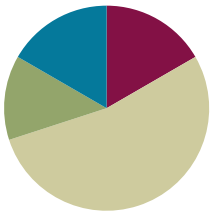
Lesson 17

Objective: Use mental strategies to relate compositions of 10 tens as 1 hundred to 10 ones as 1 ten.

Suggested Lesson Structure

Fluency Practice	(10 minutes)
Concept Development	(32 minutes)
Application Problem	(8 minutes)
Student Debrief	(10 minutes)
Total Time	**(60 minutes)**



Fluency Practice (10 minutes)

- Compensation **2.NBT.5** (5 minutes)
- Rename the Units **2.NBT.1** (5 minutes)

Compensation (5 minutes)

Note: This fluency exercise reviews the mental math strategy taught in Lesson 4, using compensation to add the same amount to each addend. By making a multiple of 10, students solve a much simpler addition problem.

T: (Write 42 + 19 = _____.) Let's use a mental math strategy to add. How much more does 19 need to make the next ten?
S: 1 more.
T: Where can 19 get 1 more from?
S: From the 42.
T: Take 1 from 42 and give it to 19. Say the simplified number sentence, with the answer.
S: 41 + 20 = 61.
T: 37 + 19. Say the simplified number sentence, with the answer.
S: 36 + 20 = 56.

Continue with the following possible sequence: 29 + 23, 38 + 19, 32 + 19, 24 + 17, and 34 + 19.

Rename the Units (5 minutes)

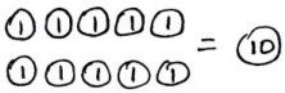
Note: This fluency exercise reviews foundational concepts that support today's lesson.

T: (Write 10 ones = _____ ten ____ ones.) Say the number sentence.
S: 10 ones = 1 ten 0 ones.
T: (Write 20 ones = 1 ten _____ ones.) Say the number sentence.
S: 20 ones = 1 ten 10 ones.
T: (Write 24 ones = 1 ten _____ ones.) Say the number sentence.
S: 24 ones = 1 ten 14 ones.
T: (30 ones = 2 tens ___ ones.) Say the number sentence.
S: 30 ones = 2 tens 10 ones.

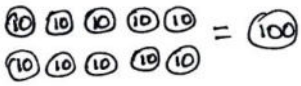
Repeat the process for 32, 38, 40, 41, 46, 50, 63, and 88.

Concept Development (32 minutes)

T: Show me your magic counting sticks.
S: (Hold up all 10 fingers.)
T: Give them a value of one. Count with me.
S: 1, 2, …, 10. (On 10, students clasp their hands together with a loud clap, interlacing their fingers to make one unit of 10.)
T: How many ones in 1 ten?
S: 10 ones!
T: Yes! (Draw the image to the right on the board.) 10 ones equal 1 ten.



T: Hold up your magic counting sticks again. This time, give them each a value of ten. Count with me.
S: 10, 20, …, 100.
T: How many tens in 1 hundred?
S: 10 tens!
T: Correct! (Draw the image to the right on the board.) 10 tens equal 1 hundred.



T: (Write 1 one + ___ = 10 ones = 1 ten.) Read these sentences aloud, filling in the blanks.
S: 1 one plus 9 ones equals 10 ones equals 1 ten.
T: (Write 1 ten + ___ = 10 tens = 1 hundred.) Read these sentences.
S: 1 ten plus 9 tens equals 10 tens equals 1 hundred.
T: Talk with your partner. How are these statements the same and different?
S: Both have 1 plus 9. The only thing that changes is if it's ones or tens. → They both have a group of 10, but when you add 10 ones, you make a ten, and when you add 10 tens, you make a hundred.

NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

Have the students skip-count by tens from 0 to 200 and back to 0. Improve concentration by having the students touch their lifted right knee with their left hand, and vice versa, alternating with each count.

T: How is making a ten similar to making a hundred?

S: It's the same, but instead of using ones to make a ten, you use tens to make a hundred. → 10 ones make a ten, and 10 tens make a hundred. → Ten of the same unit makes 1 of the next higher unit, like 10 ones makes 1 ten, and 10 tens makes 1 hundred. → Ten of the same unit makes a unit of the next higher place value.

T: What's 6 ones + 4 ones?

S: 10 ones! → 1 ten!

T: 6 tens + 4 tens is…?

S: 10 tens! → 1 hundred!

T: 60 + 40 is…?

S: 100.

T: 7 ones + 6 ones is…?

S: 13 ones.

T: 7 + 6 is…?

S: 13.

T: 7 tens + 6 tens is…?

S: 13 tens.

T: 13 tens equals is…?

S: 130.

T: 70 + 60 is…?

S: 130.

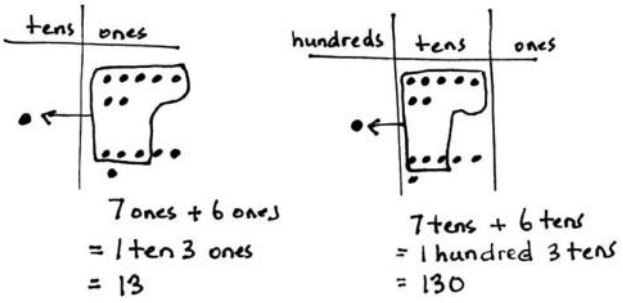
NOTES ON MULTIPLE MEANS OF REPRESENTATION:

Explain to students who are struggling with the concept that adding tens is like adding apples. If students add 12 apples and 5 apples, they get 17 apples. It is the same with tens: If students add 12 tens (120) and 5 tens (50), they get 17 tens (170). Demonstrate with place value disks if students continue to struggle.

T: Pretend your partner is a family member. How can you prove to her that 13 tens is the same as 130?

MP.3

S: Count by tens 13 times. → Show 13 tens on a place value chart. When you circle 10 tens, you get a hundred, and there are still 3 tens left. → Show her 13 tens the break apart way, so she sees 13 tens is the same as 10 tens + 3 tens, 100 + 30 = 130.



T: Excellent reasoning! So, 10 tens is…?

S: 100.

T: 11 tens is…?

S: 110.

T: 16 tens is…?

S: 160.

T: 19 tens is…?

S: 190.

T: 20 tens…?

S: 200.

T: Now, let's make tens and hundreds. (On the board, write the problem pictured to the right.)

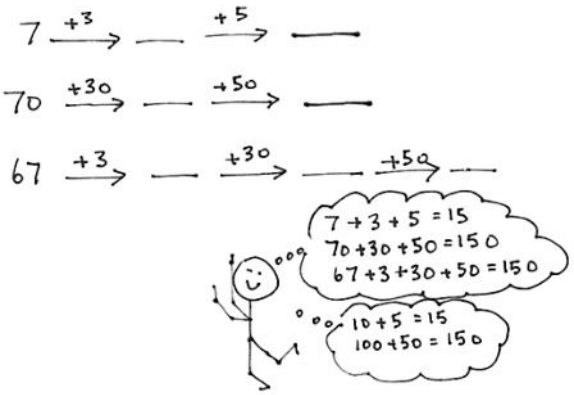
T: Talk with your partner. What numbers go into the blanks?

S: The numbers in the blanks were 10, 15, and 100, 150 and 70, 100, 150. → I see a pattern.

T: Find the total in each problem.

S: 15 and 150.

T: Explain the relationship between the first problem and the two last problems.



S: First, we made a ten; then, we made a hundred. → And all the answers are alike, 15 ones and 15 tens. → The last one had an extra step because we had to get to the ten.

Repeat with the following possible sequence: 64 + 6 + 10 + 10 + 10, 85 + 5 + 10 + 100, and 171 + 9 + 20.

As students demonstrate an understanding of adding 10 or 100, allow them 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.

Application Problem (8 minutes)

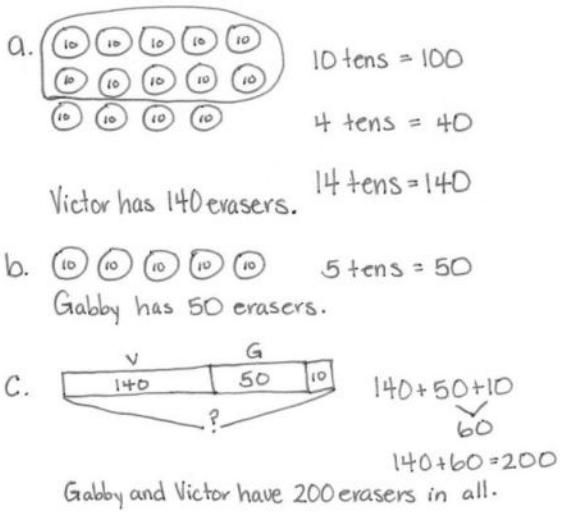
Erasers come in boxes of 10. Victor has 14 boxes. Gabby has 5 boxes.

a. How many erasers does Victor have?

b. How many erasers does Gabby have?

c. If Gabby gets another box, how many erasers do they have in all?

Note: This Application Problem follows the Concept Development, inviting students to apply their understanding of mental strategies for composing 1 hundred and 1 ten to a real world context.



Student Debrief (10 minutes)

Lesson Objective: Use mental strategies to relate compositions of 10 tens as 1 hundred to 10 ones as 1 ten.

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

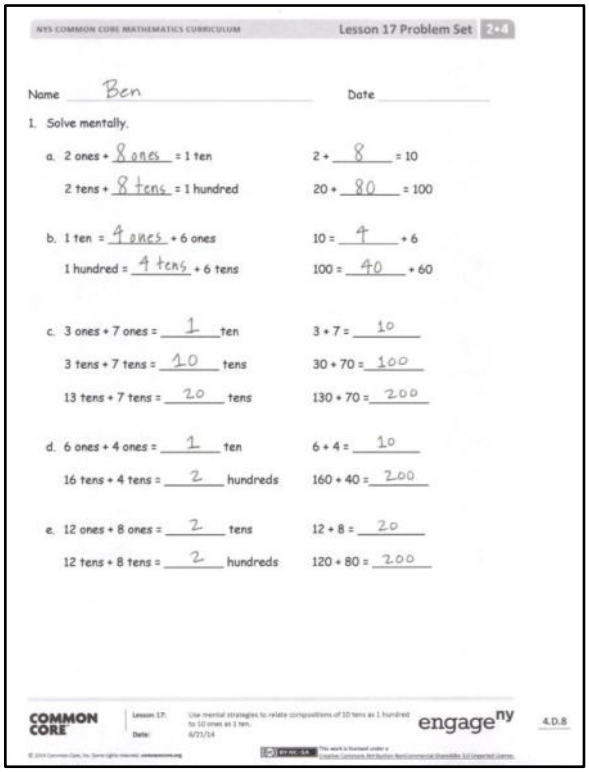
Invite students to review their solutions for the Problem Set. They should check work by comparing answers with a partner before going over answers as a class. Look for misconceptions or misunderstandings that can be addressed in the Debrief. Guide students in a conversation to debrief the Problem Set and process the lesson.

Any combination of the questions below may be used to lead the discussion.

- What was the total for each problem in 1(c)? What pattern do you notice? What is the relationship between the first problem and the other two problems?
- For Problem 1(d), prove to your partner that 16 tens is the same as 160. Use what you know about the place value chart to support your reasoning.
- How are the problems in 2(a) the same and different? What is the relationship between them?
- For Problems 3(a) and (b), why do we add 6 ones first? How does adding 6 ones and then 7 tens change the totals in each problem?
- Ones, tens, and hundreds are part of a base ten system. Why do you think it is called *base ten*? What important connection did we make today between ones, tens, and hundreds?

Exit Ticket (3 minutes)

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help with assessing students' understanding of the concepts that were presented in today's lesson and planning more effectively for future lessons. The questions may be read aloud to the students.



NYS COMMON CORE MATHEMATICS CURRICULUM Lesson 17 Problem Set 2•4

Name Ben Date

1. Solve mentally.

a. 2 ones + 8 ones = 1 ten — 2 + 8 = 10
2 tens + 8 tens = 1 hundred — 20 + 80 = 100

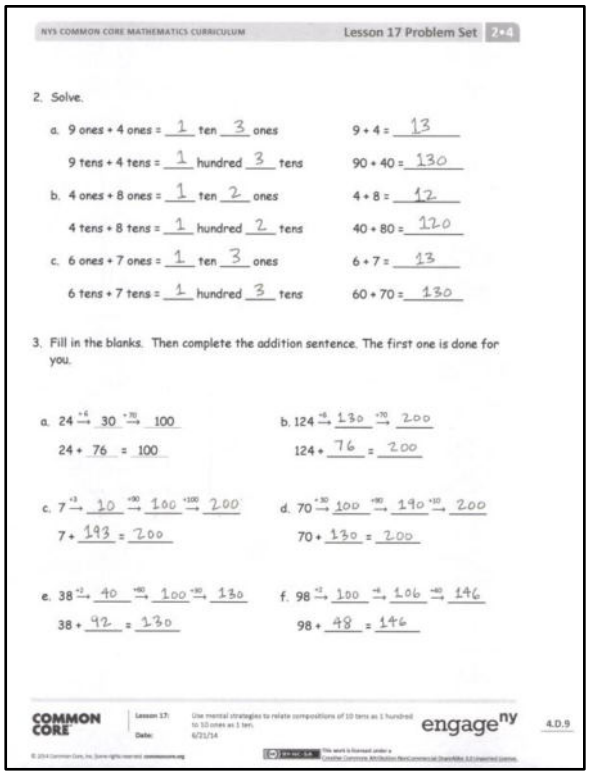
b. 1 ten = 4 ones + 6 ones — 10 = 4 + 6
1 hundred = 4 tens + 6 tens — 100 = 40 + 60

c. 3 ones + 7 ones = 1 ten — 3 + 7 = 10
3 tens + 7 tens = 10 tens — 30 + 70 = 100
13 tens + 7 tens = 20 tens — 130 + 70 = 200

d. 6 ones + 4 ones = 1 ten — 6 + 4 = 10
16 tens + 4 tens = 2 hundreds — 160 + 40 = 200

e. 12 ones + 8 ones = 2 tens — 12 + 8 = 20
12 tens + 8 tens = 2 hundreds — 120 + 80 = 200

COMMON CORE Lesson 17: Date: Use mental strategies to relate compositions of 10 tens as 1 hundred to 10 ones as 1 ten. 6/21/14 engage^ny 4.D.8



NYS COMMON CORE MATHEMATICS CURRICULUM Lesson 17 Problem Set 2•4

2. Solve.

a. 9 ones + 4 ones = 1 ten 3 ones — 9 + 4 = 13
9 tens + 4 tens = 1 hundred 3 tens — 90 + 40 = 130

b. 4 ones + 8 ones = 1 ten 2 ones — 4 + 8 = 12
4 tens + 8 tens = 1 hundred 2 tens — 40 + 80 = 120

c. 6 ones + 7 ones = 1 ten 3 ones — 6 + 7 = 13
6 tens + 7 tens = 1 hundred 3 tens — 60 + 70 = 130

3. Fill in the blanks. Then complete the addition sentence. The first one is done for you.

a. 24 +6→ 30 +70→ 100
24 + 76 = 100

b. 124 +6→ 130 +70→ 200
124 + 76 = 200

c. 7 +3→ 10 +90→ 100 +100→ 200
7 + 193 = 200

d. 70 +30→ 100 +90→ 190 +10→ 200
70 + 130 = 200

e. 38 +2→ 40 +60→ 100 +30→ 130
38 + 92 = 130

f. 98 +2→ 100 +6→ 106 +40→ 146
98 + 48 = 146

COMMON CORE Lesson 17: Date: Use mental strategies to relate compositions of 10 tens as 1 hundred to 10 ones as 1 ten. 6/21/14 engage^ny 4.D.9

Name _____ Date _____

1. Solve mentally.

a. 2 ones + _____ = 1 ten 2 + _____ = 10

2 tens + _____ = 1 hundred 20 + _____ = 100

b. 1 ten = _____ + 6 ones 10 = _____ + 6

1 hundred = _____ + 6 tens 100 = _____ + 60

c. 3 ones + 7 ones = _____ ten 3 + 7 = _____

3 tens + 7 tens = _____ tens 30 + 70 = _____

13 tens + 7 tens = _____ tens 130 + 70 = _____

d. 6 ones + 4 ones = _____ ten 6 + 4 = _____

16 tens + 4 tens = _____ hundreds 160 + 40 = _____

e. 12 ones + 8 ones = _____ tens 12 + 8 = _____

12 tens + 8 tens = _____ hundreds 120 + 80 = _____

2. Solve.

a. 9 ones + 4 ones = _____ ten _____ ones 9 + 4 = _____

9 tens + 4 tens = _____ hundred _____ tens 90 + 40 = _____

b. 4 ones + 8 ones = _____ ten _____ ones 4 + 8 = _____

4 tens + 8 tens = _____ hundred _____ tens 40 + 80 = _____

c. 6 ones + 7 ones = _____ ten _____ ones 6 + 7 = _____

6 tens + 7 tens = _____ hundred _____ tens 60 + 70 = _____

3. Fill in the blanks. Then, complete the addition sentence. The first one is done for you.

a. $24 \xrightarrow{+6}$ 30 $\xrightarrow{+70}$ 100

24 + 76 = 100

b. $124 \xrightarrow{+6}$ _____ $\xrightarrow{+70}$ _____

124 + _____ = _____

c. $7 \xrightarrow{+3}$ _____ $\xrightarrow{+90}$ _____ $\xrightarrow{+100}$ _____

7 + _____ = _____

d. $70 \xrightarrow{+30}$ _____ $\xrightarrow{+90}$ _____ $\xrightarrow{+10}$ _____

70 + _____ = _____

e. $38 \xrightarrow{+2}$ _____ $\xrightarrow{+60}$ _____ $\xrightarrow{+30}$ _____

38 + _____ = _____

f. $98 \xrightarrow{+2}$ _____ $\xrightarrow{+6}$ _____ $\xrightarrow{+40}$ _____

98 + _____ = _____

Name _____ Date _____

1. Solve mentally.

   a. 4 ones + _____ = 1 ten 4 + _____ = 10

      4 tens + _____ = 1 hundred 40 + _____ = 100

   b. 2 ones + 8 ones = _____ ten 2 + 8 = _____

      2 tens + 18 tens = _____ hundreds 20 + 180 = _____

2. Fill in the blanks. Then, complete the addition sentence.

   63 $\xrightarrow{+7}$ _____ $\xrightarrow{+10}$ _____ $\xrightarrow{+10}$ _____ $\xrightarrow{+10}$ _____

   63 + _____ = _____

Name _____ Date _____

1. Solve mentally.

a. 4 ones + _____ = 1 ten 4 + _____ = 10

4 tens + _____ = 1 hundred 40 + _____ = 100

b. 1 ten = _____ + 7 ones 10 = _____ + 7

1 hundred = _____ + 7 tens 100 = _____ + 70

c. 1 ten more than 9 ones = _____ 10 + 9 = _____

1 hundred more than 9 ones = _____ 100 + 9 = _____

1 hundred more than 9 tens = _____ 100 + 90 = _____

d. 2 ones + 8 ones = _____ ten 2 + 8 = _____

2 tens + 8 tens = _____ hundred 20 + 80 = _____

e. 5 ones + 6 ones = ____ten(s) ____ one(s) 5 + 6 = _____

5 tens + 6 tens = ____hundred(s) ____ ten(s) 50 + 60 = _____

f. 14 ones + 4 ones = ____ ten(s) ____ one(s) 14 + 4 = _____

14 tens + 4 tens = ____ hundred(s) ____ tens(s) 140 + 40 = _____

2. Solve.

a. 6 ones + 5 ones = _____ ten _____ one 6 + 5 = _____

6 tens + 5 tens = _____ hundred _____ ten 60 + 50 = _____

b. 5 ones + 7 ones = _____ ten _____ ones 5 + 7 = _____

5 tens + 7 tens = _____ hundred _____ tens 50 + 70 = _____

c. 9 ones + 8 ones = _____ ten _____ ones 9 + 8 = _____

9 tens + 8 tens = _____ hundred _____ tens 90 + 80 = _____

3. Fill in the blanks. Then, complete the addition sentence. The first one is done for you.

a. 36 $\xrightarrow{+4}$ 40 $\xrightarrow{+60}$ 100 $\xrightarrow{+30}$ 130

36 + 94 = 130

b. 78 $\xrightarrow{+2}$ _____ $\xrightarrow{+10}$ _____ $\xrightarrow{+10}$ _____

78 + _____ = _____

c. 61 $\xrightarrow{+9}$ _____ $\xrightarrow{+10}$ _____ $\xrightarrow{+10}$ _____ $\xrightarrow{+10}$ _____ $\xrightarrow{+100}$ _____

61 + _____ = _____

d. 27 $\xrightarrow{+3}$ _____ $\xrightarrow{+70}$ _____ $\xrightarrow{+100}$ _____

27 + _____ = _____