Topic A

Strategies for Adding and Subtracting Within 1,000

2.NBT.7, 2.NBT.8, 2.NBT.9

Focus Standards:

2.NBT.7 Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.

2.NBT.8 Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900.

2.NBT.9 Explain why addition and subtraction strategies work, using place value and the properties of operations. (Explanations may be supported by drawings or objects.)

Instructional Days: 7

Coherence -Links from: G1–M6 Place Value, Comparison, Addition and Subtraction to 100
-Links to: G3–M2 Place Value and Problem Solving with Units of Measure

In Topic A, students practice the simplifying strategies they learned in Module 4, but with numbers up to 1,000. They will be asked to consider which strategy is most efficient for each problem they encounter.

In Lesson 1, students relate 100 more, 100 less, 10 more, and 10 less to addition and subtraction. They recognize that they must still add and subtract like units, and that the digit in the hundreds place changes when adding and subtracting 100, just as the digit in the tens place changes when adding or subtracting 10. Students see numbers in terms of place value units: 290 – 100 is 2 hundreds 9 tens minus 1 hundred. They learn to record the addition and subtraction of multiples of 100 using arrow notation (i.e., the arrow way).

In Lesson 2, students add and subtract multiples of 100 by counting on by hundreds. For example, when adding 200 to 320, they may count up from 320: 420, 520. Students also develop flexibility in using related addition problems. For example, to solve 519 – 200, one student might think “5 hundreds minus 2 hundreds is 3 hundreds, plus 19 is 319,” while another starts at 200, adds on 19 and then 3 hundreds to reach 519, so 319.
In Lessons 3 and 4, students continue to add and subtract multiples of 100 with the added complexity of some tens. Problems are chosen so that at first the tens digit is close to a multiple of 100 (e.g., 190, 290, 380) to make it easier to form the next hundred by decomposing addends. This prompts students to analyze and use relationships between numbers to develop a variety of simplifying strategies.

Students also use arrow notation to record their mental math. First, they add a multiple of 100, and then count on by multiples of 10 to find the total (as shown at right). Lesson 3 focuses on addition, while Lesson 4 emphasizes related strategies for subtraction.

In Lesson 5, students apply the use of number bonds to decompose larger numbers, just as they did with numbers within 100. For example, when solving $320 + 290$, they can break $320$ into $10$ and $310$ to make $310 + 300 = 610$ (as shown at right), just as they would have decomposed to add $32$ and $29$ in Module 4. They realize the problem can be conceived of as $32$ tens + $29$ tens. Note that arrow notation can also be used to solve $320 + 290$ by first adding $200$, then $80$, and then $10$, or by adding $300$ and then subtracting $10$.

Students also work with problems such as $298 + 137$, using a number bond to decompose $137$ into $2$ and $135$, thus creating the equivalent but easier equation $300 + 135 = 435$.

In Lesson 6, the ease of subtracting a multiple of $100$ is highlighted again, as students extend their work from Module 4 using compensation (i.e., the associative property) for subtraction. Students may add or subtract a multiple of $10$ to make an equivalent problem that involves no renaming. For example, when subtracting $610 - 290$, the same number, $10$, can be added to both numbers to create a multiple of $100$ (as shown at right). Students also solve problems such as $451 - 195$, adding $5$ to both the minuend and subtrahend to make $456 - 200$.

Topic A closes with Lesson 7, which provides students the opportunity to solidify their new skills. They confront a variety of problems, solve them, and then share their solution strategies. Through spirited discussion, students critique the work of their peers while deepening their understanding of various strategies.

The strategies taught in Topic A are designed to develop students’ conceptual understanding of addition and subtraction using models, drawings, properties of operations, and strategies based on place value. At the same time, students relate these strategies to written methods such as arrow notation and number bonds. This sets the stage for flexible thinking as students move into composing and decomposing units in Topics B and C.
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Lesson 1

Objective: Relate 10 more, 10 less, 100 more, and 100 less to addition and subtraction of 10 and 100.

Suggested Lesson Structure

- Fluency Practice (10 minutes)
- Application Problem (8 minutes)
- Concept Development (32 minutes)
- Student Debrief (10 minutes)

Total Time (60 minutes)

Fluency Practice (10 minutes)

- Place Value 2.NBT.1, 2.NBT.5 (6 minutes)
- More/Less 2.NBT.5 (4 minutes)

Place Value (6 minutes)

Materials: (T) Place value chart (S) Personal white boards, place value charts

Note: Practicing place value skills will prepare students for adding and subtracting 10 and 100 in the lesson.

T: (Project place value chart to the hundreds.) Show 6 ones in chips. Write the number below it.
S: (Draw 6 chips in the ones column and write 6 below it.)
T: Show 1 chip in the tens column and write the number below it.
S: (Draw 1 chip in the tens column and write 1 at the bottom of the tens column.)
T: Say the number the Say Ten way.
S: 1 ten 6.
T: Say the number in standard form.
S: 16.
T: Add 1 chip to your tens column. What is 10 more than 16?
S: 26.
T: The Say Ten way?
S: 2 tens 6.
T: Now add 1 chip to your hundreds column. What is 100 more than 26?
S: 126.
Lesson 1

Relate 10 more, 10 less, 100 more, and 100 less to addition and subtraction of 10 and 100.

Date: 10/23/13

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Lesson 1

T: The Say Ten way?
S: 1 hundred 2 tens 6.
T: Cross out a chip in the tens column. What is 10 less than 126?
S: 116.
T: The Say Ten way?
S: 1 hundred 1 ten 6.
T: Cross out a chip in the hundreds column. What is 100 less than 116?
S: 16.

Continue with the following possible sequence: 254, 310, 505.

More/Less (4 minutes)

Note: Practicing giving 10 or 100 more or less will prepare students to add and subtract 10 and 100 fluently.

T: For every number I say, you say a number that is 10 more. When I say 5, you say 15. Ready?
T: 10.
S: 20.
T: 5.
S: 15.

Continue with the following possible sequence: 19, 67, 90, 95, 110, 111, 139, 156, 256, 299, 305, 319.

T: Now for every number I say, you say a number that is 10 less. When I say 20, you say 10. Ready?
T: 20.
S: 10.
T: 22.
S: 12.

Continue with the following possible sequence: 19, 78, 100, 107, 182, 201, 299, 312, 321.

T: Let's try saying 100 more for every number I say. When I say 56, you say 156. Ready?
T: 56.
S: 156.
T: 37.
S: 137.

Continue with the following possible sequence: 80, 8, 88, 288, 300, 333, 566, 900.

T: Now for every number I say, you say a number that is 100 less. When I say 150, you say 50. Ready?
T: 150.
S: 50.
T: 159.
S: 59.
Lesson 1

Relate 10 more, 10 less, 100 more, and 100 less to addition and subtraction of 10 and 100.

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5.A.6

Application Problem (8 minutes)

The shelter rescued 27 kittens in June. In July, it rescued 11 more. In August, it rescued 40 more.

How many kittens did the shelter rescue during those 3 months?

If 64 of those kittens found homes by August, how many still needed homes?

Note: This problem is designed to lead into the Concept Development for the day’s lesson, relating 10 more and 10 less to addition and subtraction. Students will complete this problem independently to provide insight into the kinds of mental strategies they currently use.

Review the RDW procedure for problem solving: Read the problem, draw and label, write a number sentence, and write a word sentence. The more students participate in reasoning through problems with a systematic approach, the more they internalize those behaviors and thought processes.

(Excerpted from “How to Implement A Story of Units.”)

Concept Development (32 minutes)

Materials: (T) Set of sentence frames as shown to the right (S) 7 hundreds disks, 9 tens disks, 9 ones disks, place value charts

Post more sentence frames on one side of the board and less frames on the other side. Pass out charts and disks.

T: Use your number disks to show me 157 on your place value chart.
S: (Show 1 hundred 5 tens 7 ones.)
T: Show me 10 more.
S: (Add a tens disk to show 1 hundred 6 tens 7 ones.)
T: Use a sentence frame to describe adding 10 to 157.
S: 10 more than 157 is 167. → 167 is 10 more than 157.
T: What did you do to change 157?
S: We added 10 to the tens place. → We added 1 ten to 5 tens.
T: Give me an addition sentence starting with 157.
S: 157 + 10 = 167.

10 more than ___ is ___. 10 less than ___ is ___.
___ is 10 more than ___. ___ is 10 less than ___.
100 more than ___ is ___. 100 less than ___ is ___.
___ is 100 more than ___. ___ is 100 less than ___.

MP.8

NOTES ON MULTIPLE MEANS OF REPRESENTATION:

Use different models to demonstrate the change in 10 more, 10 less, 100 more, 100 less.
- Use Hide Zero cards to show the changes in place value.
- Use concrete objects other than disks, such as bundled straws or base ten blocks, to show new groups of hundreds and/or tens.

Continue with the following possible sequence: 168, 170, 270, 277, 400, 404, 434.
Lesson 1

Relate 10 more, 10 less, 100 more, and 100 less to addition and subtraction of 10 and 100.

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NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

Listen intently as students use place value language to talk with their partners. Use number disks and place value charts to help students navigate the following vocabulary: place value, hundreds, tens, ones, digit, value, and unit. Add new vocabulary to the wall and point to words accompanied by a visual.

T: Start with 167.

(Repeat the process for 10 less than 157.)

T: Show me 157 again. (Pause as students reset their place value charts.)
T: Show me 100 more than 157.
S: (Add a hundreds disk to show 2 hundreds 5 tens 7 ones.)
T: Use a sentence frame to describe adding 100 to 157.
S: 257 is 100 more than 157. \(\rightarrow\) 100 more than 157 is 257.

T: What did you do to change 157?
S: We added another hundred. \(\rightarrow\) We added 1 hundred to 1 hundred.
T: Be specific. Where did you add the hundred?
S: To the hundreds place.
T: Yes!
T: Give me an addition sentence starting with 157.
S: 157 + 100 = 257.
T: Start with 257.
S: 257 = 100 + 157. \(\rightarrow\) 257 = 157 + 100.

Repeat the process for 100 less than 157.

T: Talk with your partner. Use place value language to explain what you understand about 10 more, 10 less, 100 more, and 100 less. (Allow about one minute for discussion.)
S: We already knew about 10 more and 10 less, and now 100 acts the same. \(\rightarrow\) 10 less and 100 less is the same as taking away 10 or 100. \(\rightarrow\) We have to subtract and add the same units, so the tens place changes when we add or subtract 10. The same for the hundreds place.
T: (Collect the number disks and charts.) Listen as I say a number pattern. Raise your hand when you know the more or less rule for my pattern.
T: For example, if I say, “121, 131, 141, 151, 161,” you say, “10 more.” Wait for my signal. Ready?
T: 135, 145, 155, 165, 175.
S: 10 more!
S: 10 less!

Continue until students can readily identify the rule.

T: Take out your personal boards. Now I’ll write a series of numbers on the board. You write the rule and the next three numbers. The rules are + 10, – 10, + 100, and – 100.
T: Turn your board over when you have written your answer. Wait until I say, “Show me.” Ready?
Lesson 1

T: (Write 67, 57, 47, ___, ___, ___. Pause.) Show me.
S: (Show – 10 and 37, 27, 17.)

Continue to give students practice with each rule.

In this next activity, model arrow notation by recording the following sequence on the board step by step as students write each answer.

It will look like this: \(542 \rightarrow \_ \rightarrow \_ \rightarrow \_ \rightarrow \_ \rightarrow \_\).

T: Let’s try something different. (Write 542 \rightarrow ___ on the board.) What is 542 + 100? Show me.
S: (Write 642.)
T: – 10? (Continue to record the sequence by filling in 642 and writing \(\rightarrow 10\) ___.)
S: (Write 632.)
T: – 10? (Fill in 632 and write \(\rightarrow 10\) ___.)
S: (Write 622.)
T: – 100? (Fill in 622 and write \(\rightarrow 100\) ___.)
S: (Write 522.)
T: – 100? (Fill in 522 and write \(\rightarrow 100\) ___.)
S: (Write 422.)

T: (Point to the completed sequence on the board.) In the last module, we used this simplifying strategy; we called it the arrow way. Talk to your partner about how this example is the same as and different from the ones we’ve done before.

S: Instead of ones and tens, this is tens and hundreds. \(\rightarrow\) It’s just different place values. Everything else is the same. \(\rightarrow\) It shows that you’re changing the ones or the tens place and whether it’s more or less.

If necessary or if time permits, model another example with the following problem:

\[367 - 220.\]

\[224 - 100 \rightarrow 100 \rightarrow 10 \rightarrow 10 \rightarrow 10.\]

Problem Set (10 minutes)

Students should do their personal best to complete the Problem Set within the allotted 10 minutes. Some problems do not specify a method for solving. This is an intentional reduction of scaffolding that invokes MP.5, Use Appropriate Tools Strategically. Students should solve these problems using the RDW approach used for Application Problems.

For some classes, it may be appropriate to modify the assignment by specifying which problems students should work on first. With this option, let the careful sequencing of the problem set guide your selections so that problems continue to be scaffolded. Balance word problems with other problem types to ensure a range
of practice. Assign incomplete problems for homework or at another time during the day.

**Student Debrief (10 minutes)**

**Lesson Objective:** Relate 10 more, 10 less, 100 more, and 100 less to addition and subtraction of 10 and 100.

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 makes Problems 1(e) and (f) more challenging? In Problem 1(e), does 10 more mean we should add 10 to 319? Why not? In Problem 1(f), why did you add 100 to 499 when it says 100 less?
- What do you need to know to complete each pattern in Problem 2?
- In Problem 3(b), what total quantity did you subtract from 187? How can you write it as an equation?
- In Problem 4(b), what total quantity did you add to 323 to arrive at 400? How did you show the missing addend using the arrow way? How can we show it as an equation?
- Which simplifying strategy did we use today to record a sequence of numbers? How is it helpful?
- What important connection did we make today? What are we actually doing when we talk about 10 more, 10 less, 100 more, 100 less than a number?
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.
1. Complete each more or less statement.
   a. 10 more than 175 is _______.
   b. 100 more than 175 is _______.
   c. 10 less than 175 is _______.
   d. 100 less than 175 is _______.
   e. 319 is 10 more than _______.
   f. 499 is 100 less than _______.
   g. _______ is 100 less than 888.
   h. _______ is 10 more than 493.
   i. 898 is ___________ than 998.
   j. 607 is ___________ than 597.
   k. 10 more than 309 is _______.
   l. 309 is __________ than 319.

2. Complete each regular number pattern.
   a. 170, 180, 190, ______, ______, ______
   b. 420, 410, 400, ______, ______, ______
   c. 789, 689, ______, ______, ______, 289
   d. 565, 575, ______, ______, ______, 615
   e. 724, ______, ______, ______, 684, 674
   f. ______, ______, ______, 886, 876, 866
3. Complete each statement.

   a. $389 \rightarrow \underline{\hspace{2cm}} + 10 \rightarrow \underline{\hspace{2cm}} + 100 \rightarrow \underline{\hspace{2cm}}$

   b. $187 \rightarrow \underline{\hspace{2cm}} - 100 \rightarrow \underline{\hspace{2cm}} - 10 \rightarrow \underline{\hspace{2cm}}$

   c. $609 \rightarrow \underline{\hspace{2cm}} - 10 \rightarrow \underline{\hspace{2cm}} + 10 \rightarrow 499 \rightarrow \underline{\hspace{2cm}} + 10 \rightarrow \underline{\hspace{2cm}} + 100 \rightarrow 519$

   d. $512 \rightarrow \underline{\hspace{2cm}} - 10 \rightarrow \underline{\hspace{2cm}} - 10 \rightarrow \underline{\hspace{2cm}} + 100 \rightarrow \underline{\hspace{2cm}} + 100 \rightarrow \underline{\hspace{2cm}} + 10 \rightarrow \underline{\hspace{2cm}}$

4. Solve using the arrow way.

   a. $212 + 106 = \underline{\hspace{2cm}}$

   b. $323 + \underline{\hspace{2cm}} = 400$

   c. $\underline{\hspace{2cm}} + 511 = 732$
Name ____________________________ Date _____________

Solve using the arrow way.

1. 448 + 206 = ____________

2. 679 + ____________ = 890

3. ____________ + 765 = 945
Name _________________________________  Date ________________

1. Complete each more or less statement.
   a. 10 more than 222 is _______.  
   b. 100 more than 222 is _______.  
   c. 10 less than 222 is _______.  
   d. 100 less than 222 is _______.  
   e. 515 is 10 more than _______.  
   f. 299 is 100 less than _______.  
   g. _______ is 100 less than 345.  
   h. _______ is 10 more than 397.  
   i. 898 is ___________ than 998.  
   j. 607 is ___________ than 597.  
   k. 10 more than 309 is _______.  
   l. 309 is ___________ than 319.

2. Complete each regular number pattern.
   a. 280, 290, _______, _______, _______, 330
   b. 530, 520, 510, _______, _______, _______
   c. 643, 543, _______, _______, _______, 143
   d. 681, 691, _______, _______, _______, 731
   e. 427, _______, _______, _______, 387, 377
   f. _______, _______, _______, 788, 778, 768
3. Complete each statement.

a. \[235 \rightarrow \_ + 10 \rightarrow \_ + 100 \rightarrow \_\]

b. \[391 \rightarrow \_ - 100 \rightarrow \_ - 10 \rightarrow \_\]

c. \[417 \rightarrow \_ - 10 \rightarrow \_ - 100 \rightarrow 297\]

d. \[311 \rightarrow \_ - 10 \rightarrow \_ + 100 \rightarrow \_ + 100 \rightarrow \_ + 10 \rightarrow \_\]

4. Solve using the arrow way.

a. \[376 + 103 = \_\]

b. \[290 + \_ = 400\]

c. \[\_ + 712 = 852\]
Lesson 2

Objective: Add and subtract multiples of 100 including counting on to subtract.

Suggested Lesson Structure

- Application Problem (6 minutes)
- Fluency Practice (10 minutes)
- Concept Development (34 minutes)
- Student Debrief (10 minutes)
- Total Time (60 minutes)

Application Problem (6 minutes)

Max has 42 marbles in his marble bag after he added 20 marbles at noon. How many marbles did he have before noon?

Note: This problem gives students a chance to apply their new learning and to practice an add to with start unknown problem, as in G2–Module 4. Many students will say 62 marbles. Encourage them to represent the problem using a number bond if they are struggling. This way, they will see the part–whole relationship modeled differently.

Fluency Practice (10 minutes)

- Place Value 2.NBT.1, 2.NBT.7 (7 minutes)
- How Many More Hundreds? 2.NBT.7 (3 minutes)

Place Value (7 minutes)

Materials: (T) Place value chart (S) Personal white boards, place value charts

Note: Practicing place value skills prepares students for adding and subtracting multiples of 100 in the lesson.

T: (Project place value chart to the hundreds.) Show 1 hundred, 5 tens, and 2 ones in chips on a place value chart. Write the number below it.

S: (Draw 1 hundred, 5 tens, and 2 ones in chips on a place value chart.)

T: Say the number in unit form.

S: 1 hundred 5 tens 2 ones.
Lesson 2: Add and subtract multiples of 100 including counting on to subtract.

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Lesson 2:

Add and subtract multiples of 100 including counting on to subtract.

T: Say the number in unit form using only tens and ones.
S: 15 tens 2 ones.
T: Say the number in unit form using only hundreds and ones.
S: 1 hundred 52 ones.
T: Say the number in standard form.
S: 152.
T: Add 2 hundreds to your chart. How many hundreds do you have now?
S: 3 hundreds.
T: What is 200 more than 152?
S: 352.
T: Add 3 hundreds to 352. How many hundreds do you have now?
S: 6 hundreds.
T: What is 300 more than 352?
S: 652.
T: Now subtract 4 hundreds from 652. What is 400 less than 652?
S: 252.

Continue with the following possible sequence: + 500, – 100, + 300, – 900.

How Many More Hundreds? (3 minutes)

Note: Practicing subtracting multiples of 100 prepares students for the lesson.

T: If I say 300 – 200, you say 100. To say it in a sentence, you say, “100 more than 200 is 300.” Ready?
T: 300 – 200.
S: 100.
T: Say it in a sentence.
S: 100 more than 200 is 300.


Concept Development (34 minutes)

Materials: (T) Hide Zero cards (S) Personal whiteboards, 9 each of ones, tens, and hundreds disks

Draw a place value chart on the board. Show 125 using Hide Zero cards.

T: Yesterday we added and subtracted 1 hundred. Today, let’s add 2 hundreds, then 3 hundreds, and more!
T: How many do you see?
Lesson 2: Add and subtract multiples of 100 including counting on to subtract.

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S: 125!
T: (Separate the cards.) Say the number in unit form.
S: 1 hundred 2 tens 5 ones.
T: Show me this number with your disks.
S: (Students show 1 hundred, 2 tens, and 5 ones on their charts.)
T: (Draw the disks on the board. Change hundreds card to 300, and put cards together.) How much do you see?
S: 325!
T: How can you show this change using your place value disks?
S: Add 2 more hundreds.
T: Do it.
T: Now I am going to add 2 more hundreds. You do it too. Turn and talk, what will happen to the number when I add 2 hundreds?
S: The number in the hundreds place will get bigger by 2. The number will get bigger by 200. The ones and tens digits will stay the same. It will be 525.
T: (Draw 2 more hundreds.) What is 325 + 200?
S: 525!
T: Say it in unit form.
S: 5 hundreds, 2 tens, 5 ones!
T: If I asked you to add 3 hundreds to 450, how could you solve that?
S: Count on by a hundred 3 times. Change the 4 to 7 because 4 hundreds plus 3 hundreds is 7 hundreds. Add 3 hundreds disks on the place value chart.
T: Let's show that on the board using both simplifying strategies, the arrow way and number bonds. I know many of you can just do mental math!
T: I can add 3 hundreds using the arrow way, as we did yesterday. (Demonstrate and involve the students as you write.) I can also break apart the hundreds and tens with a number bond, add the hundreds, and then add the tens. (Demonstrate and involve the students as you write.)
T: No matter which way I write it, when I add hundreds to a number, the tens and ones stay the same!
T: Now it's your turn. On your personal board, solve 147 + 200. Show me your board when you have an answer.

Repeat this process with examples as needed: 276 + 300, 382 + 400, and 400 + 516.
Lesson 2:
Add and subtract multiples of 100 including counting on to subtract.

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NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:
Invite a student to be in charge of the place value chart while you work with the Hide Zero cards, or vice versa.
The number bond’s decomposition is one choice for solving the problem that may not work for some students as a solution strategy, but is beneficial for all to understand. Students should be encouraged to make connections between different solution strategies and to choose what works best for a given problem or for their way of thinking.

(Show 725 using Hide Zero cards and draw disks on the place value chart on the board.)

T: Now, let’s subtract 2 hundreds, then 3 hundreds, and more!
T: How many do you see?
S: 725!
T: Say it in unit form.
S: 7 hundreds 2 tens 5 ones!
T: (Replace the 700 card with 500 and erase 2 hundreds from the chart.) How many do you see?
S: 5 hundreds 2 tens 5 ones.
T: I am going to subtract 2 more hundreds. Turn and talk: What will happen to the number when I subtract 2 hundreds?
S: The number in the hundreds place will get smaller by 2. → The number will get smaller by 200. → It will be 325 because 5 hundreds minus 2 hundreds equals 3 hundreds. The other digits stay the same.
T: (Subtract 2 hundreds.) What is 525 – 200?
S: 325!
T: Say it in unit form.
S: 3 hundreds 2 tens 5 ones!
T: Okay, now let’s subtract 3 hundreds from 582. Take a moment and work on your personal board to solve 582 – 300. (Show the work on the board as students work out this first problem using number bonds and the arrow way.)

T: (Model both the number bonds and arrow methods from their work.) We have an extra simplifying strategy when we are subtracting. We can count up from the part we know.

T: What is the whole?
S: 582.
T: What is the part we know?

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<th>The Arrow Way</th>
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<td>582 - 300</td>
</tr>
<tr>
<td>[ 500 \cdot 3 = 1500 ]</td>
<td></td>
</tr>
<tr>
<td>[ 200 + 82 = 282 ]</td>
<td>[ 482 - 100 = 382 ]</td>
</tr>
<tr>
<td>[ 500 - 300 = 200 ]</td>
<td>[ 382 - 100 = 282 ]</td>
</tr>
<tr>
<td>582 - 300</td>
<td>282</td>
</tr>
</tbody>
</table>
Lesson 2

Add and subtract multiples of 100 including counting on to subtract.

Student Debrief (10 minutes)

Lesson Objective: Add and subtract multiples of 100 including counting on to subtract.

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.

- In Problem 1(c), 400 + 374, what happened to 374 when you added 4 hundreds? What happened to the other digits?
Lesson 2: Add and subtract multiples of 100 including counting on to subtract.

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Lesson 2

- Which strategy did you use to solve the sequence in Problem 1(e)? Why is the arrow way a good choice when you have a missing part, or addend?
- If you were using number disks to show Problem 2(b), 667 – 500, what change would you make on your place value chart? What would stay the same?
- Explain to your partner how you solved the sequence in Problem 2(c). How could you show the missing part with an addition problem? How could you count on from the part you know?
- How was solving Problem 3(a) different from solving Problem 3(b)? Did you add hundreds in both situations? For each problem, did you find the part or whole?
- Explain to your partner which strategies you used to solve Problems 3(c) and (d). Did you use the same strategy for both problems? Can you think of another way to solve these problems?

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.
Lesson 2: Add and subtract multiples of 100 including counting on to subtract

Name ____________________________ Date ________________

1. Solve using place value strategies. Use the arrow way or mental math and record your answers. You may use scratch paper if you like.

   a. 2 hundreds 4 tens + 3 hundreds = ______ hundreds _____ tens

      240 + 300 = ______

   b. 340 + 300 = _____   140 + 500 = _____   200 + 440 = _____

   c. 400 + 374 = _____   274 + 500 = _____   700 + 236 = _____

   d. 571 + _____ = 871   _____ + 349 = 749   96 + _____ = 696

   e. _____ + 562 = 862   300 + _____ = 783   600 + _____ = 726

2. Solve using place value strategies. Use the arrow way or mental math and record your answers. You may use scratch paper if you like.

   6 hundreds 2 ones - 4 hundreds = _____ hundreds _____ tens _____ ones

   602 - 400 = ______

   a. 640 - 200 = _____   650 - 300 = _____   750 - _____ = 350

   b. 462 - 200 = _____   667 - 500 = _____   731 - 400 = _____

   c. 431 - _____ = 131   985 - ______ = 585   768 - ______ = 68

   d. _____ - 200 = 662   ______ - 300 = 653   734 - ______ =234
3. Fill in the blank to make true number sentences. Use place value strategies, number bonds, or the arrow way to solve.

   a. 200 more than 389 is ___________.

   b. 300 more than ___________ is 568.

   c. 400 less than 867 is ___________.

   d. ___________ less than 962 is 262.

4. Jessica’s lemon tree has 526 lemons. She gave away 300 lemons. How many does she have left? Use the arrow way to solve.
Solve using place value strategies. Use the arrow way or mental math and record your answers. You may use scratch paper if you like.

1. \(760 - 500 = \___\) \(880 - 600 = \___\) \(990 - \___ = 590\)

2. \(534 - 334 = \___\) \(\___ - 500 = 356\) \(736 - \___ = 136\)
1. Solve using place value strategies. Use the arrow way or mental math and record your answers. You may use scratch paper if you like.

   a. 4 hundreds 5 tens + 2 hundreds = ______ hundreds _____ tens

      450 + 200 = _____

   b. 220 + 300 = _____ 230 + 500 = _____ 200 + 440 = _____

   c. 400 + 368 = _____ 386 + 500 = _____ 700 + 239 = _____

   d. 119 + _____ = 519 _____ + 272 = 872 62 + _____ = 562

2. Solve using place value strategies. Use the arrow way or mental math and record your answers. You may use scratch paper if you like.

   5 hundreds 8 ones - 3 hundreds = _____ hundreds _____ tens _____ ones

   508 - 300 = _____

   a. 430 - 200 = _____ 550 - 300 = _____ 860 - _____ = 360

   b. 628 - 200 = _____ 718 - 500 = _____ 836 - 400 = _____

   c. 553 - _____ = 153 981 - ______ = 381 827 - ______ = 27
3. Fill in the blank to make true number sentences. Use place value strategies, number bonds, or the arrow way to solve.

   a. 300 more than 215 is __________.

   b. 300 more than __________ is 668.

   c. 500 less than 980 is __________.

   d. __________ less than 987 is 487.

   e. 600 __________ than 871 is 271.

   f. 400 __________ than 444 is 844.
Lesson 3

Objective: Add multiples of 100 and some tens within 1,000.

Suggested Lesson Structure

- Application Problem (5 minutes)
- Fluency Practice (11 minutes)
- Concept Development (34 minutes)
- Student Debrief (10 minutes)

Total Time (60 minutes)

Application Problem (5 minutes)

A children’s library sold 27 donated books. Now they have 48. How many books were there to begin with?

Note: This problem is a take from with start unknown. Because selling invites subtraction, the problem may prove to be a challenge for some students. The calculation itself involves using their place value strategies from G2–Module 4, allowing them to choose between using a vertical method, a number bond, or the arrow way.

Fluency Practice (11 minutes)

- How Many More to Make 100? 2.NBT.7 (2 minutes)
- Sprint: Adding Multiples of Ten and Some Ones 2.NBT.7 (9 minutes)

How Many More to Make 100? (2 minutes)

Note: Students practice mentally making 100.

T: How many more ones does 8 need to make 10?
S: 2 ones.
T: Say the addition number sentence.
S: 8 + 2 = 10.
T: How many more tens does 8 tens need to make 10 tens?
S: 2 tens.
T: Say the addition number sentence.
Lesson 3:

Add multiples of 100 and some tens within 1,000.

Date: 10/23/13

S: 8 tens + 2 tens = 10 tens.
T: How much more does 80 need to make 100?
S: Twenty.
T: Say the addition sentence.
S: 80 + 20 = 100.

Continue with the following sequence: 16, 16 tens and 160, 28, 28 tens and 280.)

Sprint: Adding Multiples of Ten and Some Ones (9 minutes)

Materials: (S) Adding Multiples of Ten and Some Ones Sprint

Note: Students review adding multiples of ten and some ones in preparation for the lesson.

Concept Development (34 minutes)

Materials: (S) Personal white boards, place value chart insert

Problem 1: 420 + 100, 420 + 110

T: (While speaking, record using the arrow way.) 420 + 100 is...?
S: 520.
T: 420 + 100 (pause) + 10 is...?
S: 530.
T: How much did we add in all?
S: 110.
T: Say the complete number sentence for our last problem.
S: 420 + 110 = 530.
T: Turn and talk to your partner about the steps in adding 110 to 420.
S: We first added 1 hundred then 1 ten. → We chopped 110 into two parts, a hundred and a ten and we added each one to make it easier.

Problem 2: 550 + 200, 550 + 250, 550 + 260

T: Let’s try another. (Record as before.) 550 + 200 is...?
S: 750.
T: 550 + 200 (pause) + 50 is...?
S: 800.
T: Add another 10. How many now?
S: 810.
Lesson 3

Add multiples of 100 and some tens within 1,000.

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T: Talk with your partner. What just happened?
S: We started with 550. We added 200 and then added 50 to make 8 hundred. Then we added 10 more to get 810. We added 260 in all, one chunk at a time.

Problem 3: 280 + 200, 280 + 220, 280 + 230

T: (Write 280 on the board.)
T: Add 200. How many now?
S: 480.
T: How many more to get to the next hundred? Talk with a partner.
S: Two tens. Twenty.
T: Now we have 500. Let’s show this the arrow way. Do what I do on your boards. (Draw as shown at right.)
S: (Write on their boards.)
T: (Show the same on the board.) We just added 280 + 220. Let’s write this using the arrow way. (Write on the board as shown at right.)
T: First we added 200 to 280, and then we added another 20 to compose the new hundred.
T: Now let’s add another 10. Show me on your charts.
S: (Add another 10 on charts.)
T: What do we have?
S: 510!
T: This is the same as 280 + 230. First we added 200, then composed a new hundred, and then we added 10 to get 510. Let’s show this with the arrow way (shown above right).

Problem 4: 470 + 200, 470 + 210, 470 + 230

In this part, students record their answers on their boards and then turn them over. When most students are ready, say, “Show me.” Students hold up their boards for a visual check. Then they erase their boards and get ready for the next problem.

T: 400 + 200. Show me.
S: (Show 600 on their boards.)
T: 470 + 200. Show me.
S: (Show 670 on their boards.)
Lesson 3: Add multiples of 100 and some tens within 1,000.

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T: 470 + 210? Talk with a partner first.

S: I added 7 tens and 1 ten to make 8 tens, and then 4 hundreds and 2 hundreds to make 6 hundreds. That’s 680. \( \rightarrow \) I added 400 + 200 and then 70 + 10, and 600 plus 80 equals 680. \( \rightarrow \) I used the arrow way and added 200 to 470, which is 670, and then added on 10 more, so 680.

T: Show me.

S: (Show 680 on their boards.)

T: 470 + 230?

S: That’s like the problem we did before!

T: Yes! We can find 470 + 230 using 470 + 210 to help us.

T: How much more do we need to get from 210 to 230?

S: 20 more.

T: What was 470 + 210?

S: 680!

T: 20 more? (Demonstrate as shown at right.)

S: 700! (Demonstrate as shown at right.)

T: Now try 470 + 250. Talk with your partner about how you solved it.

S: I did 400 + 200 and then did 70 + 30 to get another hundred, and then added the 20 more to get 720. \( \rightarrow \) I added 470 and 200, and then 30 more to get 700, and then the leftover 20 to get 720. \( \rightarrow \) I added 470 + 230 like we did before, and then I just added the last 20.

Problem 5: 590 + 240

T: I notice something interesting about the first number. (Point to 590 on the board.) I wonder if anyone else notices the same thing.

S: It’s close to 600! \( \rightarrow \) It’s just 10 away from 600. \( \rightarrow \) I can make the next 100 to help me solve the problem.

T: Let’s try it. You write what I write. (Record as shown at right.)

T: How much do we have left in 240 after using 10?

S: 230.

Guide students through adding the hundreds and tens the arrow way, asking for their input as you go. When they have worked through this problem, invite them to complete 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 solve these problems using the RDW approach used for Application Problems.

Student Debrief (10 minutes)

Lesson Objective: Add multiples of 100 and some tens within 1,000.

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.

- For Problem 1(b), how does knowing 470 + 400 help you to solve the other problems in that set?
- In Problem 1, what do you notice about the second problem in each set?
- Share with a partner: How did you use the arrow way to solve Problem 1(c), 650 + 280? How did you decompose 280 to add?
- For Problems 2(a) and (b), how did the first problem in each set help you to solve the next two?
- Share with a partner: For Problem 2(c), what was the most efficient way to add 280 + 260? Did you agree or disagree with your partner? Is there more than one way to solve?
- How is thinking about the make ten strategy helpful when composing a new hundred?
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.
### Lesson 3: Add multiples of 100 and some tens within 1,000.

**Date:** 10/23/13

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### NYS COMMON CORE MATHEMATICS CURRICULUM

Lesson 3 Sprint 2•5

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Lesson 3: Add multiples of 100 and some tens within 1,000.

Date: 10/23/13

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<td>55 + 42 =</td>
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<td>32 + 45 =</td>
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Lesson 3: Add multiples of 100 and some tens within 1,000.

Date: 10/23/13

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<td>a.</td>
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<td>380 + 220</td>
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<td>b.</td>
<td>470 + 400</td>
<td>470 + 430</td>
<td>470 + 450</td>
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<tr>
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<td>d.</td>
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<td>430 + 370</td>
<td>430 + 390</td>
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2. Solve using the arrow way or mental math. Use scratch paper if needed.

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<td>a. 490 + 200 = _____</td>
<td>210 + 490 = _____</td>
<td>490 + 220 = _____</td>
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<tr>
<td>b. 230 + 700 = _____</td>
<td>230 + 710 = _____</td>
<td>730 + 230 = _____</td>
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<td>c. 260 + 240 = _____</td>
<td>260 + 260 = _____</td>
<td>280 + 260 = _____</td>
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<tr>
<td>d. 160 + 150 = _____</td>
<td>370 + 280 = _____</td>
<td>380 + 450 = _____</td>
</tr>
<tr>
<td>e. 430 + 290 = _____</td>
<td>660 + 180 = _____</td>
<td>370 + 270 = _____</td>
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3. Solve.

a. 66 tens + 20 tens = _________ tens
b. 66 tens + 24 tens = _________ tens

c. 66 tens + 27 tens = _________ tens
d. 67 tens + 28 tens = _________ tens

What is the value of 86 tens? _________
Name ________________________________     Date ______________

1. Solve each using the arrow way.

   a.  
      \[
      \begin{align*}
        440 + 300 \\
        360 + 440 \\
        440 + 380 \\
        440 + 300 \\
      \end{align*}
      \]

   b.  
      \[
      \begin{align*}
        670 + 230 \\
        680 + 240 \\
        250 + 660 \\
        \end{align*}
      \]
1. Solve each using the arrow way.

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<tr>
<td>a.</td>
<td>260 + 200</td>
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<td>320 + 400</td>
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<tr>
<td>c.</td>
<td>550 + 200</td>
<td>550 + 250</td>
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<tr>
<td>d.</td>
<td>230 + 400</td>
<td>230 + 470</td>
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2. Solve using the arrow way or mental math. Use scratch paper if needed.

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<td>a. 320 + 200 = ______ 280 + 320 = ______ 290 + 320 = ______</td>
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<tr>
<td>b. 130 + 500 = ______ 130 + 560 = ______ 130 + 580 = ______</td>
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<td>c. 360 + 240 = ______ 350 + 270 = ______ 380 + 230 = ______</td>
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<tr>
<td>d. 260 + 250 = ______ 270 + 280 = ______ 280 + 250 = ______</td>
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<tr>
<td>e. 440 + 280 = ______ 660 + 160 = ______ 770 + 250 = ______</td>
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3. Solve.

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<tbody>
<tr>
<td>a. 34 tens + 20 tens = ______ tens  b. 34 tens + 26 tens = ______ tens</td>
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<tr>
<td>c. 34 tens + 27 tens = ______ tens  d. 34 tens + 28 tens = ______ tens</td>
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What is the value of 62 tens? ______
Lesson 4

Objective: Subtract multiples of 100 and some tens within 1,000.

Suggested Lesson Structure

- Application Problem (5 minutes)
- Fluency Practice (11 minutes)
- Concept Development (34 minutes)
- Student Debrief (10 minutes)
- Total Time (60 minutes)

Application Problem (5 minutes)

Diane needs 65 craft sticks to make a gift box. She only has 48. How many more craft sticks does she need?

Note: Instruct students to approach this addend unknown problem using any simplifying strategy or even vertical subtraction. When students are finished, invite them to share tape diagrams and solution strategies.

Fluency Practice (11 minutes)

- Subtracting Multiples of Hundreds and Tens 2.NBT.7 (2 minutes)
- Subtracting Multiples of Ten and Some Ones Sprint 2.NBT.7 (9 minutes)

Subtracting Multiples of Hundreds and Tens (2 minutes)

Note: Students review fluently subtracting multiples of tens and hundreds in preparation for the lesson.

T: What is 2 tens less than 130?
S: 110.
T: Give the subtraction number sentence.
S: 130 – 20 = 110.
T: What is 2 hundreds less than 350?
S: 150.
T: Give the subtraction number sentence.
S: 350 – 200 = 150.
Continue with the following sequence: 6 tens less than 150, 3 hundreds less than 550, 7 tens less than 250.

Subtracting Multiples of Ten and Some Ones Sprint (9 minutes)

Materials: (S) Sprint

Note: Students fluently subtract multiples of ten and some ones in preparation for the lesson.

Concept Development (34 minutes)

Materials: (S) Personal white boards, place value chart insert

Problem 1: 570 – 100, 570 – 110

T: (While speaking, record using the arrow way.) 570 – 100 is...?
S: 470.
T: 570 – 100 (pause) – 10 is?
S: 460.
T: How much did we take away in all?
S: 110.
T: Say the complete number sentence for our last problem.
S: 570 – 110 = 460.
T: Turn and talk to your partner about the steps in subtracting 110 from 570.
S: We first took away 1 hundred, and then 1 ten. We made it into two steps: first taking away the hundred, and then the ten, to make it easier.


T: Let’s try another. (Record as before.) 450 – 200 is...?
S: 250.
T: 450 – 200 (pause) – 10 is...?
S: 240.
T: Subtract another 40. How many now?
S: 200.
T: Talk with your partner. What just happened?
S: We started with 450. We took away 200 and then 10 to make 240. Then we took away 40 more to get 200. We took away 250 in all, one chunk at a time.
T: What if I needed to solve 450 – 260? Could I use 450 – 250 to help me?
S: Yes. They are 10 apart, so it’s easy. Just subtract 10 more.
T: 450 – 250 – 10 is...?
S: 190.
Problem 3: $780 - 300$, $780 - 380$, $780 - 390$

T: Now with your disks, show me $780 - 300$.
S: (Students remove 3 hundreds, showing 480 on their place value charts.)
T: (Draw 780 on the board. Cross out 3 hundreds to show 480 on the board.)
T: Yes! Now we have 480. How many do we need to take away from 780 to get 400? Turn and talk.
S: 80 more. $\rightarrow$ 380 altogether. $\rightarrow$ Take away 300, then take away 80 more, so 380.
T: I heard some people say we have to take 380 away. Start with 780 and take away 380 with your disks. Do you get 400?
S: Yes!
T: (Cross out 3 hundreds and 8 tens on the board.) I started by taking away 3 hundreds and then 8 tens. I got 400, too.
T: Now I want to solve $780 - 390$. What do I need to do to solve this? Turn and talk.
S: Start with $780 - 380$, which is 400, then take away 10 more. $\rightarrow$ Rename a hundred to make 10 tens, and take a ten away. $\rightarrow$ Do one more step to get 10 less than 400, so 390.
T: I'm going to show this on the board while you do it with your disks. (Unbundle a hundred as shown at right.)
T: What is $780 - 390$?
S: 390!
T: Now let's show this problem using the arrow way. (Draw on the board as shown above right.)

Problem 4: $400 - 200$, $440 - 200$, $440 - 240$, $440 - 260$

In this part, students record their answers on their personal boards and then turn them over. When most students are ready, say, “Show me.” Students hold up their boards for a visual check. Then they erase their boards and get ready for the next problem.
Lesson Objective: Subtract multiples of 100 and some tens within 1,000.

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.

- For Problem 1(a), how does knowing 540 – 200 help you to solve the other problems in that set?
- For Problem 1(b), what makes solving 760 – 480 more challenging? How did you use what you know about place value to subtract?
Lesson 4
Subtract multiples of 100 and some tens within 1,000.

Share with a partner: How did using the arrow way help you to solve Problem 1(c), 950 – 580? What careful observations can you make about the numbers you subtracted? Why did you choose to subtract 50, then 30? Why didn’t you just subtract 80?

Look carefully at the numbers in Problem 1(d). What pattern do you notice within the numbers you subtracted from 820? How did this affect the arrow way? Could you have solved these mentally?

For Problem 2(d), 740 – 690, Terri solved the problem using an equal sign instead of arrows: 740 – 600 = 140 – 40 = 100 – 50 = 50. Is her answer correct? Is her equation correct? Why can’t she use an equal sign to show the change?

How does using the arrow way help us when there are not enough tens from which to subtract (e.g., 740 – 650)? How did you decompose one part to subtract more easily?

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.
<table>
<thead>
<tr>
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<td>2</td>
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<td>3</td>
<td>55 - 44 =</td>
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<td>4</td>
<td>99 - 88 =</td>
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<td>5</td>
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<td>8</td>
<td>88 - 22 =</td>
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<td>21</td>
<td>43 - 21 =</td>
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<td>22</td>
<td>54 - 32 =</td>
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Lesson 4: Subtract multiples of 100 and some tens within 1,000.
Date: 10/23/13
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<tr>
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<td>99 - 42 =</td>
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<td>44 - 11 =</td>
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<td>43 - 22 =</td>
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<td>68 - 43 =</td>
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<tr>
<td>22</td>
<td>54 - 22 =</td>
<td>44</td>
<td>98 - 72 =</td>
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</table>
1. Solve using the arrow way.

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<tr>
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<tbody>
<tr>
<td>a.</td>
<td>570 - 200</td>
<td>570 - 270</td>
<td>570 - 290</td>
<td></td>
</tr>
<tr>
<td></td>
<td>760 - 400</td>
<td>760 - 460</td>
<td>760 - 480</td>
<td></td>
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<tr>
<td>c.</td>
<td>950 - 500</td>
<td>950 - 550</td>
<td>950 - 580</td>
<td></td>
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<tr>
<td>d.</td>
<td>820 - 320</td>
<td>820 - 360</td>
<td>820 - 390</td>
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</table>
2. Solve using a simplifying strategy. Use scratch paper if needed.

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<tbody>
<tr>
<td>a.</td>
<td>530 - 400 = _______ 530 - 430 = _______ 530 - 460 = _______</td>
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<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td>b.</td>
<td>950 - 550 = _______ 950 - 660 = _______ 950 - 680 = _______</td>
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<td></td>
<td></td>
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<tr>
<td>c.</td>
<td>640 - 240 = _______ 640 - 250 = _______ 640 - 290 = _______</td>
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<tr>
<td>d.</td>
<td>740 - 440 = _______ 740 - 650 = _______ 740 - 690 = _______</td>
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</table>

3. Solve.

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<tbody>
<tr>
<td>a.</td>
<td>88 tens - 20 tens = _______</td>
<td></td>
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<tr>
<td>b.</td>
<td>88 tens - 28 tens = _______</td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td>88 tens - 29 tens = _______</td>
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<tr>
<td>d.</td>
<td>84 tens - 28 tens = _______</td>
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<tr>
<td>e.</td>
<td>What is the value of 60 tens? ________________</td>
<td></td>
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<tr>
<td>f.</td>
<td>What is the value of 56 tens? ________________</td>
<td></td>
</tr>
</tbody>
</table>
1. Solve using a simplifying strategy. Show your work if needed.

   \[ 830 - 530 = \_\_\_\_ \quad 830 - 750 = \_\_\_\_ \quad 830 - 780 = \_\_\_\_ \]

Solve.

a. 67 tens - 30 tens = _____ tens. The value is _____.

b. 67 tens - 37 tens = _____ tens. The value is _____.

c. 67 tens - 39 tens = _____ tens. The value is _____.
Name ____________________________  Date ________________

1. Solve using the arrow way.

   a.  
      \[430 - 200\]  
      \[430 - 230\]  
      \[430 - 240\]

   b.  
      \[570 - 300\]  
      \[570 - 370\]  
      \[570 - 390\]

   c.  
      \[750 - 400\]  
      \[750 - 450\]  
      \[750 - 480\]

   d.  
      \[940 - 330\]  
      \[940 - 360\]  
      \[940 - 480\]
2. Solve using a simplifying strategy. Use scratch paper if needed.

<p>| | | | |</p>
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<tbody>
<tr>
<td>a.</td>
<td>330 - 200 = _______</td>
<td>330 - 230 = _______</td>
<td>330 - 260 = _______</td>
</tr>
<tr>
<td>b.</td>
<td>440 - 240 = _______</td>
<td>440 - 260 = _______</td>
<td>440 - 290 = _______</td>
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<tr>
<td>c.</td>
<td>860 - 560 = _______</td>
<td>860 - 570 = _______</td>
<td>860 - 590 = _______</td>
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<tr>
<td>d.</td>
<td>970 - 470 = _______</td>
<td>970 - 480 = _______</td>
<td>970 - 490 = _______</td>
</tr>
</tbody>
</table>

3. Solve.
   a. 66 tens - 30 tens = _______  
   b. 66 tens - 36 tens = _______  
   c. 66 tens - 38 tens = _______  
   d. 67 tens - 39 tens = _______  
   e. What is the value of 28 tens? ________________  
   f. What is the value of 36 tens? ________________
Lesson 5

Objective: Use the associative property to make a hundred in one addend.

Suggested Lesson Structure

- Application Problem (6 minutes)
- Fluency Practice (10 minutes)
- Concept Development (34 minutes)
- Student Debrief (10 minutes)
- Total Time (60 minutes)

Application Problem (6 minutes)

Jenny had 39 collectible cards in her collection. Tammy gave her 36 more. How many collectible cards does Jenny have now?

Note: This problem is designed to provide a real life context for the skills the students have learned in this lesson and in the previous ones. Invite students to solve this problem using number bonds or any other simplifying strategy they have learned. After solving the problem, have students share their strategies with a partner.

Fluency Practice (10 minutes)

- Making the Next Hundred 2.NBT.5, 2.NBT.7 (4 minutes)
- Making the Next Hundred to Add 2.NBT.5, 2.NBT.7 (6 minutes)

Making the Next Hundred (4 minutes)

Note: This fluency will review foundations that lead into today’s lesson.

T: (Post 170 + ___ = 200 on the board.) Let’s find missing parts to make the next ten. If I say 170, you would say 30. Ready? 170.

S: 30.

T: Give the number sentence.

S: 170 + 30 = 200.

Continue with the following possible sequence: 190, 160, 260, 270, 370, 380, 580, 620, 720, 740, 940, 194,
196, 216, 214, 224.

Making the Next Hundred to Add (6 minutes)

Note: This fluency will review foundations that lead into today’s lesson.

| S | 10 tens + 3 tens. |
| T | Answer. |
| S | 130. |
| T | 90 + 40. |
| S | 130. |

Continue with possible sequence: 19 tens + 4 tens, 29 tens + 4 tens, 29 tens + 14 tens, 9 tens + 6 tens, 19 tens + 6 tens, 19 tens + 16 tens, 29 tens + 16 tens, 8 tens + 3 tens, 18 tens + 3 tens, 18 tens + 13 tens, 28 tens + 13 tens, 8 tens + 5 tens, 18 tens + 15 tens, 28 tens + 15 tens.

Concept Development (34 minutes)

Materials: (S) Personal white boards

Problem Set 1: 17 + 13, 17 tens + 13 tens, 170 + 130, 170 + 40

| T | What is 17 + 12? |
| S | 29! |
| T | What is 17 + 13? |
| S | 30! |
| T | That was fast! How did you know? |
| S | I added 1 more to 17 + 12. → 13 is 1 more than 12, so the answer had to be 1 more than 29. |
| T | How many tens equal 17 tens plus 13 tens? |
| S | 30 tens. |
| T | What is the value of 30 tens? |
| S | 300! |
| T | What is 170 + 130? |
| S | 300. |
| T | What happened when we added those numbers? Turn and talk. |
| S | We made a new hundred, just like when we added 17 to 13 and made a new ten. → We composed a new hundred. → Instead of 30 ones, we have 30 tens. It’s just like 17 + 13 except that the place value is different. |
| T | What is 17 + 14? Write it on your board and turn it over so I know when you’re ready. |
| T | (Wait until students are ready.) Show me! |
NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:
For accelerated learners, ask for alternative addition and subtraction number sentences that would have the same total (e.g., 32 tens or 320). Include number sentences with three addends.

- ____ + ____ = 32 tens
- 32 tens - ____ = ____
- ____ + ____ + ____ = 320

NOTES ON MULTIPLE MEANS OF REPRESENTATION:
For students who have trouble seeing that the two expressions, 190 + 120 and 200 + 110, are equivalent, show compensation using manipulatives, such as place value disks.

---

**Lesson 5: Use the associative property to make a hundred in one addend.**

**Date:** 10/23/13

S: 31!
T: How many tens equal 17 tens plus 14 tens?
S: 31 tens!
T: 170 + 140?
S: 310!
T: Talk with your partner. How did you know?
S: 17 tens plus 14 tens is just like 17 + 14, only in tens, so the answer is similar but in tens. \(170 + 140\) is 10 more than 170 + 130, so the answer has to be 10 more. \(170 + 130\) was 30 tens, I knew that 170 + 140 had to be 31 tens; it’s 1 more ten.

Extend to 17 tens + 15 tens and continue until students are comfortable with the concept.

**Problem Set 2: Add multiples of 10 by making a hundred.**

T: In the past, we’ve used number bonds to make the next ten. Let’s do it here, too, to make our adding easier when we have hundreds.
T: (Write 190 + 120 on the board.) Is one of these numbers close to the next hundred?
S: Yes!
T: Which one?
S: 190!
T: What is it close to?
S: 200!
T: How many more do we need to make 200?
S: 10 more!
T: Where can we get 10 more?
S: From the 120!
T: Great idea! Let’s break apart 120 into 110 and 10. Now, we can add the 10 from 120 to the 190. And we know that 190 plus 10 equals 200. (Show number bond on the board.)
T: What is our new addition problem? (Point to corresponding parts of the number bond.)
S: 200 + 110!
T: Talk with a partner. What does this equal?
S: 310! \(190 + 10 = 200\)
S: \(200 + 110 = 310\)
T: I heard someone say they remembered what they did with the tens. Great! When we have a zero in the ones place, we can think of it as tens.
T: How can we prove that 200 + 110 is the same as 190 + 120? Turn and talk.

S: I can add 100 to 190 and get 290, then count 20 more by tens, so 300, 310. ⇒ I can show both the arrow way, first adding hundreds, then tens. ⇒ I just know that since 190 is 10 less than 200, the other part has to be 10 more than 110. Then the total will be equal. ⇒ I did it by using the algorithm, and I got the same answer.

Have students solve the following problems on their personal boards with a partner using number bonds: 190 + 160, 430 + 180, 370 + 240.

**Problem Set 3: Add three-digit numbers by making a hundred.**

T: So far, we’ve only been working with numbers that have zero in the ones place. Let’s try something different now. (Write 199 + 25 on the board.)

T: What hundred is close to 199?
S: 200!

T: How far away is it?
S: 1 away!

T: Let’s try decomposing 25 into 24 and 1. We can add the 1 from 25 to the 199. And we know that 199 plus 1 equals 200. (Draw number bond.) What is our new addition problem?

S: 200 + 24!

T: And what is the total?
S: 224!

T: Let’s try another example. (Write 295 + 78 on the board.)

T: I see one number that is close to some hundreds. Which number is that?
S: 295!

T: How far away is it?
S: 5 away!

T: Talk with a partner. How would you use a number bond to make a new, simpler number sentence?
S: I could make 295 into 300 and have 73 left over. ⇒ I break 78 into 5 and 73, and then I give the 5 to 295, so 300 + 73. ⇒ I get 300 and 73.

T: (After student conversation, choose a volunteer to show the number bond and new number sentence on the board.) What is 300 + 73?
S: 373!

T: Now let’s try one that has hundreds in both. (Write 535 + 397 on the board.)

T: Which number is closer to the next hundred?
S: 397!

T: With a partner, write the number bond and new addition problem. Then, solve it.
Lesson 5: Use the associative property to make a hundred in one addend.

S: I made 532 + 400, so 932. \(\rightarrow\) 397 is 3 away from 400, so I need to move 3 from the 535 to the 597. 400 + 532 = 932. \(\rightarrow\) Since I added 3 to 397, I had to take away 3 from 535. Now it’s easy to add 4 hundreds onto 532.

Have students solve the following problems on their personal boards with a partner using number bonds: 299 + 22, 495 + 30, 527 + 296. As they complete the problems, they may begin work on 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 solve these problems using the RDW approach used for Application Problems.

Student Debrief (10 minutes)

Lesson Objective: Use the associative property to make a hundred in one 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.

- For Problem 1(a), 18 tens + 12 tens is the same as adding what two numbers? What is the value of 30 tens? How does (a) help you to solve (b)?
- Share with a partner: How did you solve Problem 1(c)? How could you have used 1(c) to help you solve (d)? What would it look like to solve with a number bond?
Lesson 5: "Use the associative property to make a hundred in one addend."

- In Problem 2(b), 260 + 190, how did you use a number bond to make a new, simpler addition problem? Which number did you break apart, or decompose? Why?
- In Problem 2(c), 330 + 180, how did you extend your understanding of the make ten strategy? What do these strategies have in common? What is 330 + 180 the Say Ten way?
- For Problem 2(e), 199 + 86, can you think of alternate strategies to solve? Do you think you could use disks and a place value chart? Why should we choose a number bond? Explain to your partner the steps you took to solve.
- What connections can you make between the number bond strategy and the arrow way? What is the goal of these strategies?

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.
Name _______________________________ Date ______________

1. Solve.
   a. 30 tens = ____________
   b. 43 tens = ____________

   c. 18 tens + 12 tens = ____________
   d. 18 tens + 13 tens = ____________

   e. 24 tens + 19 tens = ____________
   f. 25 tens + 29 tens = ____________

2. Add by drawing a number bond to make a hundred. Write the simplified number sentence and solve.

   a. 190 + 130

      \[ \begin{align*}
      &10 \\
      &120 \\
      \hline
      &200 + 120 \quad = \quad \underline{320}
      \end{align*} \]

   b. 260 + 190

      \[ \begin{align*}
      &200 + 120 \quad = \quad \underline{320}
      \end{align*} \]

   c. 330 + 180

      \[ \begin{align*}
      \underline{510} \quad = \quad \underline{510}
      \end{align*} \]
d. 440 + 280

________________ = __________

e. 199 + 86

________________ = __________

f. 298 + 57

________________ = __________

g. 425 + 397

________________ = __________
Add by drawing a number bond to make a hundred. Write the simplified number sentence and solve.

1. 390 + 210
   a. ____________________ = _______

   ____________________ = _______

   b. 798 + 57

   ____________________ = _______

Solve.

2. 53 tens + 38 tens = _______________
Lesson 5 Homework

Name ____________________________ Date ______________

1. Solve.
   a. 32 tens = __________
   b. 52 tens = __________
   c. 19 tens + 11 tens = __________
   d. 19 tens + 13 tens = __________
   e. 28 tens + 23 tens = __________
   f. 28 tens + 24 tens = __________

2. Add by drawing a number bond to make a hundred. Write the simplified number sentence and solve.

   a. 90 + 180
      \[\begin{array}{c}
      10 \\
      170
      \end{array}\]
      \[100 + 170 = \]

   b. 190 + 460
      \[\text{_____________} = \text{_____________}\]
Lesson 5 Homework

Use the associative property to make a hundred in one addend.

Date: 10/23/13

2. 540 + 280

\[
\_\_\_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_\_
\]

d. 380 + 430

\[
\_\_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_\_
\]

e. 99 + 141

\[
\_\_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_\_
\]

f. 75 + 299

\[
\_\_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_\_
\]

g. 795 + 156

\[
\_\_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_\_
\]
Lesson 6

Objective: Use the associative property to subtract from three-digit numbers and verify solutions with addition.

Suggested Lesson Structure

- Application Problems (5 minutes)
- Fluency Practice (9 minutes)
- Concept Development (36 minutes)
- Student Debrief (10 minutes)
- Total Time (60 minutes)

Application Problem (5 minutes)

Maria made 60 cupcakes for the school bake sale. She sold 28 cupcakes on the first day. How many cupcakes did she have left?

Note: This Application Problem primes students to subtract multiples of 10. They may use whichever subtraction strategy they prefer. Lead students through the RDW process, or have students work independently and then share their work.

Fluency Practice (9 minutes)

- Compensation with Linking Cubes 2.NBT.5 (5 minutes)
- Compensation with Subtraction 2.NBT.5 (4 minutes)

Compensation with Linking Cubes (5 minutes)

Materials: (S) Linking cubes in three colors

Note: This is a teacher directed, whole class activity. With continued practice, students will gain automaticity compensating when subtracting.

T: Show a row of 8 cubes with five in yellow and 3 in red and a row of 5 yellow cubes.

T: What is the difference between 8 and 5?

S: 3.

T: What is a number sentence to represent the difference?

\[ 8 - 5 = 9 - 6 \]
Lesson 6:

Use the associative property to subtract from three-digit numbers and verify solutions with addition.

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S: 8 − 5 = 3.
T: Now add 1 green cube to the end of each stick. Has the difference changed?
S: No.
T: What is the new number sentence?
S: 9 − 6 = 3.
T: True or false? (Write 8 − 5 = 9 − 6 on the board.)
S: True.

Continue with possible sequence: 7 − 3 = 8 − 4, 9 − 4 = 10 − 5.

Compensation with Subtraction (4 minutes)

Note: This fluency drill prepares students for the lesson by reviewing compensation when subtracting. Students add the same amount to the minuend and subtrahend to make a multiple of 10 in order to make the problem easier to solve.

Post a tape diagram on board for visual representation.

T: (Write 34 − 19 = ____.) Let’s use the same mental math strategy to subtract larger numbers. How much more does 19 need to make the next ten?
S: 1 more.
T: Add 1 to each number and give me the number sentence.
S: 35 − 20 = 15.
T: 34 − 19 is...?
S: 15.
T: True or false? (Write 34 − 19 = 35 − 20 on board.)
S: True.
T: What are both expressions equal to?
S: 15.
T: 43 − 28.
S: 45 − 30 = 15.

Continue with the following possible sequence: 52 − 29, 64 − 38, 83 − 27, 74 − 49, 93 − 47, 95 − 58.

Concept Development (36 minutes)

Materials: (T) Linking cubes in three colors (S) Personal white boards

Note: Compensation for subtraction is always shown on the left-hand side, whether you are manipulating linking cubes or drawing a tape diagram, in order to make it clear that the difference remains the same. If compensation is shown on the right, the difference shifts, so students may wonder if it has changed.
Problem 1: Compensation with two-digit numbers and checking with addition.

T: Let’s imagine each of the cubes is worth 10. (Show the 8 and 5 sticks.) Let’s count them by tens. (Count together: 10, 20, 30, etc.)
T: What is the difference now? Say the number sentence.
S: 80 – 50 = 30.
T: (Add 1 cube to the end of each stick.) How about now?
S: 90 – 60 = 30.
T: (Draw a two-bar diagram to represent these two problems.)
T: Let’s check to see if that worked for both of these problems. (Point to 80 – 50.) In this problem, since 80 is the whole, and 50 is one part, what is the other part? (Point to the 30.)
S: 30!
T: We know if we add both parts, we should get the whole again. Does it work? If we add 30 to 50, what do we get?
S: 80!
T: It works! (Write 30 + 50 = 80 on the board.)
Repeat this sequence with 90 – 60 = 30.
T: (Quickly draw the bonds as exemplified to the right.) Both bonds have the same missing part!

Problem 2: Compensation with multiples of 10 and three-digit numbers and checking with addition.

T: Let’s try a new problem. (Write 230 – 180 on the board.)
T: This problem is a bit challenging, isn’t it?
T: What is 250 – 200?
S: 50!
T: How did you know that so fast?
S: Because the hundreds were the same, so 50 is left. → It’s easy! Just take away 200. → I started at 200, and 50 more is 250, so the answer is 50.
T: It’s easier to take away the hundreds, isn’t it?
Draw a tape diagram on the board to represent 230 – 180. Direct students to do the same. Call a student volunteer forward to label the tape diagram.
T: Can you tell me how 230 – 180 and my other problem, 250 – 200, are related? Turn and talk.
S: 230 – 180 is the same as 250 – 200, but you added 20 more to each number. → The difference is the same, 50. → Even though the number sentence is different, they are equal to each other.
T: (Call a volunteer to add 20 to each bar on the board to change the model to 250 – 200.)
S: (Do the same at their seats.)
Lesson 6:

Use the associative property to subtract from three-digit numbers and verify solutions with addition.

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Some students may struggle to see the compensation. Allow them to continue using the linking cubes to represent the larger numbers. Again, instruct them to show the compensation with an alternate color.

For students struggling with fine motor skills, provide square tiles to help them draw the tape diagrams. Do not, however, become overly concerned with precision, as their conceptual understanding is paramount. The tape diagram is a vehicle for understanding the compensation.

Problem 3: Compensation with three-digit numbers and checking with addition.

T: So far, we have only been working with numbers with zero ones. Now let’s try subtracting numbers with some ones.

T: (Write 321 − 199 on the board.) In this problem, I see that the number I am taking away is very close to 200. How many more do I need to add to make 200?

S: 1!

T: Let’s draw a tape diagram for that. (Draw a tape diagram representing 321 − 199 and add 1 to the left of each bar.) You write this on your board, too.

T: What is our new problem?

S: 322 − 200!

T: That’s easier, don’t you think? Turn your board over when you have the answer.

T: What is 322 − 200?

S: 122!

T: Let’s check that with addition. (Write 122 + 200 on the board.) What is this?

S: 322!

T: It works! Let’s try another problem. (Write 514 − 290 on the board below a tape diagram.)

T: How much should we add to make this problem easier?

S: 10!
T: What is our new problem? (Draw 10 more onto the left of each bar.)
S: 524 – 200!
T: Draw a tape diagram and solve. Check your answer using addition.

Repeat with the following problems: 547 – 498, 720 – 575.

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.

Student Debrief (10 minutes)

Lesson Objective: Use the associative property to subtract from three-digit numbers and verify solutions with addition.

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.

- In Problem 1(b), 320 - 190, what number did you add to both numbers in the equation to make an easier problem? Why? How did you check your work?
Lesson 6:
Lesson 6:
Use the associative property to subtract from three-digit numbers and verify solutions with addition.

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- For Problem 1(c), 400 – 280, explain to your partner your strategy to solve. Then, compare how you checked your work. Make a prediction: Why will this be easier than using the algorithm to solve?
- Share with a partner: What was your new number sentence for Problem 1(e)? What is the solution? What other simplifying strategies could you use to check your work?
- What main difference do you notice between the problems on pages 1 and 2 of the Problem Set? How are they different? How is your goal the same?
- For Problems 1(b) and (c), convince me that compensation is a smart strategy to select.
- Explain what the compensation and number bond strategies have in common. What actions to you take to make solving easier?

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.
Name _______________________________ Date ________________

1. Draw and label a tape diagram to show how to simplify the problem. Write the new number sentence, and then subtract.
   a. 220 – 190 = ___________ 230 – 200 = ________

   + 10
   + 10
   220
   190

   b. 320 – 190 = ___________ = __________

   c. 400 – 280 = ___________ = __________

   d. 470 – 280 = ___________ = __________

   e. 530 – 270 = ___________ = __________
2. Draw and label a tape diagram to show how to simplify the problem. Write a new number sentence, and then subtract. Check your work using addition.

   a. $451 - 199 = \underline{\phantom{100}} 452 - 200 = \underline{\phantom{100}}$

   
   
   

   b. $562 - 299 = \underline{\phantom{100}}$

   
   
   

   c. $432 - 298 = \underline{\phantom{100}}$

   
   
   

   d. $612 - 295 = \underline{\phantom{100}}$
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Use the associative property to subtract from three-digit numbers and verify solutions with addition.

Name __________________________ Date _____________

Draw and label a tape diagram to show how to simplify the problem. Write the new number sentence, and then subtract.

1. 363 – 198 = ________________ = ________

2. 671 – 399 = ________________ = ________

3. 862 – 490 = ________________ = ________
1. Draw and label a tape diagram to show how to simplify the problem. Write the new number sentence, and then subtract.
   a. $340 - 190 = \underline{350} - \underline{200} = \underline{150}$

   \[\begin{array}{c}
   + 10 \\
   340 \\
   \end{array}\]

   \[\begin{array}{c}
   + 10 \\
   190 \\
   \end{array}\]

   b. $420 - 190 = \underline{430} - \underline{200} = \underline{230}$

   c. $500 - 280 = \underline{510} - \underline{280} = \underline{230}$

   d. $650 - 280 = \underline{660} - \underline{280} = \underline{380}$

   e. $740 - 270 = \underline{750} - \underline{270} = \underline{480}$
2. Draw and label a tape diagram to show how to simplify the problem. Write a new number sentence, and then subtract. Check your work using addition.

a. $236 - 99 = \underline{237 - 100} = \underline{__________}$

\[
\begin{array}{c|c|c}
\text{+ 1} & 236 \\
\text{+ 1} & 99 \\
\hline \\
\text{Check:} \\
\end{array}
\]

b. $372 - 199 = \underline{______________} = \underline{__________}$

\[
\begin{array}{c|c|c}
\text{Check:} \\
\end{array}
\]

c. $442 - 298 = \underline{______________} = \underline{__________}$

\[
\begin{array}{c|c|c}
\text{Check:} \\
\end{array}
\]

d. $718 - 390 = \underline{______________} = \underline{__________}$

\[
\begin{array}{c|c|c}
\text{Check:} \\
\end{array}
\]
Lesson 7

Objective: Share and critique strategies for varied addition and subtraction problems within 1,000.

Suggested Lesson Structure

- Application Problem: 5 minutes
- Fluency Practice: 10 minutes
- Concept Development: 35 minutes
- Student Debrief: 10 minutes
- Total Time: 60 minutes

Application Problem (5 minutes)

Jeannie got a pedometer to count her steps. The first hour, she walked 43 steps. The next hour, she walked 48 steps.

a. How many steps did she walk in the first two hours?

b. How many more steps did she walk in the second hour than in the first?

Note: This problem invites students to apply strategies from the previous lessons. They may work alone or with partners. Guide struggling students in drawing tape diagrams to represent the problem, especially for the second step. Encourage the students to explain their thinking about why they used the strategy they chose.

Fluency Practice (10 minutes)

- Making the Next Hundred to Add 2.NBT.5, 2.NBT.7 (5 minutes)
- Compensation with Subtraction 2.NBT.5 (5 minutes)

Making the Next Hundred to Add (5 minutes)

Note: This fluency will review foundations that lead into today’s lesson.


S: 10 tens + 3 tens.

Post on board:

90 + 40 = __________

\[ \begin{array}{c}
10 \\
\hline
30
\end{array} \]

100 + 30 =
Lesson 7:
Share and critique strategies for varied addition and subtraction problems within 1,000.

Date: 10/23/13

Compensation with Subtraction (5 minutes)

Note: This fluency drill prepares students for the lesson by reviewing compensation when subtracting. Students add the same amount to the minuend and subtrahend to make a multiple of 10 thus making the problem easier to solve. Post the tape diagram on the board for visual representation.

T: (Write $34 - 19 = \_\_\_\_$.) Let's use a mental math strategy to subtract. What needs to be added to 19 to make the next ten?
S: 1 more.
T: Add 1 to each number and give me the number sentence.
S: $35 - 20 = 15$.
T: $34 - 19$ is...?
S: 15.
T: True or false? (Write $34 - 19 = 35 - 20$ on board.)
S: True.
T: What are both expressions equal to?
S: 15.
S: $45 - 30 = 15$.

Continue with the following possible sequence: $52 - 29, 64 - 38, 83 - 27, 74 - 49, 93 - 47, 95 - 58$.

Concept Development (35 minutes)

Materials: (T) Student work samples (S) Personal white boards

Problem 1: $697 + 223$

T: (Project and read.) The problem is $697 + 223$. Turn and talk to your partner about how you would solve this problem.

T: (Project Student A’s sample.) How did Student A solve this problem? Explain to your partner what this student was thinking. What strategy did Student A...?
Lesson 7: Share and critique strategies for varied addition and subtraction
problems within 1,000.

Date: 10/23/13

Problem 1:

S: She used number bonds to make a new hundred. → She made 700 + 220 to get 920. → She was thinking that she could easily make a hundred because 697 is only 3 away from 700.

T: (Label student work Number bond strategy.)

T: Let’s look at a different way to solve this. (Project Student B’s work.)

T: What did Student B choose to do? Turn and talk.

S: He used the arrow way. → First he used arrows to make a new hundred, and then he added the hundreds and tens.

T: (Label student work Arrow way.)

T: Which way would you do it? Discuss with your partner.

S: I would use the number bonds, because it’s so easy to add the hundreds after that. → The arrow helps me make sure I don’t miss any parts of the number.

T: Both work. For this one I would use the bonds. It’s fewer steps, and I’m always looking for the shortest route!

Problem 2: 864 – 380

T: (Project and read the problem.) How would you solve this problem? Solve it on your personal board and discuss it with a partner.

S: (Circulate and listen while students solve and discuss.)

T: (Project the work samples from Students C and D.) Let’s see how these two students solved the problem. One is correct, and one is incorrect. Which is which, and why? Discuss it with a partner.

S: Student C used a number bond, but he did it wrong. He added 20 to 380, but he took 20 away from 864! → That means the numbers got closer. The difference changed. Student D kept the difference the same. → The second one is right. When you add the same number to both numbers, the difference stays the same. The first one gave us the wrong answer.

T: I even see grown ups make this mistake!! To keep the difference the same, we have to do the same thing to both numbers when we subtract.
Problem 3: 490 + 275

Have students solve this problem, then swap boards with their partner and follow these steps:

- Check to see if you got the same answer.
- Figure out and fix any mistakes.
- Study the strategy your partner used.
- Explain your partner’s strategy. Take turns.
- Compare how your strategies are the same and how they are different.
- Decide which strategy is more efficient.
- Give your partner a compliment about her work. Be specific!

If time permits, repeat partner work following the suggested sequence: 380 + 223, 546 – 330, 811 – 692.

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.

Student Debrief (10 minutes)

Lesson Objective: Share and critique strategies for varied addition and subtraction problems within 1000.

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.

- For Problem 1, explain to your partner the mistake made in the second student work sample. Is compensation for addition the same
as for subtraction? Can you add the same amount to both addends without changing the total?

- In Problem 2, which student work sample incorrectly shows a strategy to solve 721 – 490? Share your new drawing and number sentence with a partner. How else could you have solved this problem?
- Which strategy do you prefer for solving Problem 3, the arrow way or a number bond? Why? What made the arrow way more challenging?
- What were you thinking when you selected a solution strategy to solve Problem 4? How was this similar to or different from your partner’s strategy?
- What was the most important thing you learned today?

**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.
Lesson 7 Problem Set

NYS COMMON CORE MATHEMATICS CURRICULUM

Lesson 7:

Share and critique strategies for varied addition and subtraction problems within 1,000.

Name ___________________________ Date ________________

1. Circle the student work that shows a correct solution to 543 + 290.

\[
\begin{align*}
543 + 290 &= 533 + 300 = 833 \\
533 + 10 &\quad \text{Explain the mistake in any of the incorrect solutions.}
\end{align*}
\]

\[
\begin{align*}
543 + 290 &= 553 + 300 = 853 \\
10 &\quad 543 \\
10 &\quad 290 \\
\end{align*}
\]

\[
\begin{align*}
543 &\quad 743 &\quad 803 &\quad 833 \\
+200 &\quad +50 &\quad +30 &\quad \\
\end{align*}
\]

2. Circle the student work that correctly shows a strategy to solve 721 - 490.

\[
\begin{align*}
721 - 490 &= 711 - 500 = 211 \\
711 + 10 &\quad 721 \\
10 &\quad 490 \\
\end{align*}
\]

\[
\begin{align*}
731 - 500 &= 231 \\
\end{align*}
\]

Fix the work that is incorrect by making a new drawing in the space below with a matching number sentence.

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5.A.79
3. Two students solved $636 + 294$ using two different strategies.

![Strategy Diagram]

Explain which strategy would be easier and why.

______________________________________________________________

______________________________________________________________

______________________________________________________________

4. a. Circle one of the strategies below and use the circled strategy to solve $290 + 374$.

   arrow way / number bond

b. Explain why you chose that strategy.

______________________________________________________________

______________________________________________________________

______________________________________________________________
1. a. Circle one of the strategies below, and use the circled strategy to solve 490 + 463.

   arrow way / number bond

b. Explain why you chose that strategy.

   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________
Lesson 7 Homework

1. Solve each problem with a written strategy such as a tape diagram, a number bond, the arrow way, the vertical method, or chips on a place value chart.
   a. \(370 + 300 = \) ______
   b. _____ = 562 - 200
   c. _____ + 500 = 812
   d. 230 - 190 = ______
   e. _____ = 640 - 180
   f. 450 - 290 = ______

2. Use the arrow way to complete the number sentences.
   a. 420 - 230 = ______
   b. 340 - 160 = ______
   c. 710 - 350 = ______
3. Solve 867 + 295 using two different strategies.

   a. 

   b. 

Tell which strategy you found easier to use when solving and explain why.


4. a. Circle one strategy to solve the problem 199 + 478.

   arrow way / number bond

   b. Solve using the strategy you circled.