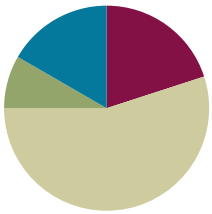
Lesson 16

Objective: Add measurements using the standard algorithm to compose larger units twice.

Related Topics: More Lesson Plans for the Common Core Math

Suggested Lesson Structure

Fluency Practice	(12 minutes)
Application Problem	(5 minutes)
Concept Development	(33 minutes)
Student Debrief	(10 minutes)
Total Time	**(60 minutes)**



Fluency Practice (12 minutes)

- Part–Whole with Metric Units **3.MD.2** (3 minutes)
- Round Three- and Four-Digit Numbers **3.NBT.1** (5 minutes)
- Group Counting **3.OA.1** (4 minutes)

Part–Whole with Metric Units (3 minutes)

Materials: (S) Personal white boards

Note: This activity reviews part–whole thinking using metric units.

T: There are 100 centimeters in 1 meter. How many centimeters are in 4 meters?
S: 400 centimeters.
T: 5 meters?
S: 500 centimeters.
T: 7 meters?
S: 700 centimeters.
T: (Write 30 minutes + ____ minutes = 1 hour.) There are 60 minutes in 1 hour. On your boards, complete the equation.
S: (Write 30 minutes + 30 minutes = 1 hour.)

Continue with the following suggested sequence: 40 minutes and 25 minutes.

T: (Write 300 mL + ____ mL = 1 L.) There are 1000 milliliters in 1 liter. On your boards complete the equation.
S: (Write 300 mL + 700 mL = 1 liter.)

Continue with the following suggested sequence: 200 mL, 600 mL, 550 mL.

Round Three- and Four-Digit Numbers (5 minutes)

Materials: (S) Personal white boards

Note: This activity reviews rounding from Lessons 13 and 14.

T: (Write 73 ≈ ___.) What is 73 rounded to the nearest ten?
S: 70.

Repeat the process, varying numbers.

Group Counting (4 minutes)

Note: Group counting reviews interpreting multiplication as repeated addition. It reviews foundational strategies for multiplication from Module 1 and anticipates Module 3.

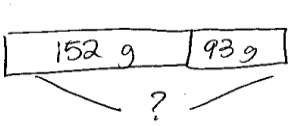
Direct students to count forward and backward, occasionally changing the direction of the count.

- Threes to 30
- Fours to 40
- Sixes to 60
- Sevens to 70
- Eights to 80
- Nines to 90

As students' fluency with skip-counting improves, help them make a connection to multiplication by tracking the number of groups they count using their fingers.

Application Problem (5 minutes)

Josh's apple weighs 93 grams. His pear weighs 152 grams. What is the total weight of the apple and the pear?



152 g
+ 93 g
245 g

The total weight of the apple and the pear is 245 grams.

Note: This problem reviews using the standard algorithm to compose larger units once.

Concept Development (33 minutes)

Materials: (T) Bag A of beans (266 grams), Bag B of beans (158 grams), scale that weighs in grams
(S) Personal white boards, place value charts, place value disks

Problem 1: Use place value charts, disks, and the standard algorithm to add measurements, composing larger units twice.

T: (Show Bags A and B.) Bag A has 266 grams of beans, and Bag B has 158 grams of beans. Let's use our place value charts and disks to figure out how many grams of beans we have altogether. Slip the place value chart into your personal board.

T: Use disks to represent the weight of the beans in Bag B.

S: (Put 8 ones disks in the ones column, 5 tens disks in the tens column, and 1 hundreds disk in the hundreds column.)

T: Record 158 grams in the workspace on your personal board.

T: Leave the disks on your chart. Use more disks to represent the weight of the beans in Bag A. Place them below your model of 158.

S: (Place 6 ones disks, 6 tens disks, and 2 hundreds disks in respective columns.)

T: In the workspace on your personal board, use an addition sign to show that you added 266 grams to 158 grams.

T: (Point to the place value disks in the ones column.) 8 ones plus 6 ones equals?

S: 14 ones.

T: We can change 10 ones for 1 ten. Take 10 ones disks and change them for 1 tens disk. Where do we put the tens disk on the place value chart?

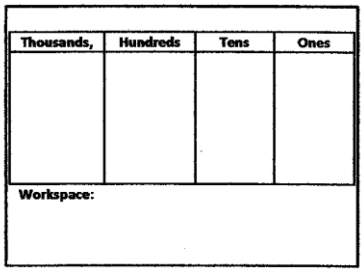
S: In the tens column.

T: How many ones do we have now?

S: 4 ones!

T: Let's use the standard algorithm to show our work on the place value chart. Use the equation you wrote in the workspace on your personal boards. (Write the equation vertically, as shown.) Be sure your equation is written vertically, like mine.

Place Value Chart

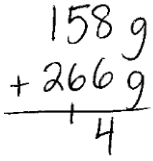


NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

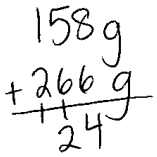
Students working above grade level may be eager to find the sum quickly without using number disks. Keep these learners engaged by optimizing their choice and autonomy. Request from them an alternative model, such as a tape diagram. They may enjoy offering two more examples of their own in which they use the standard algorithm to compose larger units twice.

158 g
+ 266 g

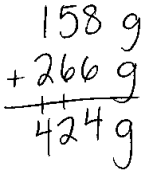
T: (Point to the ones in the equation.) 8 ones plus 6 ones equals?
S: 14 ones.
T: Let's rename some ones as tens. How many tens and ones in 14?
S: 1 ten and 4 ones.
T: Just like we practiced yesterday, show that on your equation.
S: (Write the 1 so that it crosses the line under the tens in the tens place, and the 4 below the line in the ones column.)



T: (Point to the place value disks in the tens column.) 5 tens plus 6 tens plus 1 ten equals?
S: 12 tens!
T: We can change 10 tens for 1 hundred. Take 10 tens disks and change them for 1 hundreds disk. Where do we put the hundreds disk on the place value chart?
S: In the hundreds column.
T: How many tens do we have now?
S: 2 tens!
T: Let's show that in our equation. (Point to the tens in the equation.) 5 tens plus 6 tens plus 1 ten equals?
S: 12 tens.
T: Let's rename some tens as hundreds. How many hundreds and tens in 12 tens?
S: 1 hundred and 2 tens.
T: We show our new hundred just like we showed our new ten before, but this time we put it in the hundreds column because it's a hundred, not a ten. (Write the 1 so that it crosses the line under the hundreds in the hundreds place, and the 2 below the line in the tens column.)



T: (Point to the place value disks in the hundreds column.) 1 hundred plus 2 hundreds plus 1 hundred equals?
S: 4 hundreds!
T: 4 hundreds 2 tens 4 ones makes how many total grams of beans in Bag A and Bag B?
S: 424 grams.
T: Let's show that in our equation. (Point to the hundreds in the equation.) 1 hundred plus 2 hundreds plus 1 hundred equals?
S: 4 hundreds!
T: Record 4 hundreds in the hundreds column below the line.
T: What unit do we need to include in our answer?
S: Grams!



T: Read the problem with me. (Point and read.) 158 grams plus 266 grams equals 424 grams.
T: How can I check our work using a scale?
S: Put Bag A and Bag B on the scale and read the measurement.
T: (Put Bags A and B on the scale.) The total weight of the beans is 424 grams!

Continue with the following suggested problems:

- *Add to with start unknown:* Jamal has a piece of rope. His brother cut off 47 centimeters and took it! Now Jamal only has 68 centimeters left. How long was Jamal's rope before his brother cut it?
- *Compare with bigger unknown:* The goldfish aquarium at Sal's Pet Store has 189 liters of water. The guppy aquarium has 94 more liters of water than the goldfish aquarium. How many liters of water are in both aquariums?

Problem 2: Use the partner–coach strategy and the standard algorithm to add measurements, composing larger units twice.

Materials: (S) Problem Set

Students work with a partner and use the partner–coach strategy to complete page 1 of the Problem Set.

Prepare students:

- Explain how to use the partner-coach strategy. (One partner coaches, verbalizing the steps needed to solve the problem, while the other partner writes the solution. Then partners switch roles.)
- Generate a class list of important words that should be included in the coaching conversations (e.g., *ones*, *tens*, *hundreds*, *change*, *standard algorithm*, *mental math, rename*). Keep this list posted for students to refer to as they coach each other.

MP.6

Circulate as students work, addressing misconceptions or incorrect work.

Problem Set (5 minutes)

Students should do their personal best to complete the Problem Set within the allotted 5 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.

NOTES ON MULTIPLE MEANS FOR ACTION AND EXPRESSION:

Help students prepare for successful participation in the Student Debrief. Some may need your guidance and support to discover the patterns of Problem 1. Encourage students to read aloud the number sentences in each row and to search for the numbers that repeat.

Student Debrief (10 minutes)

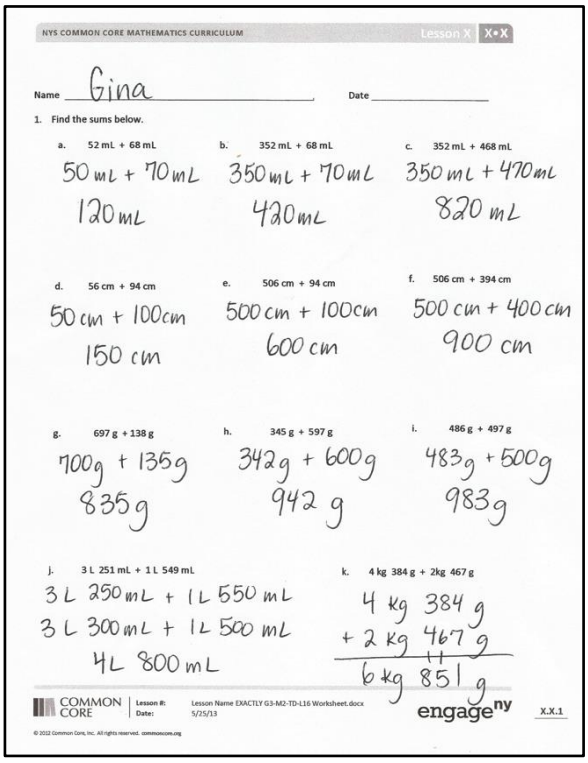
Lesson Objective: Add measurements using the standard algorithm to compose larger units twice.

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.

- What pattern did you notice between Problems 1(a), 1(b), and 1(c)? How did the pattern help you solve these problems?
- Did you or your partner use mental math? For which problems? Why?
- Look at your work for Problem 2. Did you rename ones? Tens? Hundreds? How can you tell?
- Talk to a partner, how is Problem 4 different than the other problems? What steps did you use to solve this problem?

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.



NYS COMMON CORE MATHEMATICS CURRICULUM Lesson X X•X

Name Gina Date

1. Find the sums below.

a. 52 mL + 68 mL
50 mL + 70 mL
120 mL

b. 352 mL + 68 mL
350 mL + 70 mL
420 mL

c. 352 mL + 468 mL
350 mL + 470 mL
820 mL

d. 56 cm + 94 cm
50 cm + 100 cm
150 cm

e. 506 cm + 94 cm
500 cm + 100 cm
600 cm

f. 506 cm + 394 cm
500 cm + 400 cm
900 cm

g. 697 g + 138 g
700 g + 135 g
835 g

h. 345 g + 597 g
342 g + 600 g
942 g

i. 486 g + 497 g
483 g + 500 g
983 g

j. 3 L 251 mL + 1 L 549 mL
3 L 250 mL + 1 L 550 mL
3 L 300 mL + 1 L 500 mL
4 L 800 mL

k. 4 kg 384 g + 2 kg 467 g
4 kg 384 g
+ 2 kg 467 g
6 kg 851 g

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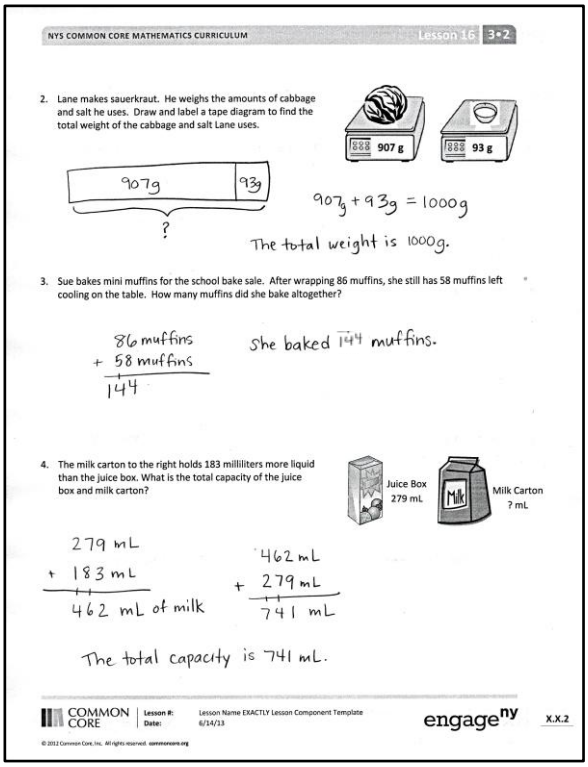

NYS COMMON CORE MATHEMATICS CURRICULUM Lesson 16 3•2

2. Lane makes sauerkraut. He weighs the amounts of cabbage and salt he uses. Draw and label a tape diagram to find the total weight of the cabbage and salt Lane uses.

907 g | 93 g
907 g + 93 g = 1000 g
?
The total weight is 1000 g.

3. Sue bakes mini muffins for the school bake sale. After wrapping 86 muffins, she still has 58 muffins left cooling on the table. How many muffins did she bake altogether?

86 muffins
+ 58 muffins
144
She baked 144 muffins.

4. The milk carton to the right holds 183 milliliters more liquid than the juice box. What is the total capacity of the juice box and milk carton?

Juice Box 279 mL
Milk Carton ? mL

279 mL
+ 183 mL
462 mL of milk

462 mL
+ 279 mL
741 mL

The total capacity is 741 mL.

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Name _____ Date _____

1. Find the sums below.

a. 52 mL + 68 mL

b. 352 mL + 68 mL

c. 352 mL + 468 mL

d. 56 cm + 94 cm

e. 506 cm + 94 cm

f. 506 cm + 394 cm

g. 697 g + 138 g

h. 345 g + 597 g

i. 486 g + 497 g

j. 3 L 251 mL + 1 L 549 mL

k. 4 kg 384 g + 2kg 467 g

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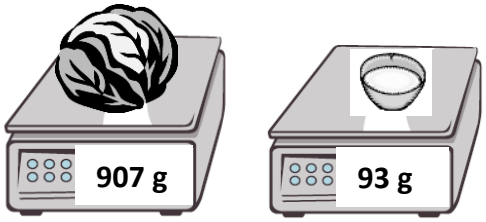

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4. The milk carton to the right holds 183 milliliters more liquid than the juice box. What is the total capacity of the juice box and milk carton?

Name _____ Date _____

1. Find the sums.

   a. 78 g + 29 g

   b. 328 kg + 289 kg

   c. 509 L + 293 L

2. The third grade sells lemonade to raise funds. After selling 38 liters of lemonade in 1 week, they still have 26 liters of lemonade left. How many liters of lemonade did they have at the beginning?

Name _____ Date _____

1. Find the sums below.

a. 47 m + 8 m

b. 47 m + 38 m

c. 147 m + 383 m

d. 63 mL + 9 mL

e. 463 mL + 79 mL

f. 463 mL + 179mL

g. 368 kg + 263 kg

h. 508 kg + 293 kg

i. 103 kg + 799 kg

j. 4 L 342 mL + 2 L 214 mL

k. 3 kg 296 g + 5kg 326g

2. Mrs. Haley roasts a turkey for 55 minutes. She checks it, and decides to roast it for an additional 36 minutes. Use a tape diagram to find the total minutes Mrs. Haley roasts the turkey.

3. A miniature horse weighs 228 fewer kilograms than a Shetland pony. Use the table to find the weight of a Shetland pony.

Types of Horses	Weight in kg
Shetland pony	_____ kg
American Saddlebred	543 kg
Clydesdale horse	_____ kg
Miniature horse	53 kg

4. A Clydesdale horse weighs as much as a Shetland pony and an American Saddlebred horse combined. How much does a Clydesdale horse weigh?

Ones	
Tens	
Hundreds	
Thousands	

Workspace: