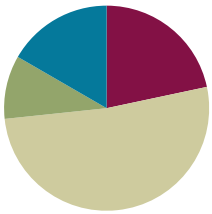
Lesson 13

Objective: Use math drawings to represent subtraction with and without decomposition and relate drawings to a written method.

Suggested Lesson Structure

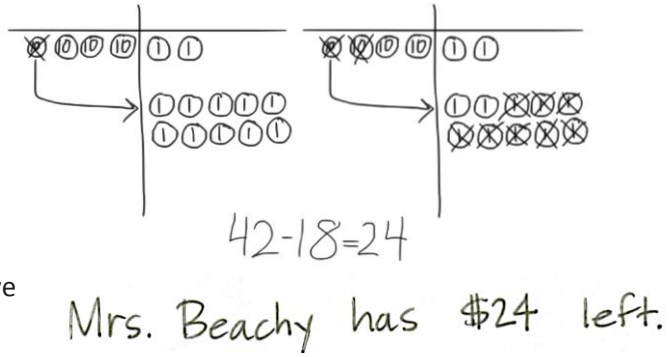


Application Problem	(6 minutes)
Fluency Practice	(13 minutes)
Concept Development	(31 minutes)
Student Debrief	(10 minutes)
Total Time	**(60 minutes)**

Application Problem (6 minutes)

Mrs. Beachy went shopping with $42. She spent $18. How much money did she have left?

Note: This problem provides students an opportunity to apply learning from Lesson 12 in getting ready to subtract. It is a simple word problem type, *take from with result unknown.* Therefore, let students draw place value disks to solve to avoid the complexity of both a tape diagram and manipulatives.



Fluency Practice (13 minutes)

- Subtraction from Tens **2.NBT.5** (5 minutes)
- Sprint: Subtraction Patterns **2.NBT.5** (8 minutes)

Subtraction from Tens (5 minutes)

Materials: (S) Personal white board

Note: This fluency activity prepares students for this lesson's Sprint and allows them to see how their take-from-ten facts help them to solve many problems.

T: I say a basic fact, you add ten to the whole and continue until I say to stop. So, after 10 – 5, you would solve 20 – 5 and then…?

S: 30 – 5, 40 – 5, 50 – 5.

T: Yes. Solve as many as you can on your personal white board before I give the signal to stop. Let's begin. 10 – 5.

When every student has completed at least two problems, stop the class, and give the next expression.

Continue with the following possible sequence: 10 – 8, 11 – 2, 12 – 4, and 11 – 5.

Sprint: Subtraction Patterns (8 minutes)

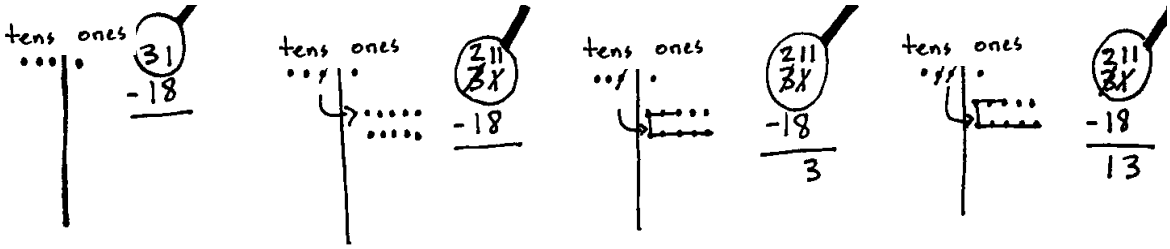
Materials: (S) Subtraction Patterns Sprint

Note: Students are given the opportunity to use mental math strategies when crossing tens to subtract.

Concept Development (31 minutes)

Materials: (S) Personal white board

Problem 1: 31 – 18



Write 31 – 18 on the board in vertical form. Draw a blank place value chart with place value headings on the board.

MP.2

T: What is the whole?
S: 31.
T: What is the part that we know?
S: 18.
T: What should I do first?
S: Count out 3 tens and 1 one.
T: Today, we're just going to draw a simple chip model with dots, or chips, like we did with addition.
T: Why do I only draw a value of 31 to solve 31 – 18? Discuss with a partner.
S: 31 is the whole. → You only draw the number you are subtracting from. → We are looking for a missing part. → 18 plus something equals 31. We have to take out 18 to find out what it is.

NOTES ON MULTIPLE MEANS OF REPRESENTATION:

Observe students carefully during the lesson. If any seem confused about how to relate the chip model to the bare numbers, work with them using the place value disks or other manipulatives until they realize the connection between the manipulatives, the drawing, and the algorithm.

T: (Draw a chip model that represents 31.) How many tens did I draw on my place value chart? How many ones?
S: 3 tens 1 one.
T: (Draw the magnifying glass around 31.) What next?
S: Get ready to subtract. Check to make sure we can subtract in every place value.
T: Can I subtract 8 ones from 1 one?
S: No!
T: What should I do?
S: Change 1 ten for 10 ones. → Unbundle a ten, and show 10 ones.
T: (Cross out a ten. Draw an arrow to show the change of 1 ten to 10 ones, and then draw 10 chips to represent the 10 ones.) Whatever we do with the chips, we show with vertical form.
T: How many tens do I have now?
S: 2. (Cross out the 3 in the tens column, and write a 2 above it.)
T: How many ones do I have now?
S: 11. (Cross out 1 in the ones column, and write 11 above it.)
T: Do we also see 2 tens and 11 ones in the chip model?
S: Yes!
T: Then we are…?
S: Ready to subtract!
MP.2
T: 11 ones minus 8 ones is…? (Cross out 8 ones in the chip model.)
S: 3 ones. (Write 3 in the ones column.)
T: 2 tens minus 1 ten is…?
S: 1 ten.
T: (Cross out 1 chip in the tens column, and write 1 in the answer space on the vertical form.) What is the answer?
S: 13.

Continue modeling subtraction using the vertical form with the magnifying glass and the chip model. Repeat the process above with the following possible sequence: 56 – 29, 72 – 36, and 85 – 48.

Problem 2: 40 – 24 and 33 – 17

T: Let's try a few together. (Write 40 – 24 = 33 – 17.)
T: I would like to know, is this true or false? What I write, you write.
T: (Write 40 – 24 in vertical form. Draw the magnifying glass around 40. Draw 4 tens chips in the tens column. Students do the same.) Let's get ready to subtract.

NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

Play Race to Zero to practice unbundling in a fun way. After pairing the students, give them 5 tens disks each. Have them take turns rolling a die (or dice, for a faster game), subtracting the quantity on the die each turn and unbundling 10 when necessary. The first one to reach 0 wins. Make it more challenging by requiring students to reach exactly 0.

For students ready for even more of a challenge, have them start with a single hundreds disk and race to zero.

T: Can I subtract 4 ones from 0 ones?
S: No.
T: What should I do?
S: Decompose a ten. → Cross out a ten on the chip model, and draw 10 ones.
T: (Cross out a ten chip in the tens column, draw an arrow to show the change, and draw 10 ones disks. Students do the same. Cross out the 4 in the tens column, and write a 3. Change the 0 to a 10. Students do the same.)
T: Now, can I subtract 4 ones from 10 ones?
S: Yes!
T: (Cross out 4 ones on the chip model, and write 6 in the ones place. Students do the same.) What next?

MP.2

S: Take away 2 tens. → 3 tens minus 2 tens is 1 ten.
T: (Cross out 2 tens on the chip model, and write 1 in the tens place on vertical form. Students do the same.) What is 40 – 24?
S: 16!
T: Now, I need to see, does 33 – 17 also equal 16?

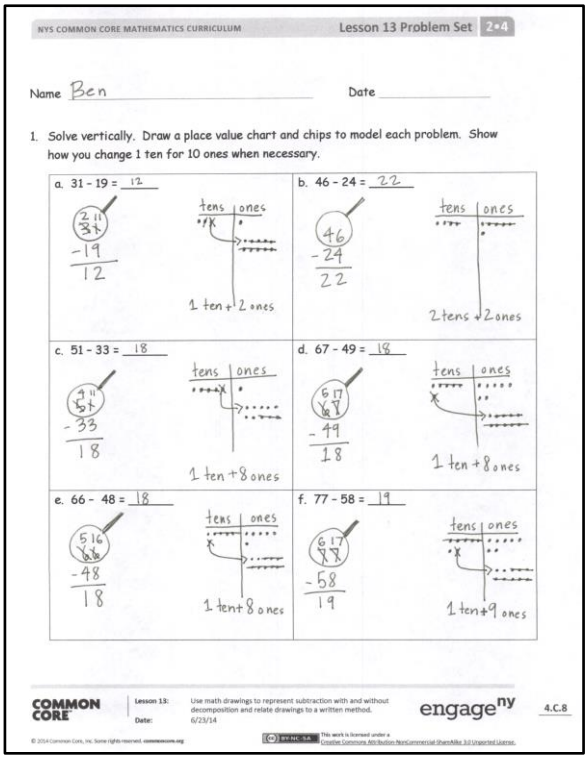
Repeat the process above with the problem 33 – 17.

T: What is 33 – 17?
S: 16.
T: So, is 40 – 24 equal to 33 – 17?
S: They're both 16, so yes!

As students show proficiency, allow them to move on to the Problem Set.

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.


NYS COMMON CORE MATHEMATICS CURRICULUM Lesson 13 Problem Set 2•4

Name Ben Date

1. Solve vertically. Draw a place value chart and chips to model each problem. Show how you change 1 ten for 10 ones when necessary.

a. 31 - 19 = 12
b. 46 - 24 = 22
c. 51 - 33 = 18
d. 67 - 49 = 18
e. 66 - 48 = 18
f. 77 - 58 = 19

Student Debrief (10 minutes)

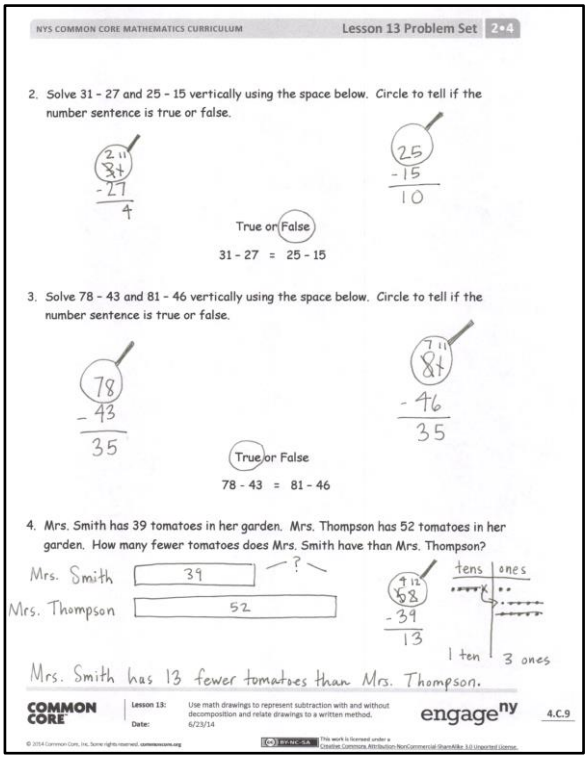
Lesson Objective: Use math drawings to represent subtraction with and without decomposition and relate drawings to a written method.

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.

- For Problem 1(a), did you decompose a ten? Why? Then how many ones did you have? How many tens were left?
- Explain to your partner how to solve Problem 1(c). How did you show decomposing a ten on your model and in vertical form? Could you have solved this problem mentally?
- Compare Problems 1(e) and 1(f) with a partner. How did you solve these two problems? Could you have solved Problem 1(f) without unbundling? How does it relate to Problem 1(e)?
- For Problem 2, what did you need to be sure to do when solving 31– 27 using vertical form? Did you solve 25 – 15 mentally? What was your strategy?
- How did you subtract in Problem 3? What is the relationship between 78 – 43 and 81 – 46? What easy simplifying strategy could you use to answer the true/false question?


NYS COMMON CORE MATHEMATICS CURRICULUM Lesson 13 Problem Set 2•4

2. Solve 31 - 27 and 25 - 15 vertically using the space below. Circle to tell if the number sentence is true or false.

31 - 27 = 25 - 15 (True or False)

3. Solve 78 - 43 and 81 - 46 vertically using the space below. Circle to tell if the number sentence is true or false.

78 - 43 = 81 - 46 (True or False)

4. Mrs. Smith has 39 tomatoes in her garden. Mrs. Thompson has 52 tomatoes in her garden. How many fewer tomatoes does Mrs. Smith have than Mrs. Thompson?

Mrs. Smith 39 ?
Mrs. Thompson 52

tens ones
1 ten 3 ones

Mrs. Smith has 13 fewer tomatoes than Mrs. Thompson.

COMMON CORE Lesson 13: Date: 6/23/14 Use math drawings to represent subtraction with and without decomposition and relate drawings to a written method. engage^ny 4.C.9

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.

A

Number Correct: _____

Subtraction Patterns

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

B

Number Correct: _____

Improvement: _____

Subtraction Patterns

1.	10 – 1 =	
2.	20 – 1 =	
3.	30 – 1 =	
4.	10 – 3 =	
5.	20 – 3 =	
6.	30 – 3 =	
7.	12 – 3 =	
8.	22 – 3 =	
9.	32 – 3 =	
10.	10 – 9 =	
11.	11 – 9 =	
12.	21 – 9 =	
13.	31 – 9 =	
14.	13 – 4 =	
15.	23 – 4 =	
16.	33 – 4 =	
17.	16 – 7 =	
18.	26 – 7 =	
19.	36 – 7 =	
20.	10 – 6 =	
21.	20 – 7 =	
22.	30 – 8 =	

23.	13 – 5 =	
24.	23 – 5 =	
25.	33 – 5 =	
26.	16 – 8 =	
27.	26 – 8 =	
28.	36 – 8 =	
29.	12 – 5 =	
30.	22 – 5 =	
31.	32 – 5 =	
32.	11 – 5 =	
33.	21 – 5 =	
34.	31 – 5 =	
35.	12 – 7 =	
36.	22 – 7 =	
37.	11 – 7 =	
38.	31 – 7 =	
39.	22 – 9 =	
40.	32 – 9 =	
41.	38 – 9 =	
42.	37 – 8 =	
43.	28 – 9 =	
44.	27 – 8 =	

Name _____ Date _____

1. Solve vertically. Draw a place value chart and chips to model each problem. Show how you change 1 ten for 10 ones, when necessary.

a. 31 – 19 = _____	b. 46 – 24 = _____
c. 51 – 33 = _____	d. 67 – 49 = _____
e. 66 – 48 = _____	f. 77 – 58 = _____

2. Solve 31 – 27 and 25 – 15 vertically using the space below. Circle to tell if the number sentence is true or false.

True or False

31 – 27 = 25 – 15

3. Solve 78 – 43 and 81 – 46 vertically using the space below. Circle to tell if the number sentence is true or false.

True or False

78 – 43 = 81 – 46

4. Mrs. Smith has 39 tomatoes in her garden. Mrs. Thompson has 52 tomatoes in her garden. How many fewer tomatoes does Mrs. Smith have than Mrs. Thompson?

Name _____ Date _____

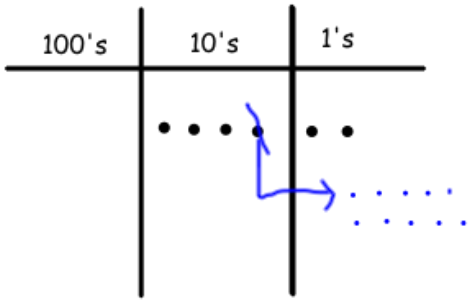
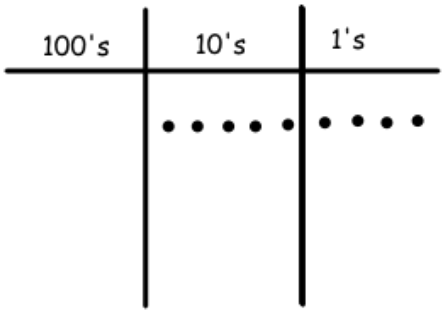
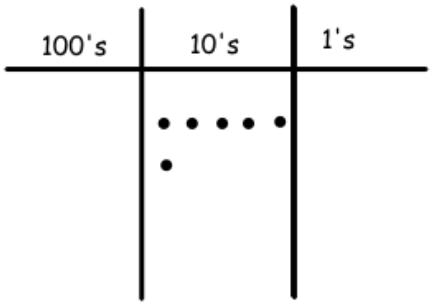
Solve vertically. Draw a place value chart and chips to model each problem. Show how you change 1 ten for 10 ones, when necessary.

1. 75 – 28 = _____

2. 63 – 35 = _____

Name _____ Date _____

1. Solve vertically. Use the place value chart and chips to model each problem. Show how you change 1 ten for 10 ones, when necessary. The first one has been started for you.

a. 42 – 26 = _____	
b. 54 – 28 = _____	
c. 60 – 17 = _____	

2. Solve vertically. Draw a place value chart and chips to model each problem. Show how you change 1 ten for 10 ones, when necessary.

a. 31 – 19 = _____	b. 47 – 24 = _____
c. 51 – 39 = _____	d. 67 – 44 = _____
e. 76 – 54 = _____	f. 82 – 59 = _____