = _____

Hundreds	Tens	Ones

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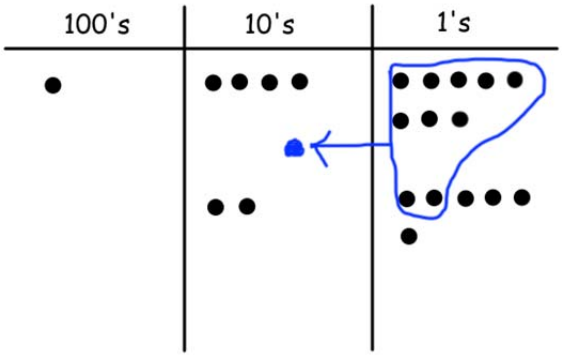
2. Solve using the algorithm. Write a number sentence for the problem modeled on the place value chart.



Solve using the algorithm. Draw and bundle chips on the place value chart.

3. Jane made 48 lemon bars and 72 cookies.
   a. How many snacks did Jane make?

Hundreds	Tens	Ones

   b. Jane made 69 more lemon bars. How many lemon bars does she have?

Hundreds	Tens	Ones

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