Eureka Math™

Grade 2 Module 4

Teacher Edition

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Grade 2 • Module 4

Addition and Subtraction Within 200 with Word Problems to 100

OVERVIEW

In Module 3, students were immersed in the base ten system as they built a strong foundation of place value understanding through a concrete to pictorial to abstract approach. They bundled groups of 10 and saw that 10 like units could be bundled to produce a new unit that is ten times as large. They progressed from seeing 10 ones as 1 ten (**1.NBT.2a**) to understanding 10 tens as 1 hundred (**2.NBT.2**). Module 4 builds on that place value understanding, which enables students to compose and decompose place value units to add and subtract within 200.

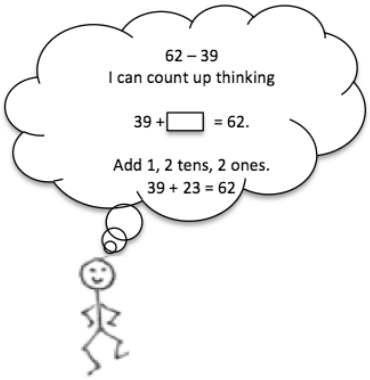
Module 4 is devoted to three major areas of work. The first two are building fluency in two-digit addition and subtraction within 100 (**2.NBT.5**) and applying that fluency to one- and two-step word problems of varying types within 100 (**2.OA.1**). Students' increasing fluency with calculations within 100 allows for word problems to transition from being mere contexts for calculation into opportunities for students to see and analyze the relationships between quantities. Daily Application Problems and specific lessons in Topics A, C, and F provide students with guided and independent practice as they solve a variety of problem types, including more complex comparison problems. Note that most two-step problems involve single-digit addends and do not involve the most difficult comparison problem types.[1] The third major area of work is developing students' conceptual understanding of addition and subtraction of multi-digit numbers within 200 (**2.NBT.7**, **2.NBT.9**) as a foundation for work with addition and subtraction within 1,000 in Module 5.

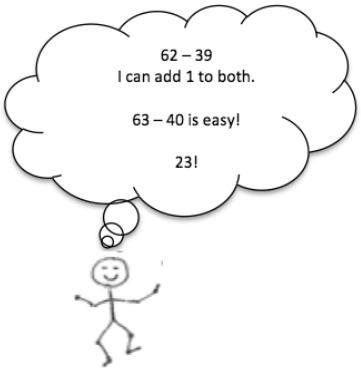
The final lessons of Module 3 (finding 1 more, 1 less, 10 more, 10 less) transition into mental addition and subtraction of 1 and 10 (**2.NBT.8**). In Topic A of Module 4, students work with place value strategies to fluently add and subtract within 100 (**2.NBT.5**). They mentally add and subtract 100 in Topics D and E, as well as during fluency activities throughout the module, as they did in Module 3.

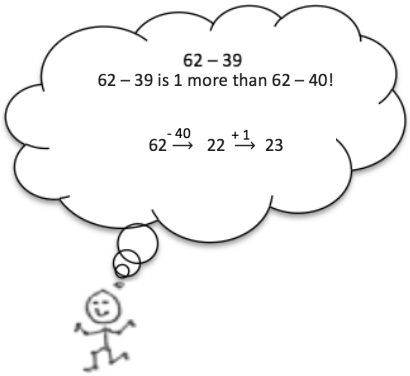
This knowledge is then extended and used to solve problems. For example, students might count on by ones and tens (e.g., 39 + ☐ = 62, so 40, 50, 60, 61, 62). They might use compensation, adding the same amount to the subtrahend as to the minuend to make a multiple of ten (e.g., 62 – 39 = 63 – 40). They might add or subtract a multiple of 10 and adjust the solution as necessary (e.g., 62 – 39 is 4 tens less than 62 but 1 more) (**2.NBT.5**). Students explain why these strategies work using place value language, properties of addition and subtraction, and models such as the number line (**2.NBT.9**).

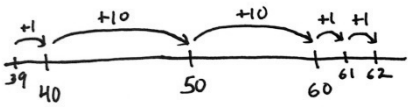
[1]See the Progression document "Operations and Algebraic Thinking," p. 18, for the specific types and the rationale.

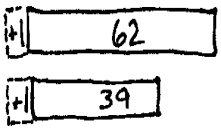
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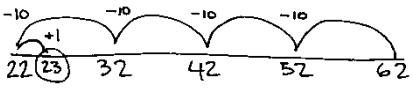






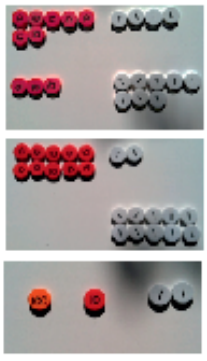






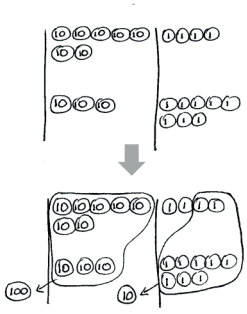
Topic A's strategies lead naturally to work with the algorithms for addition (Topic B) and subtraction (Topic C). Note that the vertical form is used to describe the written numbers, where the algorithm is used to describe the cyclical process of making a larger or smaller unit. In these two topics, students represent place value strategies with place value disks and math drawings (see images with strategy names below). Students work with composing 1 ten from 10 ones or decomposing 1 ten as 10 ones (with minuends within 100). After the Mid-Module Assessment, students continue working with manipulatives and math drawings to make sense of problems in which they compose or decompose twice. Topic D focuses on addition, with the new complexity of composing 1 hundred from 10 tens within 200 in problems with up to four addends (**2.NBT.6, 2.NBT.7**). Subtraction in Topic E involves subtracting when decomposing 1 hundred for 10 tens and 1 ten for 10 ones (**2.NBT.7**).

Concrete

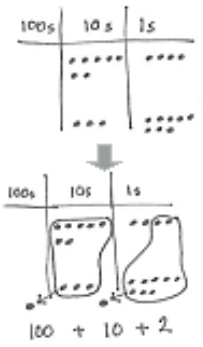


Place Value Disks

Pictorial



Place Value Chart with Labeled Disks



Chip Model

Abstract



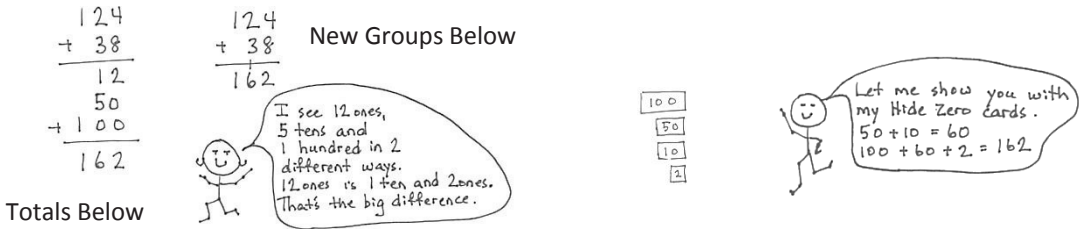
New Groups Below

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Throughout the module, manipulatives and math drawings allow students to see numbers in terms of place value units and serve as a reminder that students must add like units (e.g., knowing that 74 + 38 is 7 tens + 3 tens and 4 ones + 8 ones).

In Module 4, the focus is often on computational strategies with bare numbers (i.e., no context) so that total attention is given to understanding the value of each digit within a number, as well as why the algorithm works. Students use the place value chart as an organizer. Simultaneous use of a vertical form and a place value chart allows students to better recognize both the value of numbers when they are not on the place value chart and like units. The same is true when students make math drawings and use place value language to relate each step of the drawing to the vertical form (**2.NBT.7**). The different representations serve to solidify the understanding of the composition and decomposition of units, moving from concrete to pictorial to abstract. Throughout the work, students are encouraged to explain their actions and analyses and to use the relationship between addition and subtraction to check their work (**2.NBT.9**).

Throughout the module, students are encouraged to be flexible in their thinking and to use multiple strategies in solving problems, including the use of drawings such as tape diagrams, which they relate to equations. In Topic F, students are introduced to the totals below method (pictured below to the far left) and are challenged to explain why both it and the new groups below method (also pictured below to the left) work (**2.NBT.9**).



The Mid-Module Assessment follows Topic C, and the End-of-Module Assessment follows Topic F.

Notes on Pacing for Differentiation

If pacing is a challenge, consider the following modifications and omissions. Consider pacing more quickly the lessons that follow Topic A in Module 4 as students readily grasp renaming different hundreds, tens, and ones. Spend additional instructional minutes with word problems, unknowns in different places (e.g., 27 + ____ = 350 or 281 = ____ – 99), and mental math. Note that this same adjustment in pacing can also be made in looking ahead to the lessons that follow Topic A in Module 5.

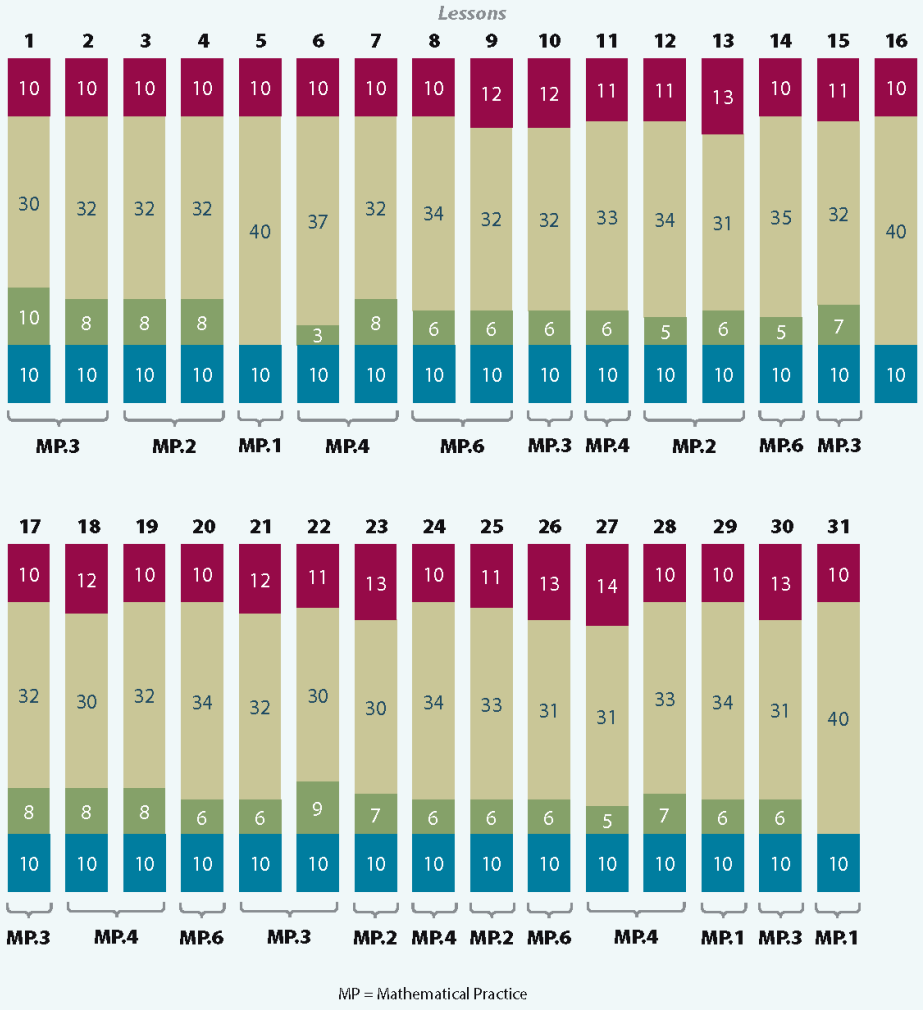
Consider omitting Lessons 29 and 30. Instead, introduce the concept of "Totals Below" in Lesson 21. Continue to embed "Totals Below" in the Concept Development or in the Debrief of subsequent lessons.

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Distribution of Instructional Minutes

This diagram represents a suggested distribution of instructional minutes based on the emphasis of particular lesson components in different lessons throughout the module.

- Fluency Practice
- Concept Development
- Application Problems
- Student Debrief



MP = Mathematical Practice

Focus Grade Level Standards

Represent and solve problems involving addition and subtraction.

2.OA.1 Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

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Use place value understanding and properties of operations to add and subtract.[2]

2.NBT.5 Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

2.NBT.6 Add up to four two-digit numbers using strategies based on place value and properties of operations.

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.)

Foundational Standards

1.OA.1 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.

1.OA.3 Apply properties of operations as strategies to add and subtract. (Students need not use formal terms for these properties.) *Examples: If 8 + 3 = 11 is known, then 3 + 8 = 11 is also known. (Commutative property of addition.) To add 2 + 6 + 4, the second two numbers can be added to make a ten, so 2 + 6 + 4 = 2 + 10 = 12. (Associative property of addition.)*

1.OA.4 Understand subtraction as an unknown-addend problem. *For example, subtract 10 – 8 by finding the number that makes 10 when added to 8.*

1.NBT.2 Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:

a. 10 can be thought of as a bundle of ten ones – called a "ten."

b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.

c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).

[2]In this module, work is limited to within 200. This work is extended to numbers within 1,000 in the next module.

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1.NBT.4 Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, 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 and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.

2.NBT.1 Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases:

a. 100 can be thought of as a bundle of ten tens – called a "hundred."

b. The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).

2.NBT.2 Count within 1000; skip-count by 5s, 10s, and 100s.

2.NBT.3 Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.

Focus Standards for Mathematical Practice

MP.1 **Make sense of problems and persevere in solving them.** Students solve two-step word problems and are challenged to make sense of more complex relationships within situations. They flexibly solve problems with a variety of strategies at their disposal, sometimes finding many ways to solve the same problem.

MP.2 **Reason abstractly and quantitatively.** Students reason abstractly when they represent two-step problems and more difficult problem types with drawings such as tape diagrams and when they relate those drawings to equations. As the module progresses, students move back and forth between concrete, pictorial, and abstract work to make sense of quantities and their relationships in problem situations.

MP.3 **Construct viable arguments and critique the reasoning of others.** Students construct viable arguments when they use place value reasoning and properties of operations to explain why their addition and subtraction strategies work and when they use that reasoning to justify their choice of strategies in solving problems. They critique the reasoning of others when they use those same concepts to disprove or support the work of their peers.

MP.4 **Model with mathematics.** Students model with mathematics when they write equations to solve two-step word problems, make math drawings when solving a vertical algorithm, or when they draw place value charts and disks to represent numbers.

MP.6 **Attend to precision.** Students attend to precision when they label their math drawings and models with specific place value units. They calculate accurately and efficiently when adding numbers within 200 and when using the relationship between addition and subtraction to check their work.

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Overview of Module Topics and Lesson Objectives

Standards	Topics and Objectives		Days
2.OA.1 **2.NBT.5** **2.NBT.8** **2.NBT.9**	A	**Sums and Differences Within 100** Lesson 1: Relate 1 more, 1 less, 10 more, and 10 less to addition and subtraction of 1 and 10. Lesson 2: Add and subtract multiples of 10 including counting on to subtract. Lessons 3–4: Add and subtract multiples of 10 and some ones within 100. Lesson 5: Solve one- and two-step word problems within 100 using strategies based on place value.	5
2.NBT.7 **2.NBT.9** 2.OA.1 2.NBT.5	B	**Strategies for Composing a Ten** Lesson 6: Use manipulatives to represent the composition of 10 ones as 1 ten with two-digit addends. Lesson 7: Relate addition using manipulatives to a written vertical method. Lesson 8: Use math drawings to represent the composition and relate drawings to a written method. Lessons 9–10: Use math drawings to represent the composition when adding a two-digit to a three-digit addend.	5
2.OA.1 **2.NBT.7** **2.NBT.9** 2.NBT.5	C	**Strategies for Decomposing a Ten** Lesson 11: Represent subtraction with and without the decomposition of 1 ten as 10 ones with manipulatives. Lesson 12: Relate manipulative representations to a written method. Lesson 13: Use math drawings to represent subtraction with and without decomposition and relate drawings to a written method. Lessons 14–15: Represent subtraction with and without the decomposition when there is a three-digit minuend. Lesson 16: Solve one- and two-step word problems within 100 using strategies based on place value.	6
		Mid-Module Assessment: Topics A–C (assessment ½ day, return ½ day, remediation or further applications 1 day)	2



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Standards	Topics and Objectives		Days
2.NBT.6 **2.NBT.7** **2.NBT.8** **2.NBT.9**	D	**Strategies for Composing Tens and Hundreds** Lesson 17: Use mental strategies to relate compositions of 10 tens as 1 hundred to 10 ones as 1 ten. Lesson 18: Use manipulatives to represent additions with two compositions. Lesson 19: Relate manipulative representations to a written method. Lessons 20–21: Use math drawings to represent additions with up to two compositions and relate drawings to a written method. Lesson 22: Solve additions with up to four addends with totals within 200 with and without two compositions of larger units.	6
2.NBT.7 **2.NBT.9**	E	**Strategies for Decomposing Tens and Hundreds** Lesson 23: Use number bonds to break apart three-digit minuends and subtract from the hundred. Lesson 24: Use manipulatives to represent subtraction with decompositions of 1 hundred as 10 tens and 1 ten as 10 ones. Lesson 25: Relate manipulative representations to a written method. Lesson 26: Use math drawings to represent subtraction with up to two decompositions and relate drawings to a written method. Lessons 27–28: Subtract from 200 and from numbers with zeros in the tens place.	6
2.OA.1 **2.NBT.7** **2.NBT.9**	F	**Student Explanations of Written Methods** Lesson 29: Use and explain the totals below method using words, math drawings, and numbers. Lesson 30: Compare totals below to new groups below as written methods. Lesson 31: Solve two-step word problems within 100.	3
		End-of-Module Assessment: Topics A–F (assessment ½ day, return ½ day, remediation or further applications 1 day)	2
Total Number of Instructional Days			**35**

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Terminology

New or Recently Introduced Terms

- Algorithm (a step-by-step procedure to solve a particular type of problem)
- Compose (e.g., to make 1 larger unit from 10 smaller units)
- Decompose (e.g., to break 1 larger unit into 10 smaller units)
- Equation (two expressions with an equal sign between them; that is, an equation is a statement that two expressions are equal; however, there is no guarantee that the statement is true)
- New groups below (show newly composed units on the line below the appropriate place in the addition algorithm, pictured above on page 4)
- Simplifying strategy (e.g., to solve 299 + 6, think 299 + 1 + 5 = 300 + 5 = 305)
- Totals below (pictured above on page 4)

NOTES ON *EXPRESSION*, *EQUATION*, AND *NUMBER SENTENCE*:

Grade 2 lessons use the following terms based on the descriptions below.

- **Expression:** A statement that has no equal sign but can be evaluated to a number (e.g., 2 + 1, 13 – 6).
- **Equation:** A statement that two expressions are equal (e.g., 13 + 2 = 15, 22 – 14 = ___, 10 – ___ = 8).
- **Number sentence** (also addition or subtraction sentence)**:** A statement that is true or false and, therefore, contains no unknowns (e.g., 21 > 7, 3 + 2 = 5).

Familiar Terms and Symbols[3]

- Addend
- Addition
- Bundle, unbundle, regroup, rename, change (compose or decompose a 10 or 100)
- Difference
- Hundreds place (referring to place value)
- Place value (referring to the unit value of each digit in a given number)
- Subtraction
- Units of ones, tens, hundreds, thousands (referring to place value; 10 ones is the same as 1 unit of ten)

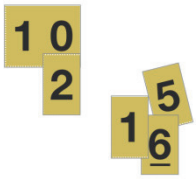
[3]These are terms and symbols students have used or seen previously.

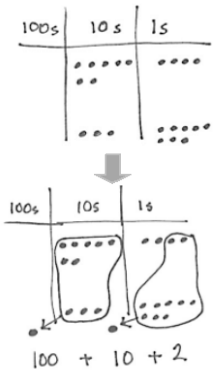
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Suggested Tools and Representations

- Arrow notation (arrow way)
- Chip model (pictured)
- Hide Zero cards (pictured)
- Number bond
- Personal white boards
- Place value chart (Template in Lesson 1)
- Place value disk sets (19 ones, 19 tens, 18 hundreds, 1 one thousand per set)
- Rekenrek
- Tape diagram

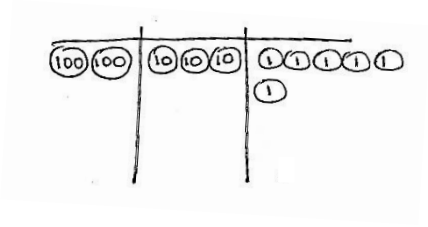
Hide Zero cards



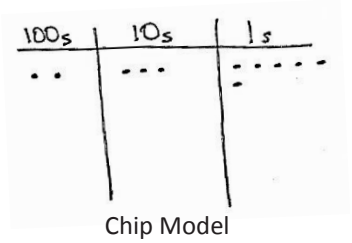


Chip Model

Note: Students work through a progression of models to represent the addition and subtraction algorithm. Following the use of actual place value disks, students learn to draw the disks to represent numbers. This model provides an added level of support in that students write the value on each disk (see image below left). Because the value is on the disk, there is no need to label the place value chart. Next, students learn the chip model, drawing dots on a labeled place value chart (see image below right). While still pictorial, this model is more abstract because the value of the chip derives from its placement on the chart.



Place Value Disk Drawing



Chip Model

Scaffolds[4]

The scaffolds integrated into *A Story of Units* give alternatives for how students access information as well as express and demonstrate their learning. Strategically placed margin notes are provided within each lesson elaborating on the use of specific scaffolds at applicable times. They address many needs presented by English language learners, students with disabilities, students performing above grade level, and students performing below grade level. Many of the suggestions are organized by Universal Design for Learning (UDL) principles and are applicable to more than one population. To read more about the approach to differentiated instruction in *A Story of Units,* please refer to "How to Implement *A Story of Units*."

Assessment Summary

[4]Students with disabilities may require Braille, large print, audio, or special digital files. Please visit the website www.p12.nysed.gov/specialed/aim for specific information on how to obtain student materials that satisfy the National Instructional Materials Accessibility Standard (NIMAS) format.

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Type	Administered	Format	Standards Addressed
Mid-Module Assessment Task	After Topic C	Constructed response with rubric	2.OA.1 2.NBT.5 2.NBT.7 2.NBT.8 2.NBT.9
End-of-Module Assessment Task	After Topic F	Constructed response with rubric	2.OA.1 2.NBT.5 2.NBT.6 2.NBT.7 2.NBT.8 2.NBT.9

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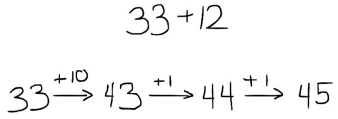
Topic A

Sums and Differences Within 100

2.OA.1, 2.NBT.5, 2.NBT.8, 2.NBT.9

Focus Standards:		2.OA.1	Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
		2.NBT.5	Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
		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.[1]
		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:		5	
Coherence	**-Links from:**	G2–M3	Place Value, Counting, and Comparison of Numbers to 1,000
	-Links to:	G2–M5	Addition and Subtraction Within 1,000 with Word Problems to 100
		G3–M2	Place Value and Problem Solving with Units of Measure

In Topic A, students build upon their understanding of the base ten system and their prior knowledge of place value strategies presented in Module 3. In Lesson 1, students relate 10 more and 10 less and 1 more and 1 less to addition and subtraction. They recognize that they must add and subtract like units and that the digit in the tens place changes when adding and subtracting 10, just as the digit in the ones place changes when adding or subtracting 1. Students see numbers in terms of place value units; 54 – 10 is 5 tens 4 ones minus 1 ten. Additionally, they learn to record the addition and subtraction of multiples of 10 using arrow notation.

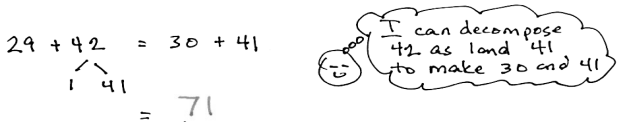


In Lesson 2, students apply place value understanding to add and subtract multiples of 10 before counting on by tens. For example, when adding 20 to 43, they may count 53, 63. Students also develop flexibility in using related addition problems. For example, to solve 92 – 60, one student might think 9 tens – 6 tens is 3 tens, plus 2 is 32, while another starts at 60, adds on 3 tens and then 2 ones to reach 92, so 32.

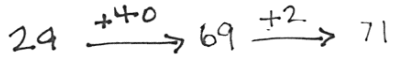
[1]Students mentally add and subtract 100 in Topics D and E of Module 4.

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In Lessons 3 and 4, students continue to add and subtract multiples of 10 with the added complexity of some ones. Problems are intentionally chosen so that the ones digit is close to a multiple of 10 (e.g., 38, 39, 41). This prompts students to discover and use relationships between the numbers to develop a variety of simplifying strategies they can use to solve. For example, students might reason mentally that for 29 + 42 they can make a multiple of 10 and count on to solve. They use number bonds to decompose 42 as 1 and 41 to make 30 + 41 = 71 (as shown above and to the right).

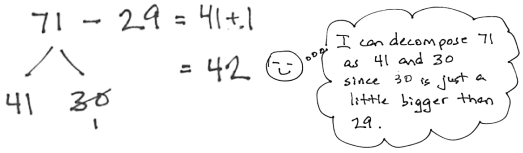


Students also learn to use arrow notation (the arrow way) to record their mental math and to show change in numbers as they work with them. First, students add a multiple of 10, then count on 2 to make 71 (as shown at right). This avoids common misconceptions arising from using the equal sign to record such computation (e.g., erroneously recording 29 + 40 = 69 + 2 = 71).

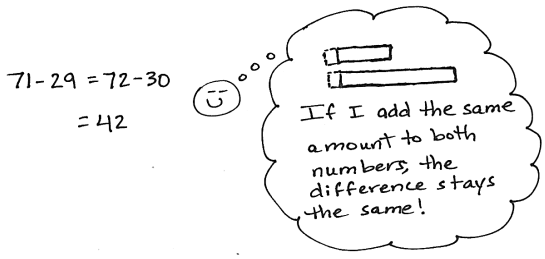


Similarly, students use number bonds to make a multiple of 10 when subtracting (as shown below). After students subtract 30 – 29, they add 41 + 1 to make 42.

The ease of subtracting a multiple of 10 is highlighted again, as students learn the strategy of compensation for subtraction.[2] For example, in 71 – 29, the same amount, 1, can be added (or subtracted) to both numbers to create the equivalent problem that involves no renaming (as shown below and to the right).



Topic A closes with a lesson that focuses on one- and two-step word problems within 100. Students apply their place value reasoning, mental strategies, and understanding of renaming to negotiate different problem types with unknowns in various positions. The lesson begins with guided practice and transitions to students solving problems on their own or with others, independent of teacher direction. Students are encouraged to be flexible in their thinking and to use multiple strategies in solving problems. For example, students might use tape diagrams to solve word problems, relating the diagrams to a situation equation (e.g., ____ – 36 = 60) and rewriting it as a solution equation (e.g., 60 + 36 = ____), thus illustrating the relationship between operations and using this relationship to check their work. Or, students might use arrow notation and count on. Discussion ensues as each problem is solved, with students sharing strategies, analyzing the efficiency of each, defending their work, and/or critiquing or supporting the work of their peers.



The strategies taught in Topic A are designed to build fluency and develop students' conceptual understanding of addition and subtraction using properties of operations and place value reasoning. This sets the stage for composing and decomposing a ten in Topics B and C.

[2]Students are formally introduced to the term *compensation* in Module 5.

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A Teaching Sequence Toward Mastery of Sums and Differences Within 100

Objective 1: Relate 1 more, 1 less, 10 more, and 10 less to addition and subtraction of 1 and 10. (Lesson 1)

Objective 2: Add and subtract multiples of 10 including counting on to subtract. (Lesson 2)

Objective 3: Add and subtract multiples of 10 and some ones within 100. (Lessons 3–4)

Objective 4: Solve one- and two-step word problems within 100 using strategies based on place value. (Lesson 5)

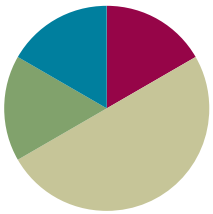
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Lesson 1

Objective: Relate 1 more, 1 less, 10 more, and 10 less to addition and subtraction of 1 and 10.

Suggested Lesson Structure

Fluency Practice	(10 minutes)
Application Problem	(10 minutes)
Concept Development	(30 minutes)
Student Debrief	(10 minutes)
Total Time	**(60 minutes)**



Fluency Practice (10 minutes)

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

Place Value (6 minutes)

Materials: (T) Unlabeled tens place value chart (Template) (S) Unlabeled tens place value chart (Template), personal white board

Note: Practicing place value skills prepares students for adding and subtracting 1 and 10 in today's lesson.

T: (Draw or project the place value chart template.) Slide the place value chart into your personal white board. Draw place value disks to show 5 ones. Write the number below it.
S: (Draw 5 ones disks, and write 5 below it.)
T: Show 2 tens disks, and write the number below it.
S: (Draw 2 tens disks, and write 2 at the bottom of the tens column.)
T: Say the number in unit form.
S: 2 tens 5.
T: Say the number in standard form.
S: 25.
T: Add 1 to your chart. What is 1 more than 25?
S: 26.
T: Now add 1 ten to your chart. What is 10 more than 26?
S: 36.

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T: Subtract 1 from 36 by crossing out a one. What is 1 less than 36?
S: 35.
T: Now subtract 10 from 35 by crossing out 1 ten. What is 10 less than 35?
S: 25.

Continue with the following possible sequence: 4 tens 7 ones, 1 ten 8 ones, and 6 tens 9 ones.

More/Less (4 minutes)

Note: Practice with giving 1 or 10 more (or less) prepares students to add and subtract 1 and 10 fluently.

T: For every number I say, you say a number that is 1 more. When I say 5, you say 6. Ready?
T: 5.
S: 6.
T: 8.
S: 9.

Continue with the following possible sequence: 9, 16, 19, 28, 38, 39, 44, 49, 54, and 60.

T: Now for every number I say, you say a number that is 10 more. When I say 50, you say 60. Ready?
T: 50.
S: 60.
T: 10.
S: 20.

Continue with the following possible sequence: 80, 40, 20, 21, 28, 30, 35, 45, and 56.

T: Let's try saying 1 less for every number I say. When I say 6, you say 5. Ready?
T: 6.
S: 5.
T: 9.
S: 8.

Continue with the following possible sequence: 11, 14, 19, 20, 30, 31, 51, and 50.

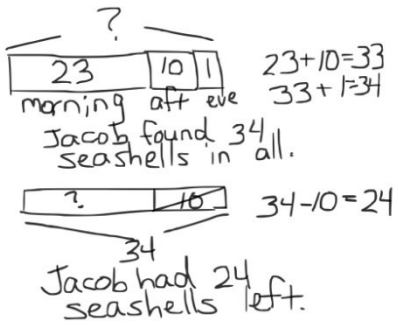
T: Now for every number I say, you say a number that is 10 less. When I say 50, you say 40. Ready?
T: 50.
S: 40.
T: 30.
S: 20.

Continue with the following possible sequence: 80, 70, 60, 61, 41, 46, 48, 28, and 18.

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Application Problem (10 minutes)

In the morning, Jacob found 23 seashells on the beach. In the afternoon, he found 10 more. In the evening, he found 1 more. How many seashells did Jacob find in all? If he gives 10 to his brother, how many seashells will Jacob have left?



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 complete this problem independently to provide insight into the kinds of mental strategies they currently use.

Review the RDW procedure for problem solving.

Directions: Read the problem, draw and label, write an equation, 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 (30 minutes)

Materials: (T) Sentence frames:
___ is 1 more than ___. 1 more than ___ is ___.
1 less than ___ is ___. ___ is 1 less than ___.
10 more than ___ is ___. ___ is 10 more than ___.
10 less than ___ is ___. ___ is 10 less than ___.
(S) Place value disks: 9 tens disks, 9 ones disks, unlabeled tens place value chart (Template), personal white board

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 place value disks to show me 36 on your place value chart.
S: (Show 3 tens 6 ones.)
T: Show me 1 more.
S: (Add a ones disk to show 3 tens 7 ones.)
T: Use a sentence frame to describe adding one to 36.
S: 37 is 1 more than 36. → 1 more than 36 is 37.
T: What did you do to change 36?
S: We added one to the ones place.
T: Give me an addition sentence starting with 36.
S: 36 + 1 = 37.

NOTES ON MULTIPLE MEANS OF REPRESENTATION:

Use different models to demonstrate the change in 1 more, 1 less, 10 more, 10 less.

- With a hundreds chart on the wall and student copies, point to different numbers, and have students show *more* and *less* changes by sliding their fingers. Ask questions to foster conceptual understanding: "What patterns do you notice in the rows? Columns? What happens to the digits? Value of the number?" Invite one or two students to lead the class and model problems. Then, have students work in pairs.
- Use concrete objects other than disks, such as a Rekenrek or bundled straws, to show groups of tens and ones.

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T: Start with 37.

S: 37 = 1 + 36. → 37 = 36 + 1.

Repeat the process for 1 less than 36.

T: Show me 36 again. (Pause as students reset their place value charts.)

T: Show me 10 more than 36.

S: (Add a tens disk to show 4 tens 6 ones.)

T: Use a sentence frame to describe adding ten to 36.

S: 46 is 10 more than 36. → 10 more than 36 is 46.

T: What did you do to change 36?

S: We added another ten.

T: Be specific. Where did you add the ten?

S: In the tens place.

T: Yes!

T: Give me an addition sentence starting with 36.

S: 36 + 10 = 46.

T: Start with 46.

S: 46 = 10 + 36. → 46 = 36 + 10.

NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

Listen intently as students use place value language to talk with their partners. Use place value disks and the place value chart to help students navigate the following vocabulary: *place value, tens, ones, digit, value, unit*. Post key vocabulary on the wall and point to words accompanied by a visual (e.g., 56 is 5 tens and 6 ones).

Repeat the process for 10 less than 36.

T: Talk with your partner. Use place value language to explain what you understand about 1 more, 1 less, 10 more, and 10 less. (Allow about one minute for discussion.)

S: 1 more is just adding 1, and 10 more is adding 10. → 1 less and 10 less are the same as taking away 1 or 10. → We have to subtract and add the same units, so the ones place changes when we add or subtract 1. The same happens for the tens place.

T: (Collect the place value 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, "45, 46, 47, 48, 49," you say, "1 more." Wait for my signal. Ready?

T: 23, 33, 43, 53, 63.

S: 10 more!

T: 76, 75, 74, 73, 72.

S: 1 less!

Continue until students can readily identify the rule.

T: Take out your personal white board. Now, I'll write a series of numbers on the board. You write the rule and the next three numbers. The rules are + 1, – 1, + 10, and – 10.

T: Turn your board over when you have written your answer. Wait until I say, "Show me." Ready?

T: (Write 18, 17, 16, ___, ___, ___. Pause.) Show me.

S: (Show – 1 and 15, 14, 13.)

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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.

$$33 \xrightarrow{+10} ___ \xrightarrow{-1} ___ \xrightarrow{-1} ___ \xrightarrow{-10} ___ \xrightarrow{-10} ___.$$

T: Let's try something different. (Write $33 \xrightarrow{+10} ___$ on the board.) What is 33 + 10? Show me.

S: (Write 43.)

T: Minus 1? (Continue to record the sequence by filling in 43 and writing $\xrightarrow{-1} ___$.)

S: (Write 42.)

$$33 \xrightarrow{+10} 43 \xrightarrow{-1} 42 \xrightarrow{-1} 41 \xrightarrow{-10} 31 \xrightarrow{-10} 21$$

T: Minus 1? (Fill in 42 and write $\xrightarrow{-1} ___$.)

S: (Write 41.)

T: Minus 10? (Fill in 41 and write $\xrightarrow{-10} ___$.)

S: (Write 31.)

T: Minus 10? (Fill in 31 and write $\xrightarrow{-10} ___$.)

S: (Write 21.)

T: (Point to the completed sequence on the board.) This is a **simplifying strategy** called arrow notation. We can also call it the arrow way. Pretend your partner is a family member. Explain how and why you changed each number. Be sure to use place value language.

MP.3 S: You add or subtract 1 or 10, and the arrows point to what the number becomes after you change it. → It shows that you are changing the ones or the tens place and whether it is more or less. → 10 more than 33 is 43, and 1 less is 42, and 1 less is 41. Then, 10 less than 41 is 31, and 10 less than 31 is 21.

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

62 – 23.

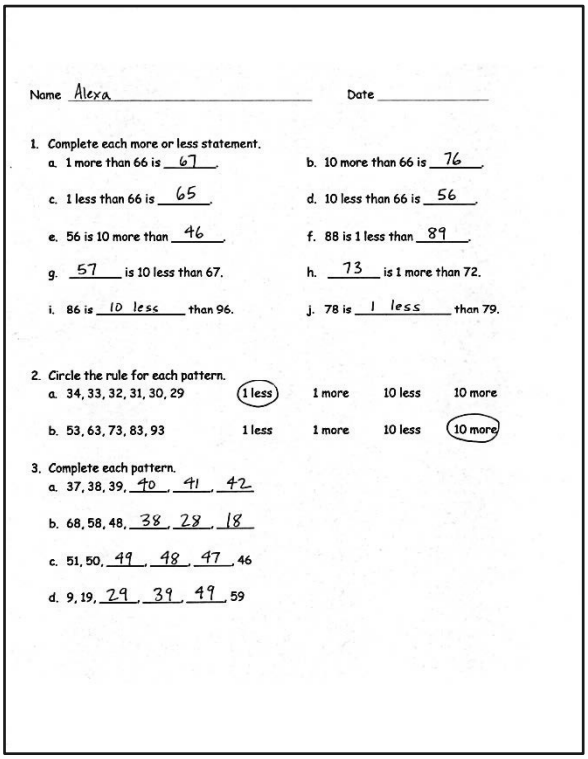
$$62 \xrightarrow{-10} ___ \xrightarrow{-10} ___ \xrightarrow{-1} ___ \xrightarrow{-1} ___ \xrightarrow{-1} ___.$$

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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 purposeful 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. Consider assigning incomplete problems for homework or at another time during the day.



Name Alexa Date

1. Complete each more or less statement.
   a. 1 more than 66 is 67.
   b. 10 more than 66 is 76.
   c. 1 less than 66 is 65.
   d. 10 less than 66 is 56.
   e. 56 is 10 more than 46.
   f. 88 is 1 less than 89.
   g. 57 is 10 less than 67.
   h. 73 is 1 more than 72.
   i. 86 is 10 less than 96.
   j. 78 is 1 less than 79.
2. Circle the rule for each pattern.
   a. 34, 33, 32, 31, 30, 29 (1 less) 1 more 10 less 10 more
   b. 53, 63, 73, 83, 93 1 less 1 more 10 less (10 more)
3. Complete each pattern.
   a. 37, 38, 39, 40, 41, 42
   b. 68, 58, 48, 38, 28, 18
   c. 51, 50, 49, 48, 47, 46
   d. 9, 19, 29, 39, 49, 59

Student Debrief (10 minutes)

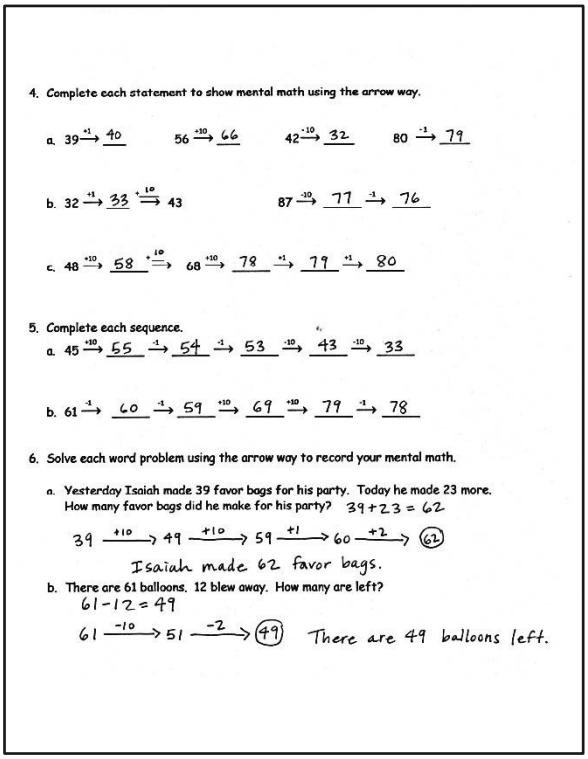
Lesson Objective: Relate 1 more, 1 less, 10 more, and 10 less to addition and subtraction of 1 and 10.

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

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

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

- What do you need to know to complete each pattern in Problem 3?
- Look at Problem 4. What are we actually doing when we talk about 10 more, 10 less, 1 more, or 1 less than a number?
- What helpful strategy did we use today to record a sequence of numbers? Can we use an equal sign instead of an arrow? Is this statement: 33 + 10 = 43 – 1 = 42 – 1 = 41 true?



4. Complete each statement to show mental math using the arrow way.
   a. 39 +1→ 40 56 +10→ 66 42 -10→ 32 80 -1→ 79
   b. 32 +1→ 33 +10⇒ 43 87 -10→ 77 -1→ 76
   c. 48 +10→ 58 +10⇒ 68 +10→ 78 +1→ 79 +1→ 80
5. Complete each sequence.
   a. 45 +10→ 55 -1→ 54 -1→ 53 -10→ 43 -10→ 33
   b. 61 -1→ 60 -1→ 59 +10→ 69 +10→ 79 -1→ 78
6. Solve each word problem using the arrow way to record your mental math.
   a. Yesterday Isaiah made 39 favor bags for his party. Today he made 23 more. How many favor bags did he make for his party? 39 + 23 = 62
      39 +10→ 49 +10→ 59 +1→ 60 +2→ (62)
      Isaiah made 62 favor bags.
   b. There are 61 balloons. 12 blew away. How many are left?
      61 - 12 = 49
      61 -10→ 51 -2→ (49) There are 49 balloons left.

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- In Problem 4, Part (c), what total quantity did you add to 48 to arrive at 80? How do you know? How can we show it as an equation?
- What simplifying strategy did you use to answer Problem 6? How could you use what you know from Problem 5 to answer Problem 6?
- What important connection did we make today?

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.

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Name _____ Date _____

1. Complete each *more* or *less* statement.

   a. 1 more than 66 is _____.

   b. 10 more than 66 is _____.

   c. 1 less than 66 is _____.

   d. 10 less than 66 is _____.

   e. 56 is 10 more than _____.

   f. 88 is 1 less than _____.

   g. _____ is 10 less than 67.

   h. _____ is 1 more than 72.

   i. 86 is _____ than 96.

   j. 78 is _____ than 79.

2. Circle the rule for each pattern.

   a. 34, 33, 32, 31, 30, 29 1 less 1 more 10 less 10 more

   b. 53, 63, 73, 83, 93 1 less 1 more 10 less 10 more

3. Complete each pattern.

   a. 37, 38, 39, _____, _____, _____

   b. 68, 58, 48, _____, _____, _____

   c. 51, 50, _____, _____, _____, 46

   d. 9, 19, _____, _____, _____, 59

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4. Complete each statement to show mental math using the arrow way.

a. 39 $\xrightarrow{+1}$ _____ 56 $\xrightarrow{+10}$ _____ 42 $\xrightarrow{-10}$ _____ 80 $\xrightarrow{-1}$ _____

b. 32 $\xrightarrow{+1}$ _____ $\xrightarrow{+____}$ 43 87 $\xrightarrow{-10}$ _____ $\xrightarrow{-1}$ _____

c. 48 $\xrightarrow{+10}$ _____ $\xrightarrow{+____}$ 68 $\xrightarrow{+10}$ _____ $\xrightarrow{+1}$ _____ $\xrightarrow{+1}$ _____

5. Complete each sequence.

a. 45 $\xrightarrow{+10}$ _____ $\xrightarrow{-1}$ _____ $\xrightarrow{-1}$ _____ $\xrightarrow{-10}$ _____ $\xrightarrow{-10}$ _____

b. 61 $\xrightarrow{-1}$ _____ $\xrightarrow{-1}$ _____ $\xrightarrow{+10}$ _____ $\xrightarrow{+10}$ _____ $\xrightarrow{-1}$ _____

6. Solve each word problem using the arrow way to record your mental math.

a. Yesterday Isaiah made 39 favor bags for his party. Today he made 23 more. How many favor bags did he make for his party?

b. There are 61 balloons. 12 blew away. How many are left?

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Name _____ Date _____

1. Complete each pattern.

   a. 48, 47, 46, 45, 44, _____, _____, _____

   b. 78, 68, 58, 48, 38, _____, _____, _____

   c. 35, 34, 44, 43, 53, _____, _____, _____

2. Create two patterns using one of these rules for each: +1, -1, +10, or –10.

   a. _____, _____, _____, _____

   Rule for Pattern (a): _____

   b. _____, _____, _____, _____

   Rule for Pattern (b): _____

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Name _____ Date _____

1. Complete each *more* or *less* statement.

a. 1 more than 37 is _____.

b. 10 more than 37 is _____.

c. 1 less than 37 is _____.

d. 10 less than 37 is _____.

e. 58 is 10 more than _____.

f. 29 is 1 less than _____.

g. _____ is 10 less than 45.

h. _____ is 1 more than 38.

i. 49 is _____ than 50.

j. 32 is _____ than 22.

2. Complete each pattern and write the rule.

a. 44, 45, _____, _____, 48 Rule: _____

b. 44, _____, 24, _____, 4 Rule: _____

c. 44, _____, _____, 74, 84 Rule: _____

d. _____, 43, 42, _____, 40 Rule: _____

e. _____, _____, 44, 34, _____ Rule: _____

f. 41, _____, _____, 38, 37 Rule: _____

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3. Label each statement as true or false.

   a. 1 more than 36 is the same as 1 less than 38. _____

   b. 10 less than 47 is the same as 1 more than 35. _____

   c. 10 less than 89 is the same as 1 less than 90. _____

   d. 10 more than 41 is the same as 1 less than 43. _____

4. Below is a chart of balloons at the county fair.

Color of Balloons	Number of Balloons
Red	59
Yellow	61
Green	65
Blue	
Pink	

   a. Use the following to complete the chart and answer the question.
      - The fair has 1 more blue than red balloons.
      - There are 10 fewer pink than yellow balloons.

      Are there more blue or pink balloons?

   b. If 1 red balloon pops and 10 red balloons fly away, how many red balloons are left? Use the arrow way to show your work.

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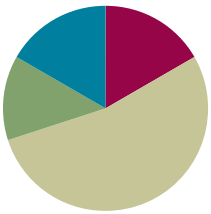
unlabeled tens place value chart

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Lesson 2

Objective: Add and subtract multiples of 10 including counting on to subtract.

Suggested Lesson Structure



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

Fluency Practice (10 minutes)

- Place Value **2.NBT.1, 2.NBT.5** (7 minutes)
- How Many More Tens? **2.NBT.5** (3 minutes)

Place Value (7 minutes)

Materials: (T) Unlabeled tens place value chart (Lesson 1 Template) (S) Unlabeled tens place value chart (Lesson 1 Template), personal white board

Note: Practicing place value skills prepares students for adding and subtracting multiples of 10.

T: (Project the unlabeled tens place value chart template. Have students insert the template in their personal white boards.) Draw place value disks to show 1 ten and 3 ones. Write the number below it.

S: (Draw 1 ten and 3 ones on the place value chart, and write 13 below it.)

T: Say the number in unit form.

S: 1 ten 3 ones.

T: Say the number in standard form.

S: 13.

T: Add 2 tens to your chart. How many tens do you have now?

S: 3 tens.

T: What is 20 more than 13?

S: 33.

NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

Before the lesson, have students skip-count by tens to one hundred and back down to zero while doing a physical activity (e.g., jumping jacks).

During the lesson, encourage one or more students to lead the class in an example (e.g., 48 – 30). These may be students who are struggling to grasp the concept and would benefit from personal guidance or students who grasp the concept quickly and would thrive on leadership opportunities. Praise their use of place value language to explain their thinking.

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T: Add 3 tens to 33. How many tens do you have now?
S: 6 tens.
T: What is 30 more than 33?
S: 63.
T: Say the number in unit form.
S: 6 tens 3 ones.
T: Now, subtract 4 tens from 63. What is 40 less than 63?
S: 23.

Continue with the following possible sequence: 23 + 70, 93 – 40, 53 + 30, and 83 – 80.

How Many More Tens? (3 minutes)

Materials: (S) Personal white board

Note: Subtracting multiples of 10 prepares students for the lesson.

T: If I say 34 – 24, you say 10. To say it in a sentence, you say 34 is 10 more than 24. Ready?
T: 64 – 44.
S: 20.
T: Say it in a sentence.
S: 64 is 20 more than 44.

Continue with the following possible sequence: 85 – 45, 68 – 38, 59 – 49, 47 – 17, and 99 – 19.

Concept Development (32 minutes)

Materials: (T) Rekenrek (S) Personal white board

Show 34 beads on the Rekenrek.

T: In Lesson 1, we added and subtracted 1 ten. Today, let's add 2 tens, then 3 tens, and more!
T: How many do you see?
S: 34.
T: The Say Ten way?
S: 3 tens 4.
T: (Add 2 tens.) How many do you see?
S: 5 tens 4.
T: I am going to add 2 more tens. Turn and talk. What will happen to the number when I add 2 tens?
S: The number in the tens place will get bigger by 2. → The number will get bigger by 20. → It will be 74.
T: (Add 2 tens.) What is 54 + 20?

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S: 74.

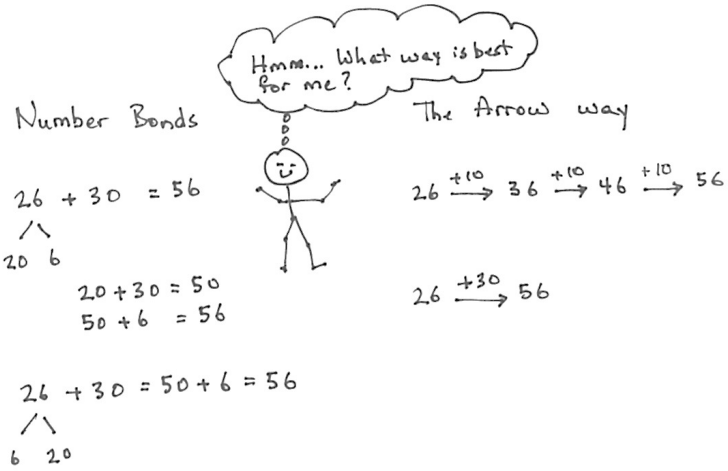
T: The Say Ten way?

S: 7 tens 4.

T: If I asked you to add 3 tens to 26, how could you solve that?

S: Count on by ten three times. → Change the 2 to 5 because 2 tens plus 3 tens is 5 tens. → Add 3 tens on the Rekenrek.

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 write adding 3 tens the arrow way, as we did yesterday. (Demonstrate and involve the students as you write.) I can also break apart the tens and ones with a number bond, add the tens, and then add the ones. (Demonstrate and involve the students as you write.)

T: No matter which way I write it, when I add tens to a number, the ones stay the same!

Note: 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.

MP.3

T: Now it's your turn. On your personal white board, solve 18 + 20. Show your board when you have an answer.

Repeat this process using the following possible sequence: 25 + 50, 38 + 40, and 40 + 27.

Show 74 beads on the Rekenrek.

T: Now, let's subtract 2 tens, then 3 tens, and more!

T: How many do you see?

S: 74.

T: The Say Ten way?

S: 7 tens 4.

T: (Subtract 2 tens.) How many do you see?

S: 5 tens 4.

T: I am going to subtract 2 more tens. Turn and talk. What will happen to the number when I subtract 2 tens?

S: The digit in the tens place will get smaller by 2. → The number will get smaller by 20. → It will be 34.

T: (Add 2 tens.) What is 54 – 20?

S: 34.

NOTES ON MULTIPLE MEANS OF REPRESENTATION:

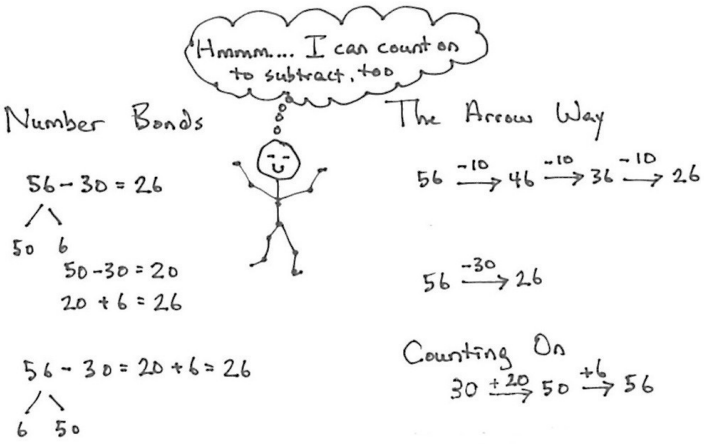
When counting up by tens and on by ones, use a number line to provide visual support. For example, when counting from 30 to 42, have students point to the jump between 30 and 40 and then point to 41, 42. The number line correlates very well to the arrow notation.

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T: The Say Ten way?

S: 3 tens 4.

T: Okay. Now, subtract 3 tens from 56. Take a moment and work on your personal white board to solve 56 – 30. (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.

MP.3

T: What is the whole?

S: 56.

T: What is the part we know?

S: 30.

T: How could we show the missing part with an addition problem?

S: 30 + ___ = 56. → ___ + 30 = 56.

T: We can use the arrow way, counting first by either tens or ones. Try it with a partner.

Guide students through this or let them work independently. Starting at 30, they might add 2 tens first and then 6 ones or add 6 ones first and then add 2 tens.

Repeat with 62 – 40, 51 – 20, and 77 – 30.

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.

NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

Encourage students to explain their thinking about adding or subtracting tens. For Problem 2, Parts (c) and (d), facilitate a discussion in which different students share which problem solving method they prefer and why.
Ask students, "How can you tell when one strategy might be better than another?" Students may learn as much from each other's reasoning as from the lesson.

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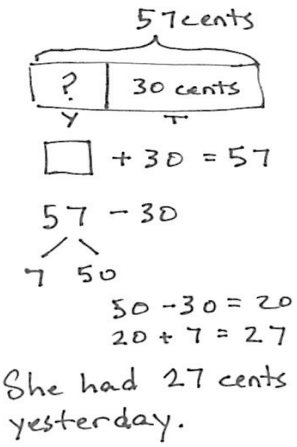
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Application Problem (8 minutes)

Susan has 57 cents in her piggy bank. If she just put in 30 cents today, how much did she have yesterday?

Note: This *add to with start unknown* problem gives students a chance to apply their new learning. It also provides an opportunity to work through a common mistake; many students will add and give the answer 87 cents. Encourage students to draw a tape diagram to show what is known. This will help them identify the whole and one part, guiding them to subtract to find the missing part.

This Application Problem comes after the Concept Development so that students can apply what they have learned about adding and subtracting multiples of 10. You may choose to lead students through the RDW process or have students work independently and then share their work.



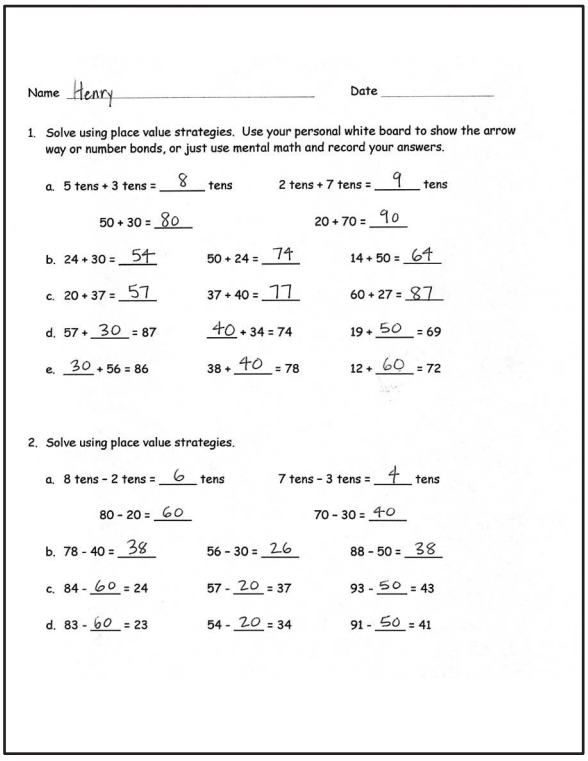
Student Debrief (10 minutes)

Lesson Objective: Add and subtract multiples of 10 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.

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



Name Henry Date

1. Solve using place value strategies. Use your personal white board to show the arrow way or number bonds, or just use mental math and record your answers.

a. 5 tens + 3 tens = 8 tens; 2 tens + 7 tens = 9 tens; 50 + 30 = 80; 20 + 70 = 90

b. 24 + 30 = 54; 50 + 24 = 74; 14 + 50 = 64

c. 20 + 37 = 57; 37 + 40 = 77; 60 + 27 = 87

d. 57 + 30 = 87; 40 + 34 = 74; 19 + 50 = 69

e. 30 + 56 = 86; 38 + 40 = 78; 12 + 60 = 72

2. Solve using place value strategies.

a. 8 tens − 2 tens = 6 tens; 7 tens − 3 tens = 4 tens; 80 − 20 = 60; 70 − 30 = 40

b. 78 − 40 = 38; 56 − 30 = 26; 88 − 50 = 38

c. 84 − 60 = 24; 57 − 20 = 37; 93 − 50 = 43

d. 83 − 60 = 23; 54 − 20 = 34; 91 − 50 = 41

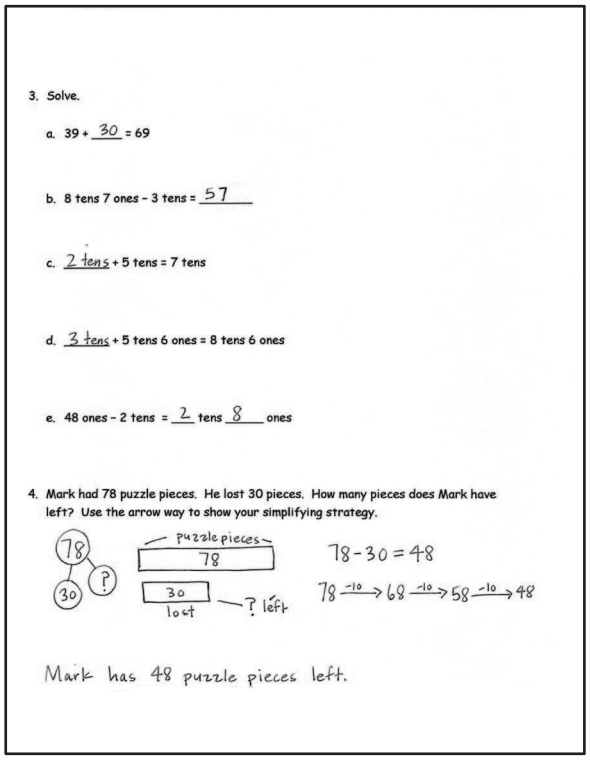
- Which simplifying strategy did you use to solve the sequence in Problem 1, Part (d)? Why is the arrow way a good choice for counting up?
- Explain to your partner how you solved the sequence in Problem 2, Part (c). How did they help you to solve the problems in Problem 2, Part (d)? What was similar about them?
- How was solving Problem 3, Part (e) different from solving the other parts of Problem 3? What did you need to do?
- Explain to your partner how you used the arrow way to solve Problem 4. Why did this strategy work well?

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- What connections can you make between the number bond strategy and the arrow way? What is the goal of these simplifying strategies?

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.



3. Solve.

a. 39 + 30 = 69

b. 8 tens 7 ones - 3 tens = 57

c. 2 tens + 5 tens = 7 tens

d. 3 tens + 5 tens 6 ones = 8 tens 6 ones

e. 48 ones - 2 tens = 2 tens 8 ones

4. Mark had 78 puzzle pieces. He lost 30 pieces. How many pieces does Mark have left? Use the arrow way to show your simplifying strategy.

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Name _____ Date _____

1. Solve using place value strategies. Use your personal white board to show the arrow way or number bonds, or just use mental math, and record your answers.

   a. 5 tens + 3 tens = _____ tens 2 tens + 7 tens = _____ tens

   50 + 30 = _____ 20 + 70 = _____

   b. 24 + 30 = _____ 50 + 24 = _____ 14 + 50 = _____

   c. 20 + 37 = _____ 37 + 40 = _____ 60 + 27 = _____

   d. 57 + _____ = 87 _____ + 34 = 74 19 + _____ = 69

   e. _____ + 56 = 86 38 + _____ = 78 12 + _____ = 72

2. Solve using place value strategies.

   a. 8 tens – 2 tens = _____ tens 7 tens – 3 tens = _____ tens

   80 – 20 = _____ 70 – 30 = _____

   b. 78 - 40 = _____ 56 – 30 = _____ 88 – 50 = _____

   c. 84 - _____ = 24 57 - _____ = 37 93 - _____ = 43

   d. 83 - _____ = 23 54 - _____ = 34 91 - _____ = 41

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3. Solve.

   a. 39 + _____ = 69

   b. 8 tens 7 ones – 3 tens = _____

   c. _____ + 5 tens = 7 tens

   d. _____ + 5 tens 6 ones = 8 tens 6 ones

   e. 48 ones – 2 tens = _____ tens _____ ones

4. Mark had 78 puzzle pieces. He lost 30 pieces. How many pieces does Mark have left? Use the arrow way to show your simplifying strategy.

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Name _____ Date _____

Fill in the missing number to make each statement true.

1. 50 + 20 = _____

2. 4 tens + 3 tens = _____ tens

3. 7 tens - _____ tens = 5 tens

4. _____ - 20 = 63

5. 6 tens + 1 ten 4 ones = 9 tens 4 ones - _____ tens

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Name _____ Date _____

1. Solve using place value strategies. Use scrap paper to show the arrow way or number bonds, or just use mental math, and record your answers.

a. 2 tens + 3 tens = _____ tens 20 + 30 = _____ 2 tens 4 ones + 3 tens = __ tens __ ones 24 + 30 = _____	b. 5 tens + 4 tens = _____ tens 50 + 40 = _____ 5 tens 9 ones + 4 tens = __ tens __ ones 59 + 40 = _____

c. 28 + 40 = _____ 18 + 30 = _____ 60 + 38 = _____

d. 30 + 25 = _____ 35 + 50 = _____ 15 + 20 = _____

e. 37 + _____ = 47 _____ + 27 = 57 17 + _____ = 87

f. _____ + 22 = 62 29 + _____ = 79 11 + _____ = 91

2. Find each sum. Then use >, <, or = to compare.

a. 23 + 40 _____ 20 + 33

b. 50 + 18 _____ 48 + 20

c. 19 + 60 _____ 39 + 30

d. 64 + 10 _____ 49 + 20

e. 70 + 21 _____ 18 + 80

f. 35 + 50 _____ 26 + 60

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3. Solve using place value strategies.

a. 6 tens – 2 tens = ___ tens 60 – 20 = _____ 6 tens 3 ones – 3 tens = __ tens __ ones 63 – 30 = _____	b. 8 tens – 5 tens = ___ tens 80 – 50 = _____ 8 tens 9 ones – 5 tens = __ tens __ ones 89 – 50 = _____

c. 55 – 20 = _____ 75 – 30 = _____ 85 – 50 = _____

d. 72 – _____ = 22 49 – _____ = 19 88 – _____ = 28

e. 67 – _____ = 47 71 – _____ = 51 99 – _____ = 69

4. Complete each more than or less than statement.

a. 20 less than 58 is _____. b. 36 more than 40 is _____.

c. 40 less than _____ is 28. d. 50 more than _____ is 64.

5. There were 68 plates in the sink at the end of the day. There were 40 plates in the sink at the beginning of the day. How many plates were added throughout the day? Use the arrow way to show your simplifying strategy.

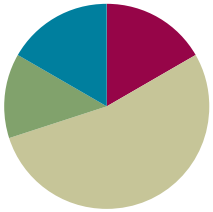
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Lesson 3

Objective: Add and subtract multiples of 10 and some ones within 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)

- More and Less: Multiples of 10 **2.NBT.5** (2 minutes)
- Sprint: Add and Subtract Ones and Tens **2.NBT.5** (8 minutes)

More and Less: Multiples of 10 (2 minutes)

Note: Students review Lesson 2 by adding and subtracting multiples of 10 fluently.

T: 2 tens less than 6 tens.
S: 4 tens.
T: Subtraction number sentence?
S: 60 – 20 = 40.
T: 2 tens less than 6 tens 8 ones.
S: 4 tens 8 ones.
T: Subtraction number sentence?
S: 68 – 20 = 48.

Continue with the following possible sequence: 56 – 26, 73 – 40, 60 + 22, 64 + 24, 57 + 30, and 49 + 50.

Sprint: Add and Subtract Ones and Tens (8 minutes)

Materials: (S) Add and Subtract Ones and Tens Sprint

Note: This Sprint reviews addition and subtraction of multiples of 10 and some ones.

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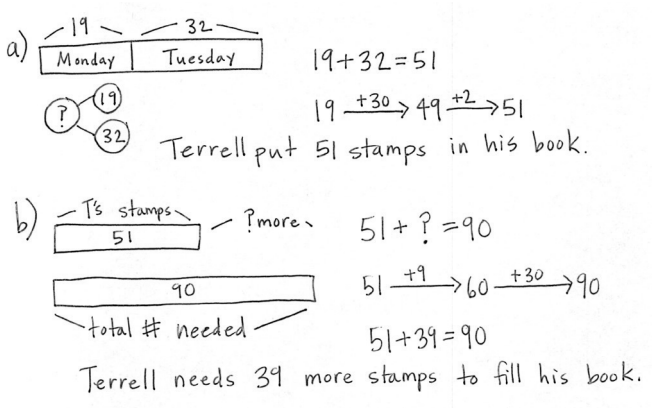
Application Problem (8 minutes)

Terrell put 19 stamps in his book on Monday. On Tuesday, he put in 32 stamps.

a. How many stamps did Terrell put in his book on Monday and Tuesday?

b. If Terrell's book holds 90 stamps, how many more stamps does he need to fill his book?

Note: This problem invites students to use mental math, arrow notation, or number bonds to solve. Choose a method to model as guided practice, or have the students work independently, and then share their methods.



Concept Development (32 minutes)

Materials: (T) Rekenrek (S) Personal white board

Note: Throughout the Concept Development portion of this lesson, students record their answers on their personal white boards and then turn their boards over. When most students' boards are turned over, say, "Show me." Students hold up their personal white boards for a visual check. They then erase their boards and are ready for the next problem.

T: 40 + 20. Show me.
S: (Show 60.)
T: 48 + 20. Show me.
S: (Show 68.)
T: 48 + 21? Talk with your partner.
S: I would add 8 ones and 1 one, 9 ones, and then add 4 tens and 2 tens, 6 tens. That's 69. → I added 40 + 20 and then 8 ones and 1 one, 69. → I added 48 + 20, which is 68, + 1 is 69.

MP.2

T: 48 + 19…?
S: That's hard!
T: We can solve 48 + 21 and 48 + 19 using 48 + 20 to help us.
T: From 20 to 21 is one more or one less?
S: 1 more.
T: From 20 to 19 is one more or one less?
S: 1 less.

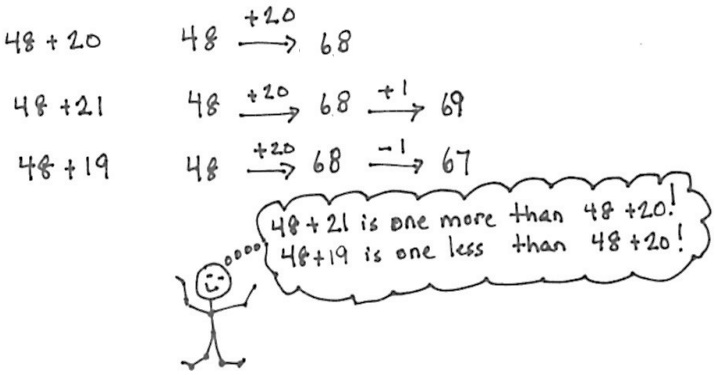
NOTES ON MULTIPLE MEANS OF REPRESENTATION:

When students turn their boards over, pay attention to students who are consistently not ready with the rest of the class, as they may need additional review or support on the foundational skills and concepts.

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T: Adding 21 is adding one more than 20. (Demonstrate as shown to the right.)

T: Adding 19 is adding one less than 20. (Demonstrate as shown.)



Have students solve the following problems on their personal white boards as they share their strategies with a partner.

- 36 + 50, 36 + 51, 36 + 49
- 27 + 60, 27 + 61, 27 + 59
- 43 + 20, 43 + 22, 43 + 18

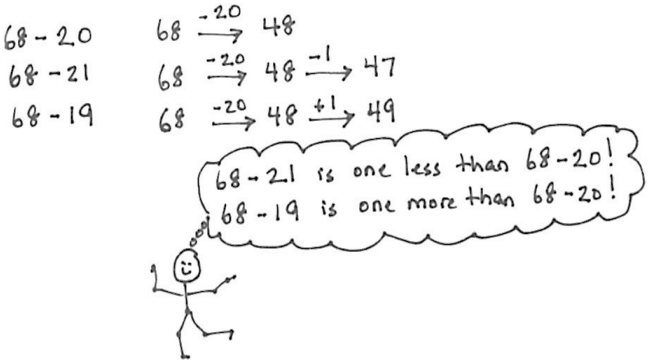
T: Let's try this with subtraction. What is 68 – 20? Show me using the arrow way.

MP.2

S: (Show.)

T: Talk with your partner. Solve 68 – 21, using 68 – 20 to help you.

T: Solve 68 – 19, using 68 – 20 to help you.



Continue with the following possible sequence:

- 57 – 30, 57 – 31, 57 – 29
- 63 – 40, 63 – 41, 63 – 39
- 72 – 50, 72 – 51, 72 – 49

Follow with a discussion of why the strategy works. Be aware that students may be more confused by the subtraction. To subtract 31, we are subtracting one more than 30. To subtract 29, we are subtracting one less than 30, so we add one to the result of 57 – 30.

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.

NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

The concept of *take away 10, add 1* in subtraction might still elude some students. With the problem 25 – 9, use a number line or hundreds chart and start with 25 – 1 = 24, working up to 25 – 10 = 15. Then, go back to 25 – 9 = 16. Guide students toward seeing that 16 is 1 greater than 15. Repeat with other examples (e.g., 61 – 29) until they grasp the concept.

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Student Debrief (10 minutes)

Lesson Objective: Add and subtract multiples of 10 and some ones within 100.

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

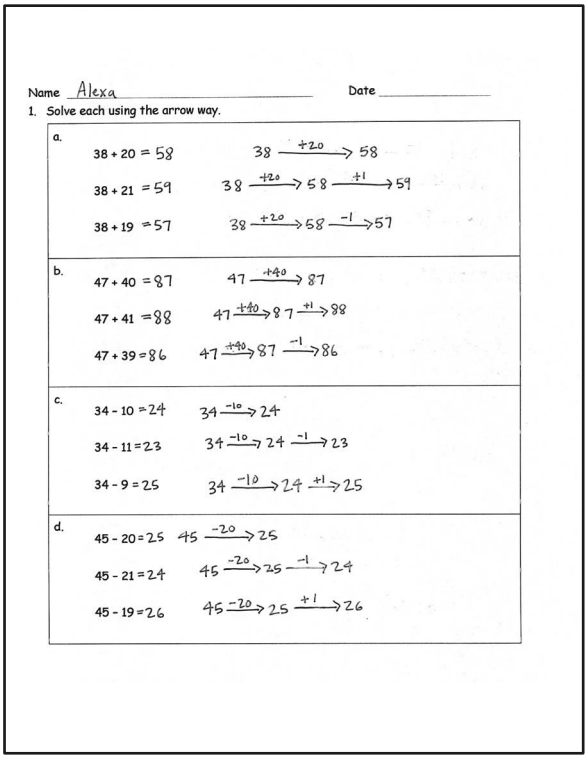
Invite students to review their solutions for the Problem Set. They should check work by comparing answers with a partner before going over answers as a class. Look for misconceptions or misunderstandings that can be addressed in the Debrief. Guide students in a conversation to debrief the Problem Set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

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

- For Problem 1, Part (a), how does knowing 38 + 20 help you to solve the other problems in that set?
- For Problem 1, Part (c), how does knowing 34 – 10 help you to solve the other problems in that set?
- How did using the arrow way help you to solve Problem 1, Part (d)? What careful observations can you make about the numbers you subtracted?
- Share and compare with a partner: What were your simplifying strategies for solving Problem 2, Part (d)? How were they the same or different?
- How does mentally adding and subtracting tens help us with numbers that are close to tens, like 19 and 41?

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.



Name Alexa Date

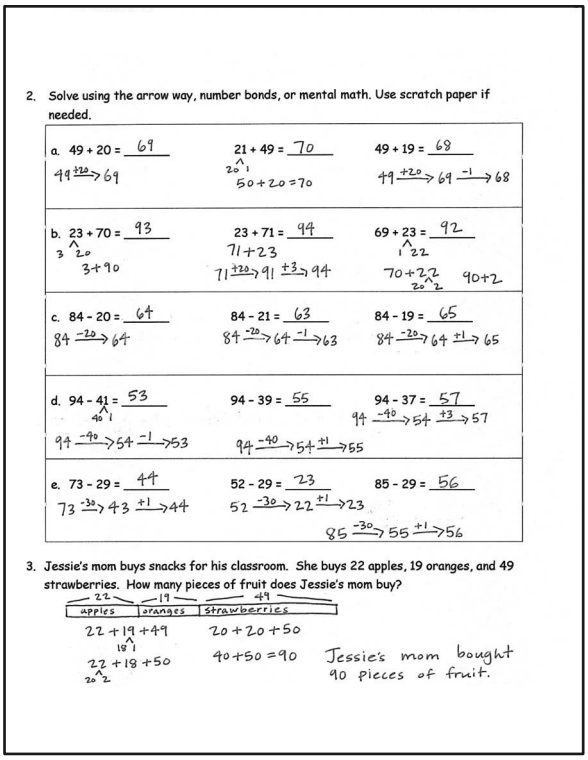
1. Solve each using the arrow way.

a.
38 + 20 = 58 38 +20→ 58
38 + 21 = 59 38 +20→ 58 +1→ 59
38 + 19 = 57 38 +20→ 58 −1→ 57

b.
47 + 40 = 87 47 +40→ 87
47 + 41 = 88 47 +40→ 87 +1→ 88
47 + 39 = 86 47 +40→ 87 −1→ 86

c.
34 − 10 = 24 34 −10→ 24
34 − 11 = 23 34 −10→ 24 −1→ 23
34 − 9 = 25 34 −10→ 24 +1→ 25

d.
45 − 20 = 25 45 −20→ 25
45 − 21 = 24 45 −20→ 25 −1→ 24
45 − 19 = 26 45 −20→ 25 +1→ 26



2. Solve using the arrow way, number bonds, or mental math. Use scratch paper if needed.

a. 49 + 20 = 69 (49 +20→ 69) | 21 + 49 = 70 (20, 1; 50 + 20 = 70) | 49 + 19 = 68 (49 +20→ 69 −1→ 68)

b. 23 + 70 = 93 (3, 20; 3 + 90) | 23 + 71 = 94 (71 + 23; 71 +20→ 91 +3→ 94) | 69 + 23 = 92 (1, 22; 70 + 22; 20, 2; 90 + 2)

c. 84 − 20 = 64 (84 −20→ 64) | 84 − 21 = 63 (84 −20→ 64 −1→ 63) | 84 − 19 = 65 (84 −20→ 64 +1→ 65)

d. 94 − 41 = 53 (40, 1; 94 −40→ 54 −1→ 53) | 94 − 39 = 55 (94 −40→ 54 +1→ 55) | 94 − 37 = 57 (94 −40→ 54 +3→ 57)

e. 73 − 29 = 44 (73 −30→ 43 +1→ 44) | 52 − 29 = 23 (52 −30→ 22 +1→ 23) | 85 − 29 = 56 (85 −30→ 55 +1→ 56)

3. Jessie's mom buys snacks for his classroom. She buys 22 apples, 19 oranges, and 49 strawberries. How many pieces of fruit does Jessie's mom buy?

apples (22)	oranges (19)	strawberries (49)

22 + 19 + 49 (19, 1; 22 + 18 + 50; 20, 2) | 20 + 20 + 50 | 40 + 50 = 90

Jessie's mom bought 90 pieces of fruit.

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A

Number Correct: _____

Add and Subtract Ones and Tens

1.	3 + 1 =	
2.	30 + 10 =	
3.	31 + 10 =	
4.	31 + 1 =	
5.	3 – 1 =	
6.	30 – 10 =	
7.	35 – 10 =	
8.	35 – 1 =	
9.	47 + 10 =	
10.	10 – 1 =	
11.	80 – 1 =	
12.	40 + 20 =	
13.	43 + 20 =	
14.	43 + 2 =	
15.	40 – 20 =	
16.	45 – 20 =	
17.	45 – 2 =	
18.	57 + 2 =	
19.	57 – 20 =	
20.	10 – 2 =	
21.	50 – 2 =	
22.	51 – 2 =	

23.	50 + 30 =	
24.	54 + 30 =	
25.	54 + 3 =	
26.	50 – 30 =	
27.	59 – 30 =	
28.	59 – 3 =	
29.	67 + 30 =	
30.	67 – 30 =	
31.	67 – 3 =	
32.	40 – 3 =	
33.	42 – 3 =	
34.	30 + 40 =	
35.	32 + 40 =	
36.	32 + 4 =	
37.	70 – 40 =	
38.	76 – 40 =	
39.	76 – 4 =	
40.	53 + 40 =	
41.	53 + 4 =	
42.	53 – 40 =	
43.	90 – 4 =	
44.	92 – 4 =	

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B

Number Correct: _____

Improvement: _____

Add and Subtract Ones and Tens

1.	2 + 1 =	
2.	20 + 10 =	
3.	21 + 10 =	
4.	21 + 1 =	
5.	2 – 1 =	
6.	20 – 10 =	
7.	25 – 10 =	
8.	25 – 1 =	
9.	37 + 10 =	
10.	10 – 1 =	
11.	70 – 1 =	
12.	50 + 20 =	
13.	53 + 20 =	
14.	53 + 2 =	
15.	50 – 20 =	
16.	54 – 20 =	
17.	54 – 2 =	
18.	64 + 2 =	
19.	64 – 20 =	
20.	10 – 2 =	
21.	60 – 2 =	
22.	61 – 2 =	
23.	40 + 30 =	
24.	45 + 30 =	
25.	45 + 3 =	
26.	40 – 30 =	
27.	49 – 30 =	
28.	49 – 3 =	
29.	57 + 30 =	
30.	57 – 30 =	
31.	57 – 3 =	
32.	50 – 3 =	
33.	52 – 3 =	
34.	20 + 40 =	
35.	23 + 40 =	
36.	23 + 4 =	
37.	80 – 40 =	
38.	86 – 40 =	
39.	86 – 4 =	
40.	43 + 40 =	
41.	43 + 4 =	
42.	63 – 40 =	
43.	80 – 4 =	
44.	82 – 4 =	

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Name _____ Date _____

1. Solve each using the arrow way.

a. 38 + 20 38 + 21 38 + 19
b. 47 + 40 47 + 41 47 + 39
c. 34 – 10 34 – 11 34 – 9
d. 45 – 20 45 – 21 45 – 19

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2. Solve using the arrow way, number bonds, or mental math. Use scrap paper if needed.

a. 49 + 20 = _____	21 + 49 = _____	49 + 19 = _____
b. 23 + 70 = _____	23 + 71 = _____	69 + 23 = _____
c. 84 – 20 = _____	84 – 21 = _____	84 – 19 = _____
d. 94 – 41 = _____	94 – 39 = _____	94 – 37 = _____
e. 73 – 29 = _____	52 – 29 = _____	85 – 29 = _____

3. Jessie's mom buys snacks for his classroom. She buys 22 apples, 19 oranges, and 49 strawberries. How many pieces of fruit does Jessie's mom buy?

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Name _____ Date _____

1. Solve using the arrow way or number bonds.

   a. 43 + 30 = _____

   b. 68 + 24 = _____

   c. 82 – 51 = _____

   d. 28 – 19 = _____

2. Show or explain how you used mental math to solve one of the problems above.

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1. Solve using the arrow way. The first set is done for you.

a. 67 + 20 = 87 67 $\xrightarrow{+20}$ 87 67 + 21 = 88 67 $\xrightarrow{+20}$ 87 $\xrightarrow{+1}$ 88 67 + 19 = 86 67 $\xrightarrow{+20}$ 87 $\xrightarrow{-1}$ 86	b. 56 + 40 = _____ 56 + 41 = _____ 56 + 39 = _____
c. 68 - 40 = _____ 68 - 41 = _____ 68 - 39 = _____	d. 87 - 50 = _____ 87 - 51 = _____ 87 - 49 = _____

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2. Solve using the arrow way, number bonds, or mental math. Use scrap paper if needed.

a. 48 – 20 = _____ 48 – 21 = _____ 48 – 19 = _____	b. 86 – 50 = _____ 86 – 51 = _____ 86 – 49 = _____	c. 37 + 40 = _____ 37 + 41 = _____ 37 + 39 = _____
d. 62 + 30 = _____ 62 + 31 = _____ 62 + 29 = _____	e. 77 – 40 = _____ 77 – 41 = _____ 77 – 39 = _____	f. 28 + 50 = _____ 28 + 51 = _____ 28 + 49 = _____

3. Marcy had $84 in the bank. She took $39 out of her account. How much does she have in her account now?

4. Brian has 92 cm of rope. He cuts off a piece 49 cm long to tie a package.

   a. How much rope does Brian have left?

   b. To tie a different package, Brian needs another piece of rope that is 8 cm shorter than the piece he just cut. Does he have enough rope left?

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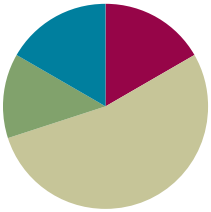
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Lesson 4

Objective: Add and subtract multiples of 10 and some ones within 100.

Suggested Lesson Structure

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



Fluency Practice (10 minutes)

- Place Value **2.NBT.1** (3 minutes)
- Making a Ten Drill **2.NBT.5** (2 minutes)
- Making the Next Ten to Add **2.NBT.5** (5 minutes)

Place Value (3 minutes)

Note: Reviewing and practicing place value skills in isolation prepares students for success with adding and subtracting tens and ones.

T: (Write 174.) Say the number.
S: 174.
T: What digit is in the tens place?
S: 7.
T: (Underline 7.) What's the value of the 7?
S: 70.
T: State the value of the 1.
S: 100.
T: State the place of the 4.
S: Ones place.

Repeat for the following possible sequence: 258, 734, 860, and 902.

Making a Ten Drill (2 minutes)

Note: This fluency activity reviews foundations that lead into today's lesson.

T: (Post 6 + ___ = 10 on the board.) Let's find the missing part to make ten. If I say 6, you say 4.

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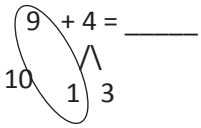
T: Ready? 6.
S: 4.
T: Number sentence.
S: 6 + 4 = 10.
T: Ready? 16.
S: 4.
T: Number sentence.
S: 16 + 4 = 20.

Continue with the following possible sequence: 7, 17, 13, 23, 27, 42, 48, and 58.

Making the Next Ten to Add (5 minutes)

Note: This fluency activity reviews foundations that lead into today's lesson.

Post on board:

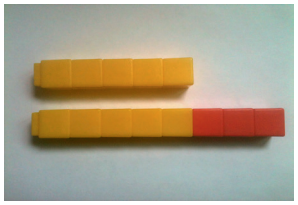


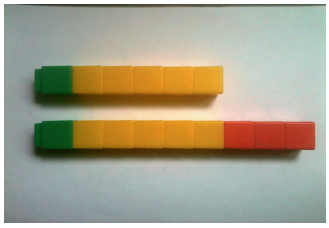
T: When I say 9 + 4, you say 10 + 3. Ready? 9 + 4.
S: 10 + 3.
T: Answer.
S: 13.

Continue with the following possible sequence: 19 + 4, 29 + 4, 49 + 4, 79 + 4, 9 + 6, 19 + 6, 29 + 6, 59 + 6, 8 + 3, 18 + 3, 48 + 3, 8 + 5, 18 + 5, 88 + 5, 7 + 6, 17 + 6, 27 + 6, 7 + 4, 17 + 4, and 67 + 4.

Concept Development (32 minutes)

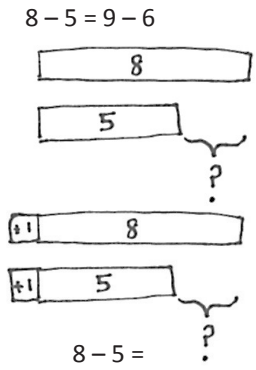
Materials: (T) Linking cubes in three colors (S) Personal white board





Show two rows of 5 linking cubes in one color (shown in yellow).
Add 3 linking cubes of another color to one row (shown in red).

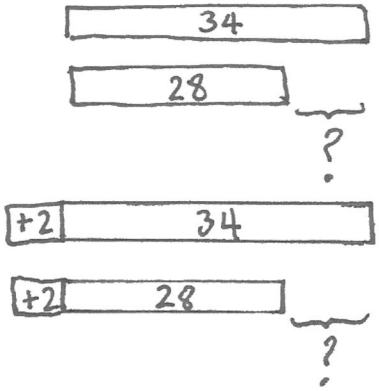
T: There are 5 yellow cubes. How many linking cubes am I holding in this stick? (Hold up a stick of 8.)
S: 8.
T: How many in this stick? (Show 5.)
S: 5.
T: What is the difference between 8 and 5? (Break off the 3 cubes that represent the difference.)
MP.2
S: 3.
T: What number sentence could I use to represent the difference between 8 and 5?
S: 8 – 5 = 3.
T: (Add one green cube to each stick.)



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T: Has the difference changed?
S: No. (Break off the difference again.)
T: But what new number sentence can I use to represent the difference between my two sticks?
S: 9 – 6 = 3.
T: The difference is still 3?
S: Yes!
T: (Draw a two-bar tape diagram to represent the two sets of cubes.)
T: I add one more to each bar. (Model as shown on the previous page.) Did the difference change?
S: No!
T: Let's test this idea. When we add the same amount to each number in a subtraction sentence, the difference stays the same.
T: Now let's try this with a new problem. (Write 34 – 28 on the board.) Now that is challenging!
T: Try this one first. 36 – 30.
S: 6.
T: How did you know the answer so fast?
S: Just take away 3 tens! → 3 tens – 3 tens = 0 tens, so you know you only have 6 ones left.
MP.2 T: Yes! Is it easier to subtract just tens!



34 – 28 = 36 – 30

Draw a tape diagram on the board to represent 34 – 28. Direct students to do the same. Call a student volunteer forward to label the tape diagram.

T: Now, can you tell me how 34 – 28 and my other problem, 36 – 30, are related? Turn and talk.
S: 34 – 28 is the same as 36 – 30, but you added two more to each number. → The difference is the same.

Call a volunteer to add two to each bar on the board to change the model to 36 – 30. Students do the same at their seats.

T: Now, how long is each bar?
S: The top bar is 36, and the bottom bar is 30.
T: We added 2 to each bar to make the problem easy!
T: Exactly! We can add the same amount to both numbers to make an equivalent but easier problem!
T: Now it's your turn. On your personal white board, solve these problems by making a tape diagram. Add on to both numbers to make the problem easier. (Write on the board: 22 – 8, 26 – 19, 33 – 18.)

NOTES ON MULTIPLE MEANS OF REPRESENTATION:

- Use a ruler to remind students that the length of an object, for example, a pencil, remains the same regardless of where it starts on the ruler.
- Use a number line to show that age differences do not change when people age. (For example, *Mark and Robert are 8 and 6 years old now. How old will they be in 3 years? What will be the difference in their ages?*)

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T: There are 6 red cubes on one end and 4 red on the other end. How many yellows are in the middle?



S: 1.

T: The total number of cubes is___?



S: 11.

T: Let's make 2 different addition sentences. Join the 1 yellow with 4 red. (Point.) What is the addition sentence for the total number of cubes?

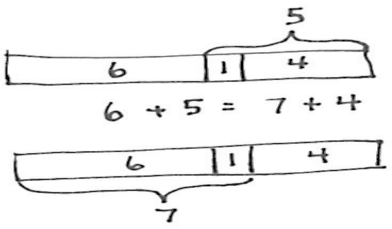


S: 6 + 5 = 11.

T: Now, instead join the 1 yellow with the 6 red.

S: 7 + 4 = 11.

T: How do you know this is true: 6 + 5 = 7 + 4? (Draw the model.)



S: Both equal eleven. → It's just the 1 yellow cube moved from one number to the other number. → You can see that the number of cubes didn't change.

T: Let's use that same idea with larger numbers to make tens.

MP.2

T: Let's solve 28 + 36.

T: (Draw a bar and label it 28.)

T: What does 28 need to be the next ten?

S: 2. (Add another chunk of 2 to the right end of the bar of 28.)

T: What is 2 less than 36?

S: 34. (Draw the second bar to show the 34.)

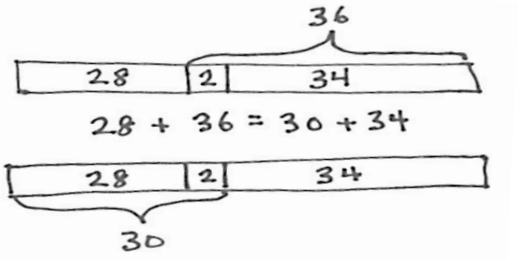
T: Why did I draw 34 instead of 36? Explain to your partner.

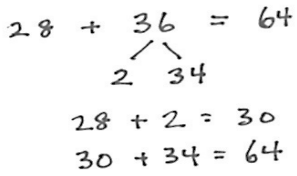
S: Because you used 2 to make 28 into 30. → Because it's easy to add tens, so we put 2 more on 28 to have 3 tens.

T: How do you know this is true: 28 + 36 = 30 + 34?

S: You can see on the model. → The two can go with the 28 or the 34. → It was easy to make 28 to 30 because it is close to the next ten.

T: We can also show 2 more for 28 with our number bond.





Write the number bond pictured to the right, working interactively with students.

Repeat with the following possible sequence: 19 + 35, 36 + 29, 78 + 24, and 37 + 46.

NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

Students with dysgraphia may benefit from using the model drawing tools on www.thinkingblocks.com.

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Problem Set (10 minutes)

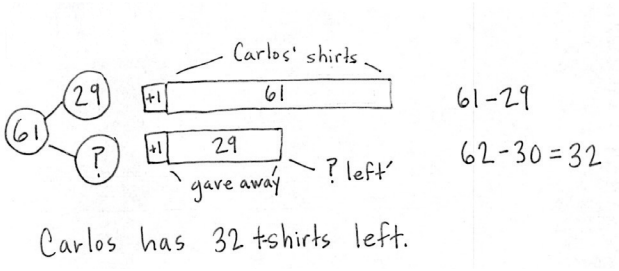
Students should do their personal best to complete the Problem Set within the allotted 10 minutes. For some classes, it may be appropriate to modify the assignment by specifying which problems they work on first.

If you find that students need additional practice with tape diagrams or number bonds, provide more practice with those models. For example, if students struggle to complete Problem 1, give them more problems where they will add on to the subtrahend to make a multiple of 10.

Application Problem (8 minutes)

Carlos bought 61 t-shirts. He gave 29 of them to his friends. How many t-shirts does Carlos have left?

Note: This Application Problem comes after the Concept Development so that students can apply what they have learned about making easy numbers (i.e., a multiple of 10) to subtract. You may choose to lead students through the RDW process or have students work independently and then share their work.



Student Debrief (10 minutes)

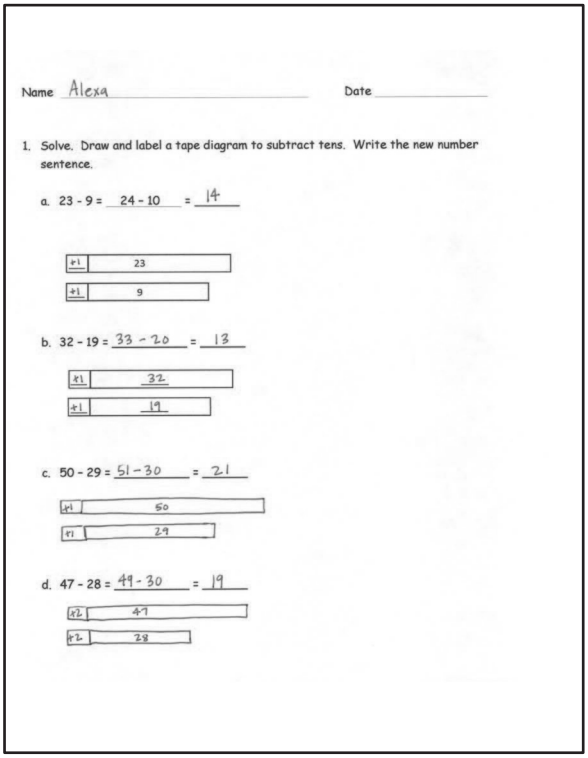
Lesson Objective: Add and subtract multiples of 10 and some ones within 100.

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.

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

- How did you label your tape diagram in Problem 1, Part (b)? Why?
- Share your tape diagram for Problem 2, Part (b) with a partner. How did you label it to add tens?
- Look at Problem 2, Part (c): 61 + 29 = 60 + 30. Is this true? How do you know?


Name Alexa Date

1. Solve. Draw and label a tape diagram to subtract tens. Write the new number sentence.

a. 23 - 9 = 24 - 10 = 14

+1 23
+1 9

b. 32 - 19 = 33 - 20 = 13

+1 32
+1 19

c. 50 - 29 = 51 - 30 = 21

+1 50
+1 29

d. 47 - 28 = 49 - 30 = 19

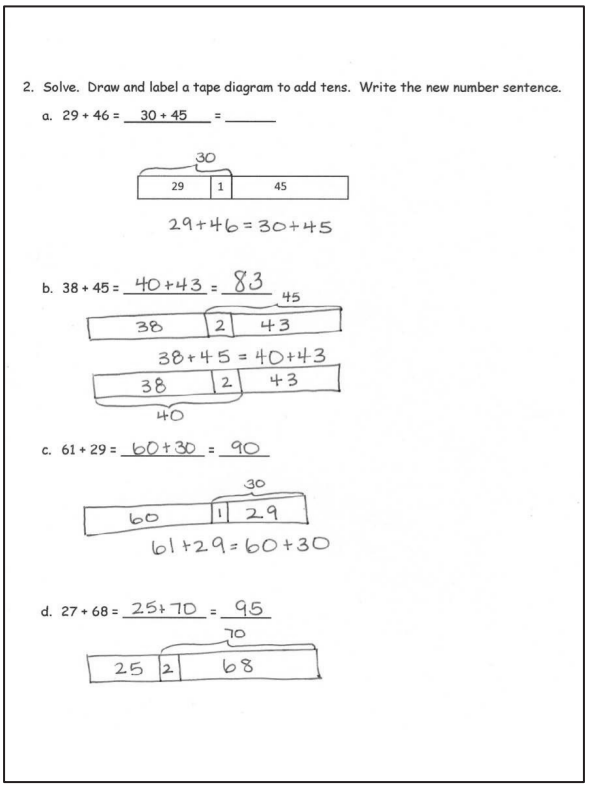
+2 47
+2 28

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- What other special strategy could you use to solve Parts (a)–(d) of Problem 1? How could you use the arrow way to solve these problems?
- What do you notice about the numbers in the Problem Set today?
- When is the best time to use the tape diagram to solve? What is the goal in using the tape diagram as a simplifying strategy?

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.


2. Solve. Draw and label a tape diagram to add tens. Write the new number sentence.

a. 29 + 46 = 30 + 45 = _____

30
29 | 1 | 45

29+46=30+45

b. 38 + 45 = 40+43 = 83

45
38 | 2 | 43

38+45=40+43

38 | 2 | 43

40

c. 61 + 29 = 60+30 = 90

30
60 | 1 | 29

61+29=60+30

d. 27 + 68 = 25+70 = 95

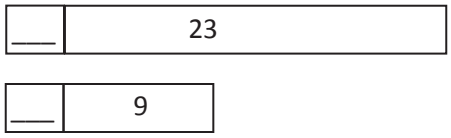
70
25 | 2 | 68

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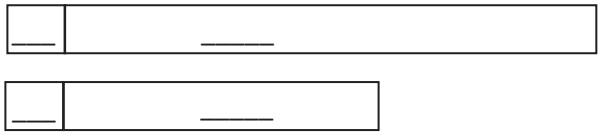
Name _____ Date _____

1. Solve. Draw and label a tape diagram to subtract tens. Write the new number sentence.

   a. 23 – 9 = __24 – 10__ = _____



   b. 32 – 19 = _____ = _____



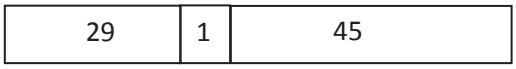
   c. 50 – 29 = _____ = _____

   d. 47 – 28 = _____ = _____

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2. Solve. Draw and label a tape diagram to add tens. Write the new number sentence.

a. 29 + 46 = 30 + 45 = _____



b. 38 + 45 = _____ = _____

c. 61 + 29 = _____ = _____

d. 27 + 68 = _____ = _____

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Name _____ Date _____

1. Solve. Draw a tape diagram or number bond to add or subtract tens. Write the new number sentence.

   a. 26 + 38 = _____ = _____

   b. 83 – 46 = _____ = _____

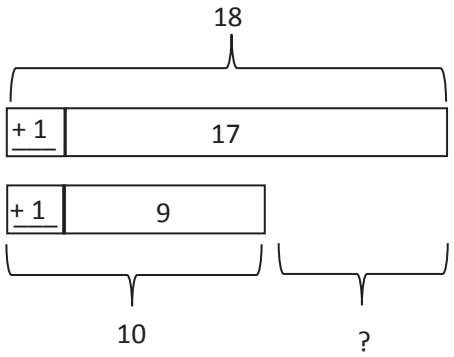
2. Craig checked out 28 books at the library. He read and returned some books. He still has 19 books checked out. How many books did Craig return? Draw a tape diagram or number bond to solve.

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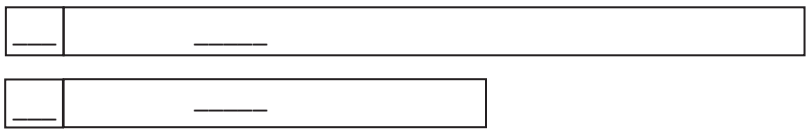
Name _____ Date _____

1. Solve. Draw and label a tape diagram to subtract 10, 20, 30, 40, etc.

a. 17 – 9 = 18 – 10 = _____



b. 33 – 19 = _____ = _____



c. 60 – 29 = _____ = _____

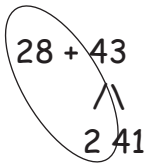
d. 56 – 38 = _____ = _____

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2. Solve. Draw a number bond to add 10, 20, 30, 40, etc.

a. 28 + 43 = 30 + 41 = _____



b. 49 + 26 = _____ = _____

c. 43 + 19 = _____ = _____

d. 67 + 28 = _____ = _____

3. Kylie has 28 more oranges than Cynthia. Kylie has 63 oranges. How many oranges does Cynthia have? Draw a tape diagram or number bond to solve.

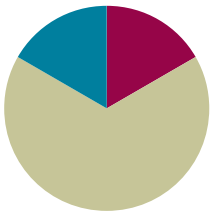
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Lesson 5

Objective: Solve one- and two-step word problems within 100 using strategies based on place value.

Suggested Lesson Structure

Fluency Practice	(10 minutes)
Concept Development	(40 minutes)
Student Debrief	(10 minutes)
Total Time	**(60 minutes)**



Fluency Practice (10 minutes)

- Rename the Units: Choral Response **2.NBT.1** (1 minute)
- Sprint: Add and Subtract Ones and Tens **2.NBT.5** (9 minutes)

Rename the Units: Choral Response (1 minute)

Note: This fluency reviews place value relationships that lead into Lesson 6.

T: (Write 10 ones = ____ ten. Draw 10 ones place value disks on the board in ten-frame format and circle them when the students say 10 ones = 1 ten.) I'm going to give you a number in ones form. Pull out as many tens as you can, and tell me how many tens and ones there are. If there are no ones, only say the tens. Ready?

T: Say the number sentence.

S: 10 ones = 1 ten.

T: (Write 20 ones = ____ tens.) Say the number sentence.

S: 20 ones = 2 tens.

T: 23 ones.

S: 23 ones = 2 tens 3 ones.

Repeat the process for the following possible sequence: 60 ones, 63 ones, 70 ones, 75 ones, 79 ones, 90 ones, and 97 ones.

Sprint: Add and Subtract Ones and Tens (9 minutes)

Materials: (S) Two-Digit Addition and Subtraction Sprint (repeated from Lesson 3)

Note: This Sprint reviews addition and subtraction of multiples of 10 and some ones.

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Concept Development (40 minutes)

Materials: (S) Math journal or personal white board

Note: Prepare Problems 1 through 4 in advance for either display or distribution to students.

Suggested Delivery of Instruction for Solving Word Problems

1. Model the problem.

Invite two pairs of students who can successfully model the problem to work at the board while the others work independently or in pairs at their seats. Review the following questions before solving the first problem.

- Can you draw something?
- What can you draw?
- What conclusions can you make from your drawing?

As students work, circulate. Reiterate the questions above, and guide students in drawing their tape diagrams.

After two minutes, have the two pairs of students share *only* their labeled diagrams.

For about one minute, encourage the demonstrating students to respond to feedback and questions from their peers.

2. Solve and write a statement.

Discuss strategies for solving, such as arrow way, number bond, and tape diagram. Give students two minutes to solve and complete the question and share their work and thought processes with a peer.

Then, instruct students to write their equations and statements of the answer.

3. Assess the solution for reasonableness.

Give students one or two minutes to assess and explain the reasonableness of their solution.

A NOTE ON LESSON STRUCTURE:

Today's Concept Development focuses on solving word problems. For this reason, the Application component is embedded in the lesson.

NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

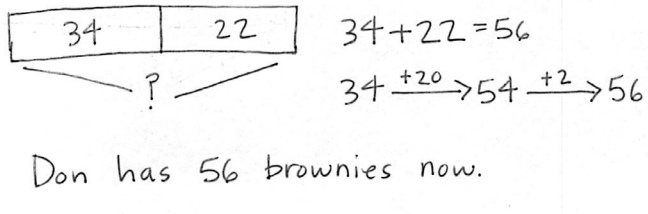
Invite students who finish early to write their own word problems similar to the ones that have been modeled. After they have checked their own solutions, instruct students to swap problems with a partner, solve, and share problem solving strategies.

Students working below grade level may continue to need additional support in adding numbers together using place value charts and place value disks.

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Problem 1: Solve a single-step word problem using a tape diagram and the arrow way.

Don has 34 brownies. He bakes 22 more. How many brownies does he have now?



NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

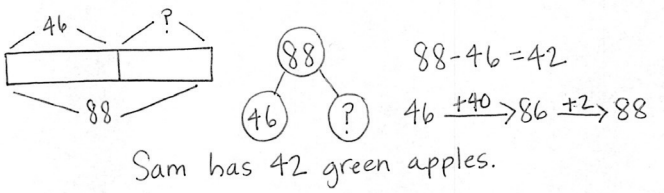
Provide graph paper for students who need support to make tape diagrams.

Support students by eliciting the response that we know both parts and need to find the whole. Students may use a number bond or tape diagram to represent the missing whole and then apply the arrow way to solve.

Problem 2: Solve a single-step word problem by drawing a tape diagram and using a number bond or the arrow way to solve.

Sam has 46 red apples and some green apples. He has a total of 88 apples. How many green apples does he have?

MP.1 Circulate and support students by guiding them to the realization that the unknown is a missing part.

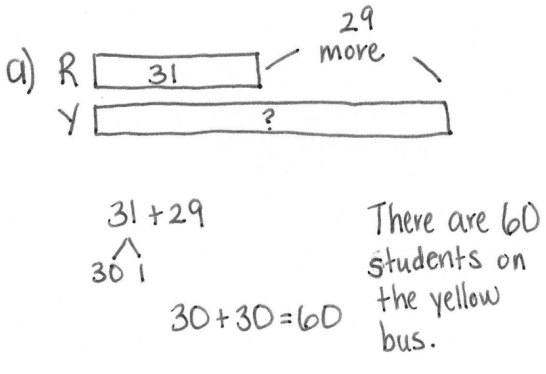


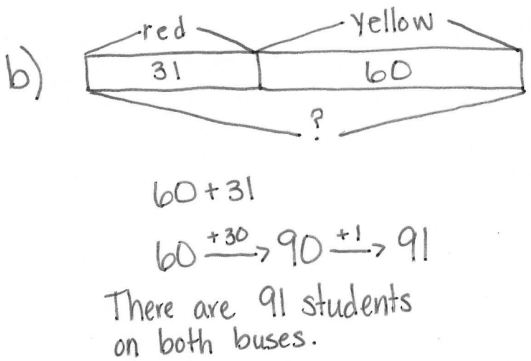
Problem 3: Solve a two-step problem by drawing a tape diagram and using a number bond to solve.

a. There are 31 students on the red bus. There are 29 more students on the yellow bus than on the red bus. How many students are on the yellow bus?

b. How many students are on both buses combined?

Note: Many students will want to draw this as a single bar, showing the total number of students to start. This works. However, the second step will most likely require a new double bar to compare the number of students on each bus. It is likely that the second step will need to be modeled for the students.





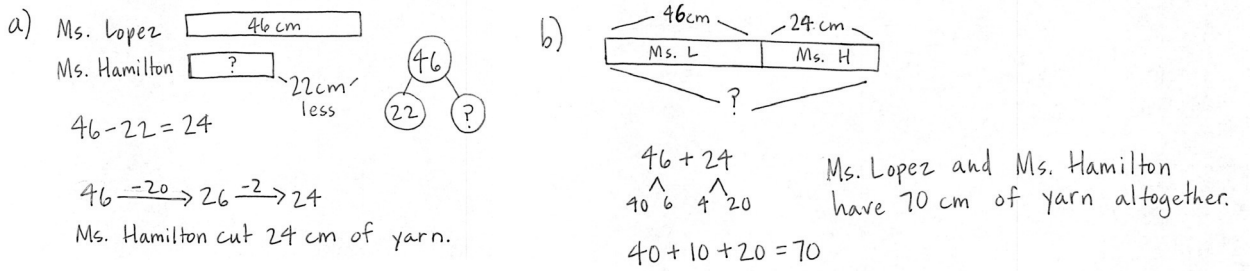
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Problem 4: Solve a two-step problem by drawing a tape diagram and using the arrow way to solve.

a. Ms. Lopez cut 46 cm of yarn. Ms. Hamilton cut 22 cm less than Ms. Lopez. How many centimeters of yarn did Ms. Hamilton cut?

b. How many centimeters of yarn did they have altogether?

MP.1



Circulate and guide students toward realizing again that the unknown is a missing part of the whole; therefore, we subtract or count on to find the answer.

Problem Set (10 minutes)

Be aware that the timing of this lesson will vary widely based on your students' experience with problem solving. You may not get to the Problem Set at all. It might be used by a small group while you work with others. It might be used by the whole class.

Student Debrief (10 minutes)

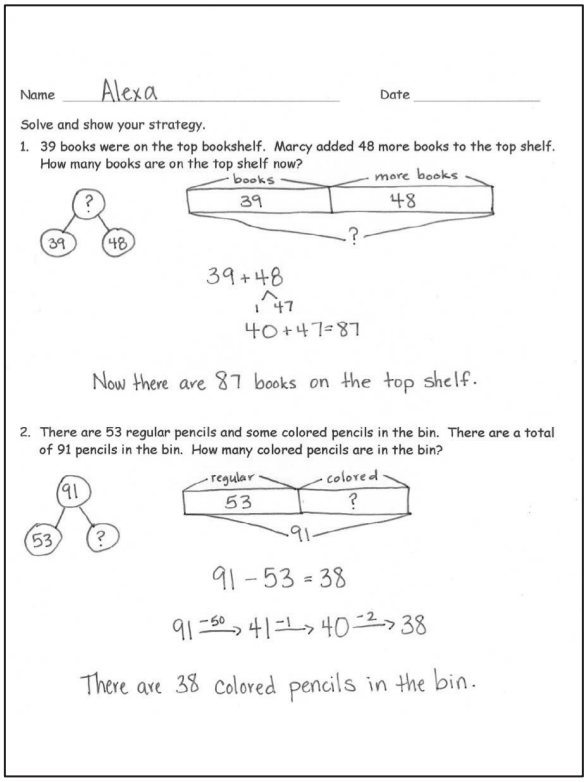
Lesson Objective: Solve one- and two-step word problems within 100 using strategies based on place value.

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.

- Let's chart the different problem-solving strategies we have used today (to be referenced in future lessons throughout the module). What did today's problem-solving strategies have in common?


Name Alexa Date

Solve and show your strategy.

1. 39 books were on the top bookshelf. Marcy added 48 more books to the top shelf. How many books are on the top shelf now?

Now there are 87 books on the top shelf.

2. There are 53 regular pencils and some colored pencils in the bin. There are a total of 91 pencils in the bin. How many colored pencils are in the bin?

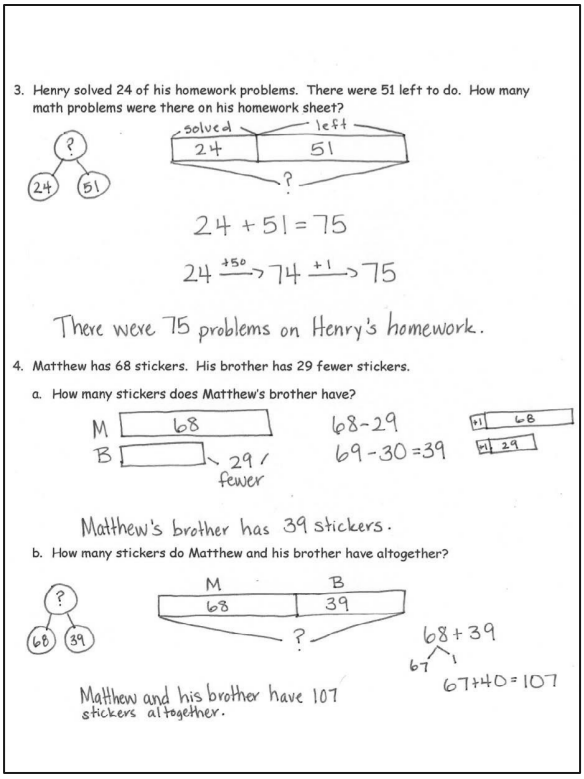
There are 38 colored pencils in the bin.

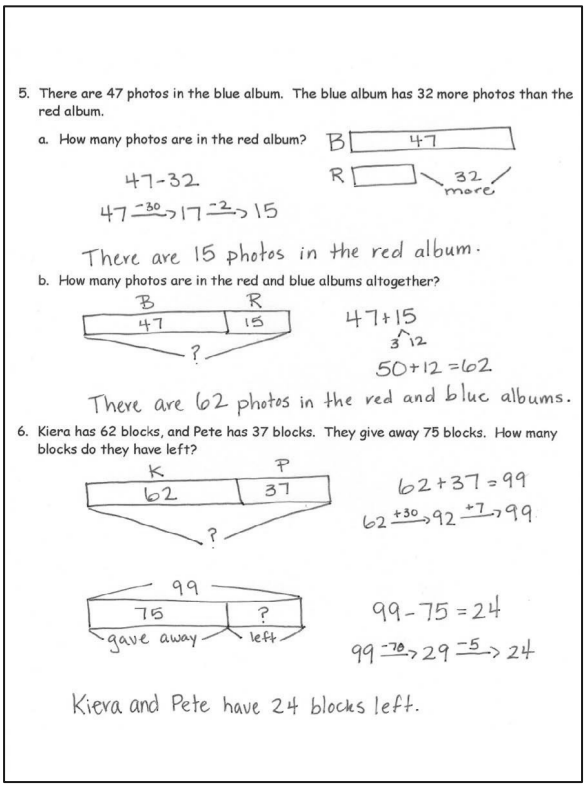
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- Explain how you decide whether to use a single bar or a double bar tape diagram when solving problems like Problem 3 or Problem 4 from today's lesson.
- Looking at the Problem Set, which simplifying strategy did you use to solve Problem 1? Why did you choose that strategy? Could you have solved this problem another way?
- Which operation did you choose to solve Problem 2? Why? How did drawing a tape diagram help you to solve?
- How did you show your thinking in Problem 4, Part (a)? Can you write an equation that describes the situation in this problem? Did you use this same operation to solve?
- What is the most challenging part about drawing a tape diagram for Problem 5, Part (a)? Based on that diagram, which simplifying strategy did you choose to solve?

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.





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Name _____ Date _____

Solve and show your strategy.

1. 39 books were on the top bookshelf. Marcy added 48 more books to the top shelf. How many books are on the top shelf now?

2. There are 53 regular pencils and some colored pencils in the bin. There are a total of 91 pencils in the bin. How many colored pencils are in the bin?

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3. Henry solved 24 of his homework problems. There were 51 left to do. How many math problems were there on his homework sheet?

4. Matthew has 68 stickers. His brother has 29 fewer stickers.

   a. How many stickers does Matthew's brother have?

   b. How many stickers do Matthew and his brother have altogether?

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5. There are 47 photos in the blue album. The blue album has 32 more photos than the red album.

   a. How many photos are in the red album?

   b. How many photos are in the red and blue albums altogether?

6. Kiera has 62 blocks, and Pete has 37 blocks. They give away 75 blocks. How many blocks do they have left?

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Name _____ Date _____

Solve and show your strategy.

1. A store sold 58 t-shirts and had 25 t-shirts left.

   a. How many t-shirts did the store have at first?

   b. If 17 t-shirts are returned, how many t-shirts does the store have now?

2. Steve swam 23 laps in the pool on Saturday, 28 laps on Sunday, and 36 laps on Monday. How many laps did Steve swim?

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Name _____ Date _____

Solve and show your strategy.

1. 38 markers were in the bin. Chase added the 43 markers that were on the floor to the bin. How many markers are in the bin now?

2. There are 29 fewer big stickers on the sticker sheet than little stickers. There are 62 little stickers on the sheet. How many big stickers are there?

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3. Rose has 34 photos in a photo album and 41 photos in a box. How many photos does Rose have?

4. Halle has two ribbons. The blue ribbon is 58 cm. The green ribbon is 38 cm longer than the blue ribbon.

   a. How long is the green ribbon?

   b. Halle uses 67 cm of green ribbon to wrap a present. How much green ribbon is left?

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5. Chad bought a shirt for $19 and a pair of shoes for $28 more than the shirt.

   a. How much was the pair of shoes?

   b. How much money did Chad spend on the shirt and shoes?

   c. If Chad had $13 left over, how much money did Chad have before buying the shirt and shoes?

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Topic B

Strategies for Composing a Ten

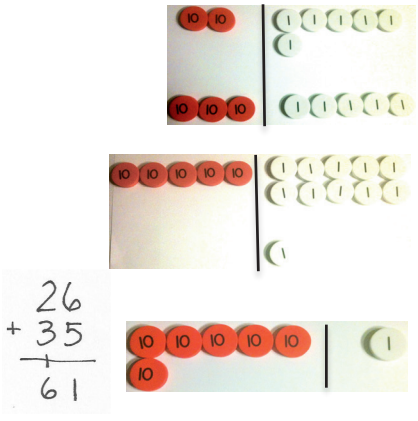
2.NBT.7, **2.NBT.9,** 2.OA.1, 2.NBT.5

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.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:		5	
Coherence	**-Links from:**	G1–M4	Place Value, Comparison, Addition and Subtraction to 40
	-Links to:	G2–M5	Addition and Subtraction Within 1,000 with Word Problems to 100
		G3–M2	Place Value and Problem Solving with Units of Measure

In Topic B, students apply their understanding of place value strategies to the addition algorithm, moving from horizontal to vertical notation. Their understanding of vertical addition starts with concrete work with place value disks, moving to pictorial place value chart drawings, and ending with abstract calculations. Consistent use of place value disks on a place value chart strengthens students' place value understanding and helps them to systematically model the standard addition algorithm including the composition of a ten. It is important to note that the algorithm is introduced at this level and is connected deeply to the understanding of place value. However, fluency with the algorithm is a Grade 4 standard and is not expected at this level.

In Lesson 6, students use place value disks on a place value chart to represent the composition of 10 ones as 1 ten with two-digit addends. The use of manipulatives reminds students that they must add like units (e.g., 26 + 35 is 2 tens + 3 tens and 6 ones + 5 ones).

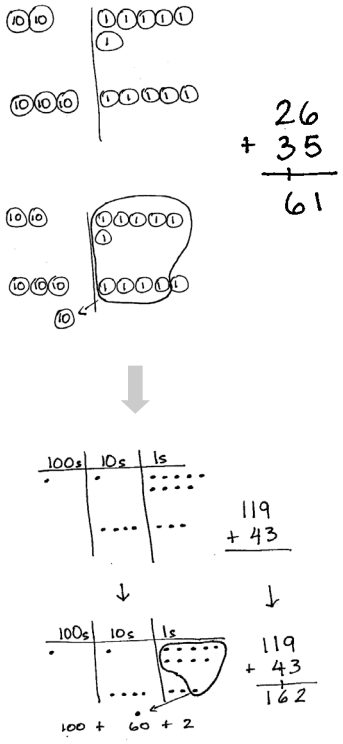
Lesson 7 builds upon this understanding as students relate manipulatives to vertical form, recording compositions as new groups below (as shown to the right). As they move the manipulatives, students use place value language to express the action as they physically make a ten with 10 ones and exchange them for 1 ten. They record each step of the algorithm in vertical form.



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In Lesson 8, students move from concrete to pictorial as they draw unlabeled place value charts with labeled disks to represent addition (as shown to the right). As they did with the manipulatives, students record each action in their drawings step-by-step in vertical form.



In Lessons 9 and 10, students work within 200, representing the composition of 10 ones as 1 ten when adding a two-digit addend to a three-digit addend. This provides practice drawing three-digit numbers without the complexity of composing a hundred. It also provides practice with adding like units. As student understanding of the relationship between their drawings and the algorithm deepens, they move to the more abstract chip model, in which place value disks are replaced by circles or dots (as shown below and to the right).

It is important to note that students must attend to precision in their drawings. Disks and dots are drawn in horizontal arrays of 5, recalling student work with 5-groups in Kindergarten and Grade 1. This visual reference enables students to clearly see the composition of the ten.

While some students may come into this topic already having learned addition in vertical form, including carrying above the tens, the process of connecting their understanding to the concrete and pictorial representations develops meaning and understanding of why the process works, not just how to use it. Therefore, students are less prone to making place value errors.

A Teaching Sequence Toward Mastery of Strategies for Composing a Ten	
Objective 1:	**Use manipulatives to represent the composition of 10 ones as 1 ten with two-digit addends. (Lesson 6)**
Objective 2:	**Relate addition using manipulatives to a written vertical method. (Lesson 7)**
Objective 3:	**Use math drawings to represent the composition and relate drawings to a written method. (Lesson 8)**
Objective 4:	**Use math drawings to represent the composition when adding a two-digit to a three-digit addend. (Lessons 9–10)**

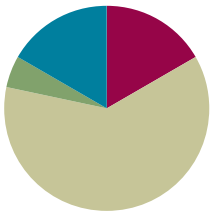
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Lesson 6

Objective: Use manipulatives to represent the composition of 10 ones as 1 ten with two-digit addends.

Suggested Lesson Structure

Fluency Practice	(10 minutes)
Application Problem	(3 minutes)
Concept Development	(37 minutes)
Student Debrief	(10 minutes)
Total Time	**(60 minutes)**



Fluency Practice (10 minutes)

- Finding Doubles **2.NBT.5** (2 minutes)
- Say Ten Counting **2.NBT.1** (3 minutes)
- Say Ten Counting to the Next Ten **2.NBT.1** (5 minutes)

Finding Doubles (2 minutes)

Note: Finding doubles gives students another mental strategy for adding.

T: I'll say a number sentence. You say the doubles fact within the number sentence and add on the rest. So, if I say 5 + 6, you say 5 + 5 + 1. Ready?
T: 4 + 5.
S: 4 + 4 + 1.
T: Answer.
S: 9.
T: 8 + 7.
S: 7 + 7 + 1.
T: Answer.
S: 15.

NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

Some students may combine addition and subtraction with double facts. For example, with 5 + 4, they may think 5 + 5 – 1. Encourage students to be versatile in their thinking, and praise different approaches that work.

Continue with the following possible sequence: 4 + 3, 8 + 9, 7 + 6, 10 + 11, and 12 + 13.

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Say Ten Counting (3 minutes)

Materials: (T) Rekenrek

Note: Reviewing and practicing saying numbers the Say Ten way in isolation prepares students for success when adding numbers during this lesson. Use a Rekenrek to model the first few to help students visualize.

T: Let's count the Say Ten way. When I say 46, you say 4 tens 6. Ready? 57.
S: 5 tens 7.
T: 78.
S: 7 tens 8.
T: 100.
S: 10 tens.
T: 113.
S: 11 tens 3.

Continue with following possible sequence: 103, 123, 127, 137, 132, 142, 143, 163, 168, 188, 198, and 200. Be aware that the Say Ten way could also mean reading the numbers as 1 hundred 2 tens 3. The focus today, however, is just reading tens.

Say Ten Counting to the Next Ten (5 minutes)

Note: Practicing this fluency activity helps students see a connection with counting the Say Ten way and making a ten. It provides practice adding ones to make a multiple of 10.

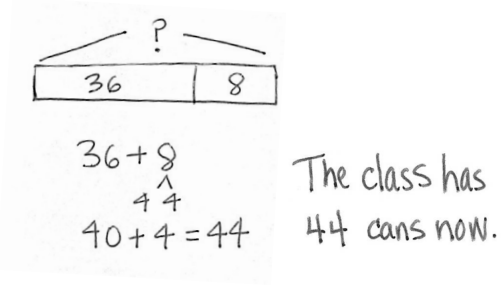
T: Let's add to make the next ten the Say Ten way. When I say 4 tens 2, you say 4 tens 2 + 8 = 5 tens. Ready? 6 tens 2.
S: 6 tens 2 + 8 = 7 tens.
T: 5 tens 1.
S: 5 tens 1 + 9 = 6 tens.
T: 7 tens 8.
S: 7 tens 8 + 2 = 8 tens.

Continue with the following possible sequence: 8 tens 4, 8 tens 5, 8 tens 9, 9 tens 6, 9 tens 3, and 9 tens 9.

Application Problem (3 minutes)

Mr. Wally's class collects 36 cans for the recycling program. Then, Azniv brings in 8 more cans. How many cans does the class have now?

Note: This problem is intended as independent work. It primes students to connect the make a ten strategy with the composition of 10 ones as 1 ten that is the focus of today's Concept Development.



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Concept Development (37 minutes)

Materials: (T) Place value disks, unlabeled tens place value chart (Lesson 1 Template) (S) Per pair: place value disks (9 tens, 18 ones), unlabeled tens place value chart (Lesson 1 Template), place value disks (Template)

Note: The place value disks template is provided to support students as they complete their homework. Students may cut it apart and store the disks in a baggy for use at home.

Project or draw unlabeled place value chart on the board.

T: Watch as I model 35 + 5 on my place value chart. (See the image to the right.)



T: What do you notice in the ones place?

S: There are two 5-groups. → You can make a ten.

T: I can! Show me your magic counting sticks. (Students hold up all 10 fingers.) Each finger represents one. Count with me.



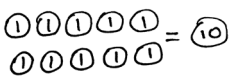
S: One, two, …, 10. (On 10, students clasp their hands together with a loud clap, interlacing their fingers to make one unit of 10.)



T: What happens when we add the ones and get a total of 10 or more?

S: We bundle it! → 10 ones equals 1 ten!

T: Yes! (Draw the image to the right on the board.) 10 ones equals 1 ten. We can **compose**, or make, a ten.



T: Where do units of 10 belong?

S: In the tens place!

T: (Point to the model.) So we bundle 10 ones as 1 ten. (Gather and remove the 10 ones, and put a tens disk in the tens place.) I change these 10 ones for 1 ten.

MP.4

T: 3 tens and a new ten equals?

S: 4 tens!

Pass out place value disks and a template to each pair of students.

T: Your turn! Partner A, show 35 on your place value chart. Partner B, show 6. Be sure to arrange the disks in 5-groups.

S: (Model the addends.)

T: Partner A, move the disks to add the ones. 5 ones + 6 ones?

S: (Partner A moves the ones together to make a ten.) 11 ones!

T: The Say Ten way?

S: 1 ten 1.

NOTES ON MULTIPLE MEANS OF REPRESENTATION:

For students who are struggling with place value disks, create a station in the classroom with a Rekenrek, so they can model the problems. Once they have mastered this, encourage students to move to the place value disks and place value chart.

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T: You've composed a unit of 10. 11 ones is the same as 1 ten 1. Partner B, change 10 ones disks for 1 tens disk.
S: (Partner B removes 10 ones and places a tens disk in the tens place.)
T: How many ones in the ones place?
S: 1.
T: How many tens in the tens place?
S: 4.
T: 35 + 6 the Say Ten way?
S: 4 tens 1.
T: Let's model another addition problem. Partner B, show 35. Partner A, show 26.
T: How is this problem different from the first one?
S: Now you're adding 2 tens. → It's 20 more than the one we just did.
MP.4 T: Partner B, move the disks to add the ones. How many ones?
S: 11 ones!
T: Partner B, change 10 ones disks for 1 tens disk.
S: (Partner B removes 10 ones and places a tens disk in the tens place.)
T: How many ones in the ones place?
S: 1.
T: Partner A, add the tens disks. How many tens?
S: 6 tens!
T: 35 + 26 the Say Ten way?
S: 6 tens 1.
T: Talk with your partner. What patterns do you notice as we're adding?
S: I add the ones together, and then I add the tens. → If we see partners to ten, we know we have to make a new ten. → We change 10 ones for 1 ten, and we put the new ten in the tens place.

Continue with the following possible sequence: 48 + 37, 59 + 23, 66 + 18, 74 + 19, 28 + 58, and 18 + 39. Have partners take turns composing the ten. Release students to work on the Problem Set as they show proficiency composing 1 ten from 10 ones.

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.

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Student Debrief (10 minutes)

Lesson Objective: Use manipulatives to represent the composition of 10 ones as 1 ten with two-digit addends.

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

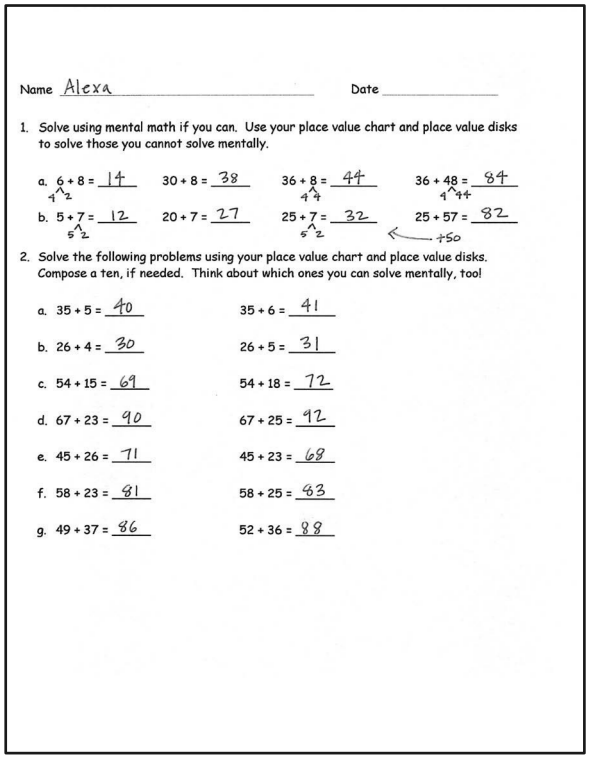
Invite students to review their solutions for the Problem Set. They should check work by comparing answers with a partner before going over answers as a class. Look for misconceptions or misunderstandings that can be addressed in the Debrief. Guide students in a conversation to debrief the Problem Set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

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

- How did the sequence in Problem 1, Part (a) help you solve 36 + 48 mentally? Did you need to **compose** a ten to solve?
- Look at the two columns in Problem 2. Did you need to model the problems in the second column? (For example, did you need to compose a ten?)
- Explain to your partner how to solve Problem 3. Did you need to compose a ten to solve? How did you know?
- For Problem 2, in rows (c), (e), and (g), did you compose a new unit of 10 in both problems? Why or why not? How could you know that you would not need to compose a new unit in one of the problems?

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.



Name Alexa Date

1. Solve using mental math if you can. Use your place value chart and place value disks to solve those you cannot solve mentally.

a. 6 + 8 = 14 (4 ^ 2) 30 + 8 = 38 36 + 8 = 44 (4 ^ 4) 36 + 48 = 84 (4 ^ 44)

b. 5 + 7 = 12 (5 ^ 2) 20 + 7 = 27 25 + 7 = 32 (5 ^ 2) 25 + 57 = 82 (+50)

2. Solve the following problems using your place value chart and place value disks. Compose a ten, if needed. Think about which ones you can solve mentally, too!

a. 35 + 5 = 40 35 + 6 = 41

b. 26 + 4 = 30 26 + 5 = 31

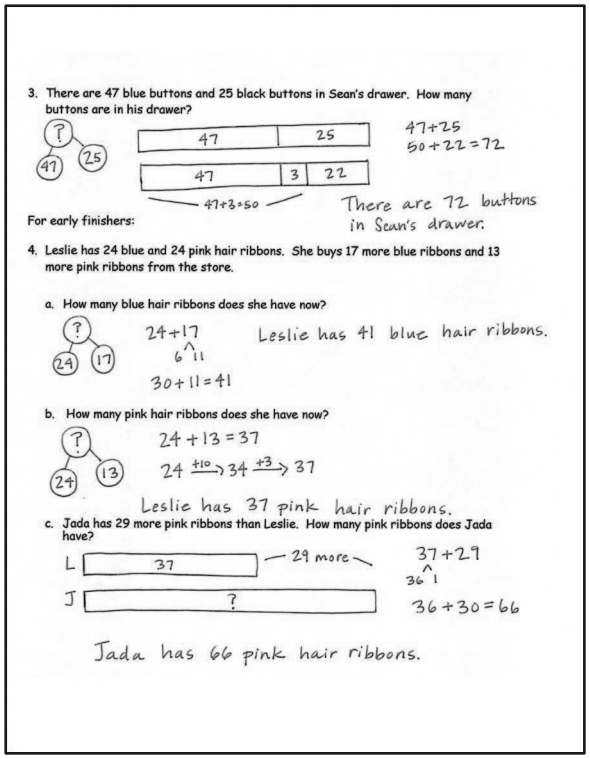
c. 54 + 15 = 69 54 + 18 = 72

d. 67 + 23 = 90 67 + 25 = 92

e. 45 + 26 = 71 45 + 23 = 68

f. 58 + 23 = 81 58 + 25 = 83

g. 49 + 37 = 86 52 + 36 = 88



3. There are 47 blue buttons and 25 black buttons in Sean's drawer. How many buttons are in his drawer?

(?) (47) (25) 47 25 47 3 22 47+3=50

47+25 50+22=72

There are 72 buttons in Sean's drawer.

For early finishers:

4. Leslie has 24 blue and 24 pink hair ribbons. She buys 17 more blue ribbons and 13 more pink ribbons from the store.

a. How many blue hair ribbons does she have now?

(?) (24) (17) 24+17 (6 ^ 11) 30+11=41

Leslie has 41 blue hair ribbons.

b. How many pink hair ribbons does she have now?

(?) (24) (13) 24+13=37 24 +10→ 34 +3→ 37

Leslie has 37 pink hair ribbons.

c. Jada has 29 more pink ribbons than Leslie. How many pink ribbons does Jada have?

L 37 — 29 more — J ?

37+29 (36 ^ 1) 36+30=66

Jada has 66 pink hair ribbons.

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Name _____ Date _____

1. Solve using mental math, if you can. Use your place value chart and place value disks to solve those you cannot solve mentally.

   a. 6 + 8 = _____ 30 + 8 = _____ 36 + 8 = _____ 36 + 48 = _____

   b. 5 + 7 = _____ 20 + 7 = _____ 25 + 7 = _____ 25 + 57 = _____

2. Solve the following problems using your place value chart and place value disks. Compose a ten, if needed. Think about which ones you can solve mentally, too!

   a. 35 + 5 = _____ 35 + 6 = _____

   b. 26 + 4 = _____ 26 + 5 = _____

   c. 54 + 15 = _____ 54 + 18 = _____

   d. 67 + 23 = _____ 67 + 25 = _____

   e. 45 + 26 = _____ 45 + 23 = _____

   f. 58 + 23 = _____ 58 + 25 = _____

   g. 49 + 37 = _____ 52 + 36 = _____

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3. There are 47 blue buttons and 25 black buttons in Sean's drawer. How many buttons are in his drawer?

For early finishers:

4. Leslie has 24 blue and 24 pink hair ribbons. She buys 17 more blue ribbons and 13 more pink ribbons from the store.

   a. How many blue hair ribbons does she have now?

   b. How many pink hair ribbons does she have now?

   c. Jada has 29 more pink ribbons than Leslie. How many pink ribbons does Jada have?

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Name _____ Date _____

Solve using your place value chart and place value disks. Compose a ten, if needed. Think about which ones you can solve mentally, too!

1. 53 + 19 = _____

2. 44 + 27 = _____

3. 64 + 28 = _____

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Name _____ Date _____

1. Solve using mental math, if you can. Use your place value chart and place value disks to solve those you cannot do mentally.

   a. 4 + 9 = _____ 30 + 9 = _____ 34 + 9 = _____ 34 + 49 = _____

   b. 6 + 8 = _____ 20 + 8 = _____ 26 + 8 = _____ 26 + 58 = _____

2. Solve the following problems using your place value chart and place value disks. Compose a ten, if needed. Think about which ones you can solve mentally, too!

   a. 21 + 9 = _____ 22 + 9 = _____

   b. 28 + 2 = _____ 28 + 4 = _____

   c. 32 + 16 = _____ 34 + 17 = _____

   d. 47 + 23 = _____ 47 + 25 = _____

   e. 53 + 35 = _____ 58 + 35 = _____

   f. 58 + 42 = _____ 58 + 45 = _____

   g. 69 + 32 = _____ 36 + 62 = _____

   h. 77 + 13 = _____ 16 + 77 = _____

   i. 59 + 34 = _____ 31 + 58 = _____

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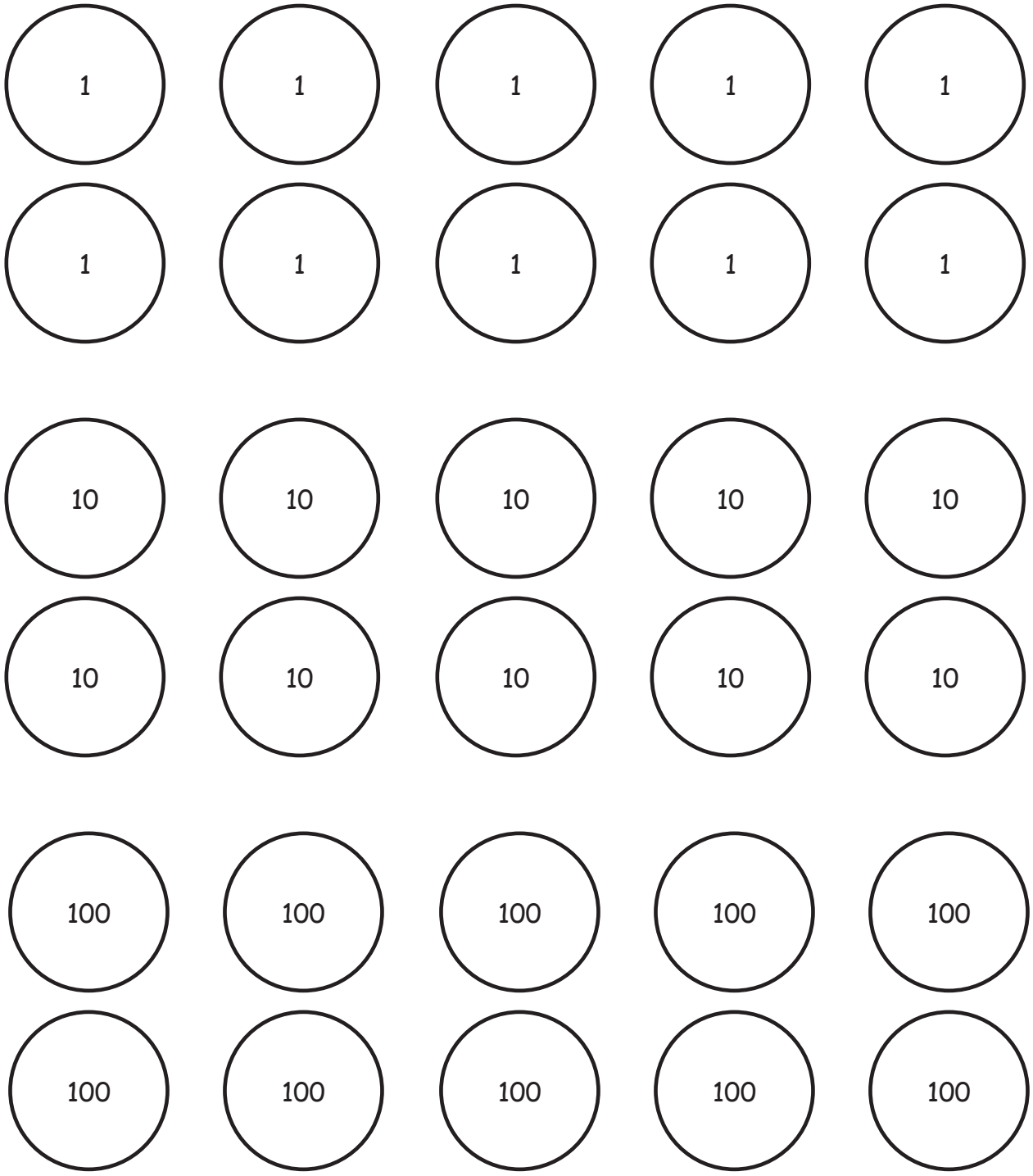
Solve using a place value chart.

3. Melissa has 36 more crayons than her brother. Her brother has 49 crayons. How many crayons does Melissa have?

4. There were 67 candles on Grandma's birthday cake and 26 left in the box. How many candles were there in all?

5. Frank's mother gave him $25 to save. If he already had $38 saved, how much money does Frank have saved now?

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place value disks

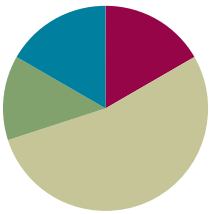
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Lesson 7

Objective: Relate addition using manipulatives to a written vertical method.

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** (3 minutes)
- Say Ten Counting **2.NBT.1** (3 minutes)
- Take Out the Tens **2.NBT.1** (4 minutes)

Place Value (3 minutes)

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

T: (Write 157 on the board.) Say the number in standard form.
S: 157.
T: Say 157 in unit form.
S: 1 hundred 5 tens 7 ones.
T: Say 157 in expanded form.
S: 100 + 50 + 7.
T: How many ones are in 157?
S: 157 ones.
T: How many tens are in the tens place?
S: Five tens.
T: How many tens are in 157?
S: Fifteen tens.
T: What digit is in the ones place?
S: 7.

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T: How many more ones does 7 ones need to make a ten?
S: 3 ones.
T: What is 157 + 3?
S: 160.

Continue with the following possible sequence: 157 + 4? What is 1 less than 157? 1 more? 10 less? 10 more? 100 more? 100 less?

Say Ten Counting (3 minutes)

Note: Students practice making a ten in unit form to prepare for composing a ten on the place value chart in today's lesson.

T: What is 3 ones + 4 ones?
S: 7 ones.
T: 6 ones + 4 ones?
S: 10 ones.
T: What is another name for 10 ones?
S: 1 ten.
T: When we make a ten, let's say the number in tens and ones. Ready? 6 ones + 5 ones.
S: 1 ten 1 one.

Repeat the process with the following possible sequence: 7 ones + 4 ones, 6 ones + 7 ones, 8 ones + 4 ones, 9 ones + 3 ones, 4 ones + 4 ones + 4 ones, and 5 ones +3 ones + 4 ones.

Take Out the Tens (4 minutes)

Note: Decomposing whole numbers into tens and ones is foundational for today's lesson.

T: (Write 43 ones = ____ tens ____ ones.) Say the number sentence.
S: 43 ones = 4 tens 3 ones.

Repeat the process with the following possible sequence: 67 ones, 39 ones, 77 ones, 89 ones, 100 ones, 118 ones, and 126 ones.

T: Now let's take out the tens for each addition sentence.
T: 21 + 30.
S: 5 tens 1 one.
T: 40 + 58.
S: 9 tens 8 ones.

Repeat the process with the following possible sequence: 50 + 37, 21 + 31, 42 + 21, 71 + 12, and 83 + 15.

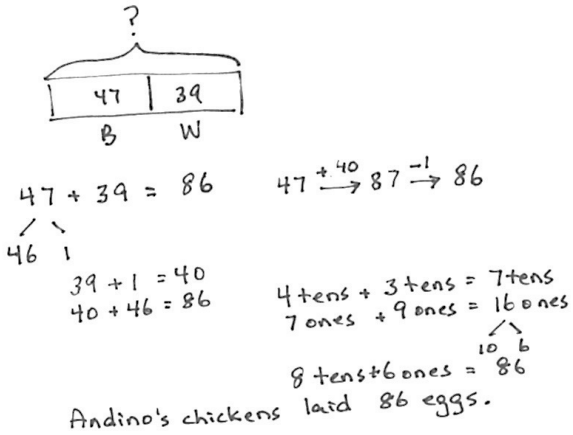
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Application Problem (8 minutes)

Farmer Andino's chickens laid 47 brown eggs and 39 white eggs. How many eggs did the chickens lay in all?

Note: This problem is intended for independent practice, giving students the opportunity to choose a preferred strategy or try a new one. Encourage students to use the RDW process. Then, students may wish to use place value disks, a number bond, or arrow notation. It is an *add to with result unknown* problem, the easiest word-problem type, so use it as an opportunity to show each of the solution strategies.



Concept Development (32 minutes)

Materials: (T) Place value disks, unlabeled tens place value chart (Lesson 1 Template) (S) Per pair: personal white board, unlabeled tens place value chart (Lesson 1 Template), place value disks (9 tens, 18 ones), place value disks (Lesson 6 Template)

Note: In the following modeled activity, it is important to emphasize how each action on the place value chart relates to each step of the algorithm. When students write the numbers vertically to record the steps of the algorithm, we refer to it as the vertical form. The term *algorithm* is introduced in Lesson 9.

Project or draw an unlabeled place value chart on the board.

T: We've learned to add numbers horizontally using different mental strategies. Let's learn another way to add. (Write 24 + 15 on the board vertically.)

T: We can also write the numbers vertically, with one number above the other so that each digit is in the correct place value column.

T: Let's use our place value chart and place value disks. I can place my disks straight up and down, like filling a ten-frame, or from left to right, like making 5-groups (pictured on the next page). Count with me as I model the addends.

MP.4

S: (Count as you place 24 above with 2 tens and 4 ones.) 10, 20, 21, 22, 23, 24, … (Count as you place 15 below with 1 ten and 5 ones.) 10, 11, 12, 13, 14, 15.

T: Does this model match the numbers written in vertical form?

S: Yes!

T: (Point to the ones in the vertical form, and then point to the ones disks.) 4 ones + 5 ones. Count the units of one with me.

S: (Count.) 4, 5, 6, 7, 8, 9.

NOTES ON MULTIPLE MEANS OF REPRESENTATION:

Show the same process on a Rekenrek or on an interactive whiteboard abacus. Have students working below grade level regroup tens on the Rekenrek to show the process. Be sure they write the numbers in vertical form as they are working with the Rekenrek.

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T: Did we compose a ten?

S: No!

T: So we show 9 ones in the vertical form like this. We write the 9 below the line in the ones place. (Write 9.)

T: (Point to the tens in the vertical form; then point to the tens disks.) Now add the units of 10.

S: 3 tens.

T: We write the 3 below the line in the tens place. (Write 3.)

T: Now let's count the value of this number.

S: (As you point to each disk.) 10, 20, 30, 31, 32, …, 39.

T: So 24 + 15 equals 39. Let's try another problem. (Write 26 + 35 vertically.)

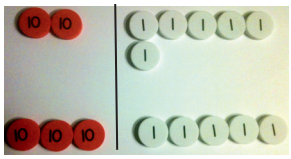
T: Count as I model the addends. (See first image below and to the right.)

T: What is 6 ones + 5 ones? (Point to the ones in the vertical form and on the model.)

S: 11 ones!

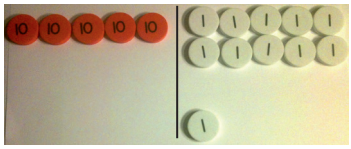
MP.4

T: (Move the 4 ones disks to join the 6 ones to form the unit ten. See the second image.) What do you see, and what should we do?



S: We made a ten. → We have to change 10 ones for 1 ten. → Take off 10 ones, and put a ten in the tens place because 11 ones is 1 ten 1.

T: That's right! We rename 11 ones as 1 ten 1 one. And where do tens belong?



S: In the tens place!

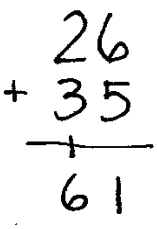
T: Of course! So watch. (Take off 10 ones disks and place a tens disk in the tens place. See the third image.) We show this step in vertical form by writing the new unit of ten on the line below the tens place. (Write 1 on the line below the tens place as shown in the last image to the right.) This is called **new groups below.**



T: And we write the 1 one below the line in the ones place.

T: Now we add the tens, including the new unit. 2 tens + 3 tens is 5 tens, and 1 more ten equals 6 tens. The answer is 61.

T: Explain to your partner how each change that I modeled on my place value chart matches each step that I recorded in the vertical form.



S: There's only 1 disk left in the ones place, and you wrote a 1 under the line in the ones place. → You showed the new ten by writing a 1 on the line below the tens place. → That little 1 under the tens place is close to the 1 under the ones place, so I can see the eleven. Then, we just add up the tens.

NOTES ON MULTIPLE MEANS OF REPRESENTATION:

The totals below method is introduced in Lesson 29. However, some students may benefit from an adaptation of this method earlier as a transitional step from the horizontal to the vertical method. For example:

18 → 10 + 8
+ 25 → 20 + 5
43 = 30 + 13

Demonstrate solving the last step by adding the parts of the expanded form on the right and then putting the total on the left.

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Pass out place value disks and the place value chart template, to be inserted in personal white boards. For each problem, have students whisper count as partners take turns modeling and writing each addend. They can count the regular way (10, 20, 30, …) or the Say Ten way (1 ten, 2 tens, …).

T: Now it's your turn. (Write 25 + 17 on the board vertically.) Write 25 + 17 as I did.
T: With your partner, use your place value disks to model 25. Whisper count as you place the disks on your chart.
T: Tell me the number of tens and ones on your chart.
S: 2 tens 5 ones!
T: Now model 17. How many ones and tens?
S: 1 ten 7 ones.
T: Look at the ones place in the vertical form. What are you adding?
S: 5 ones + 7 ones!
T: Now look at your model. 5 ones + 7 ones is…?
S: 12 ones!
T: Use your place value disks to show what we should do here. (Circulate to check for understanding.)
MP.4
S: (Remove 10 ones, and place a ten in the tens place on the place value chart.)
T: What did you do?
S: We changed 10 ones for 1 ten. → We composed a ten. → We bundled a ten. → We made 12 ones into 1 ten 2 ones just like in our fluency activity!
T: Where do I record the new unit of ten?
S: On the line below the tens place. (Write 1 on the line below the tens place.)
T: (Record the new ten.) How many ones are in the ones place now?
S: 2 ones.
T: Write 2 below the line in the ones place. (Record the 2 ones on the board.)
S: (Record 2 ones.)
T: Now count the tens. Remember to count the new unit. How many tens?
S: 4 tens!
T: Write 4 below the line in the tens place.
T: Explain to your partner how your work with the disks matches the vertical form.

NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

Some students will already have learned to write a one above the tens column instead of below it when regrouping. Explain that it is easier to add one at the end than at the beginning and that seeing the digits closer together helps us to see the whole number. Moreover, each algorithm in *A Story of Units* is designed to work as part of a coherent system. Be aware that choices made at this juncture have implications for the algorithms to come in later grades (e.g., multiplication in Grade 4).

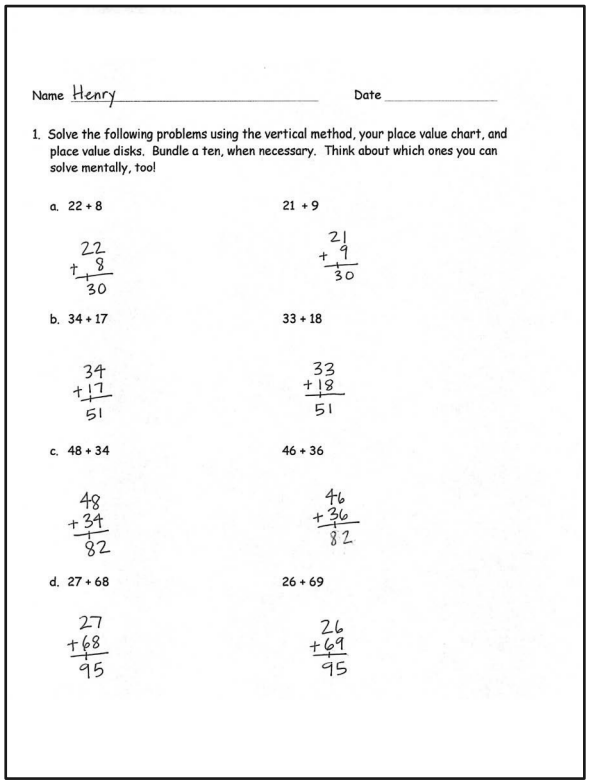
If a student is comfortable in his way and is able to solve problems with ease, allow him to continue with what works for him, but encourage him to try the new groups below method so that he is not at a disadvantage later on.

Continue with the following possible sequence: 18 + 23, 32 + 29, 34 + 37, 25 + 28, and 16 + 49. As students demonstrate confidence in relating their models to vertical form, allow them to work independently in the Problem Set.

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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.



Name Henry Date

1. Solve the following problems using the vertical method, your place value chart, and place value disks. Bundle a ten, when necessary. Think about which ones you can solve mentally, too!

a. 22 + 8

$$\begin{array}{r} 22 \\ +\ 8 \\ \hline 30 \end{array}$$

21 + 9

$$\begin{array}{r} 21 \\ +\ 9 \\ \hline 30 \end{array}$$

b. 34 + 17

$$\begin{array}{r} 34 \\ +\ 17 \\ \hline 51 \end{array}$$

33 + 18

$$\begin{array}{r} 33 \\ +\ 18 \\ \hline 51 \end{array}$$

c. 48 + 34

$$\begin{array}{r} 48 \\ +\ 34 \\ \hline 82 \end{array}$$

46 + 36

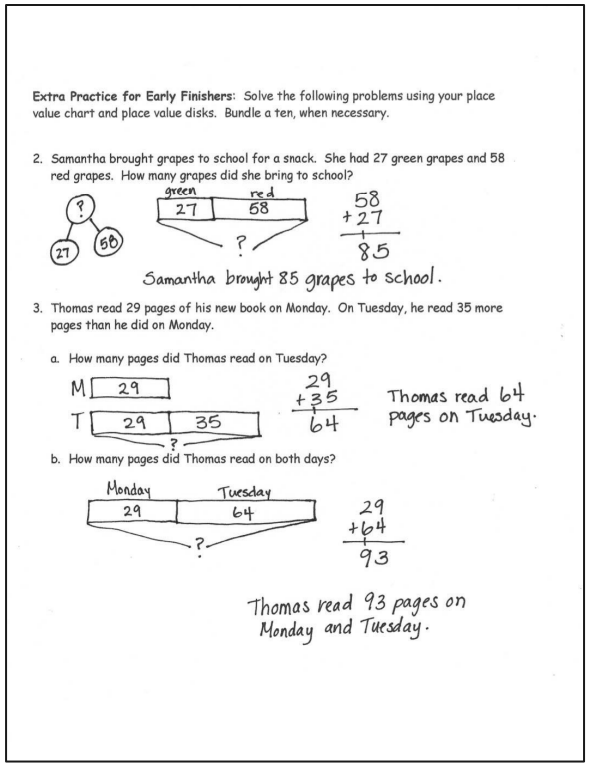
$$\begin{array}{r} 46 \\ +\ 36 \\ \hline 82 \end{array}$$

d. 27 + 68

$$\begin{array}{r} 27 \\ +\ 68 \\ \hline 95 \end{array}$$

26 + 69

$$\begin{array}{r} 26 \\ +\ 69 \\ \hline 95 \end{array}$$



Extra Practice for Early Finishers: Solve the following problems using your place value chart and place value disks. Bundle a ten, when necessary.

2. Samantha brought grapes to school for a snack. She had 27 green grapes and 58 red grapes. How many grapes did she bring to school?

$$\begin{array}{r} 58 \\ +\ 27 \\ \hline 85 \end{array}$$

Samantha brought 85 grapes to school.

3. Thomas read 29 pages of his new book on Monday. On Tuesday, he read 35 more pages than he did on Monday.

a. How many pages did Thomas read on Tuesday?

$$\begin{array}{r} 29 \\ +\ 35 \\ \hline 64 \end{array}$$

Thomas read 64 pages on Tuesday.

b. How many pages did Thomas read on both days?

$$\begin{array}{r} 29 \\ +\ 64 \\ \hline 93 \end{array}$$

Thomas read 93 pages on Monday and Tuesday.

Student Debrief (10 minutes)

Lesson Objective: Relate addition using manipulatives to a written vertical 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.

- In Problem 1, which problems were you able to solve mentally? Did you need to compose a ten for all of the problems in the second column? Why not?
- How did you solve Problem 1, Part (c): 48 + 34, 46 + 36? How did you change your place value chart to show the problem in the second column?
- Explain to your partner how you used manipulatives to solve Problem 1, Part (d): 27 + 68. How did this problem help you to solve the second one?
- For Problem 2, how did your work with the place value disks match the vertical form? How did you show **new groups below**?
- Explain to your partner how you solved Problem 3 using manipulatives and the vertical form. How could you solve this problem differently using a simplifying strategy?

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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.

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Name _____ Date _____

1. Solve the following problems using the vertical form, your place value chart, and place value disks. Bundle a ten, when necessary. Think about which ones you can solve mentally, too!

   a. 22 + 8 21 + 9

   b. 34 + 17 33 + 18

   c. 48 + 34 46 + 36

   d. 27 + 68 26 + 69

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Extra Practice for Early Finishers: Solve the following problems using your place value chart and place value disks. Bundle a ten, when necessary.

2. Samantha brought grapes to school for a snack. She had 27 green grapes and 58 red grapes. How many grapes did she bring to school?

3. Thomas read 29 pages of his new book on Monday. On Tuesday, he read 35 more pages than he did on Monday.

   a. How many pages did Thomas read on Tuesday?

   b. How many pages did Thomas read on both days?

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Name _____ Date _____

1. Solve the following problems using the vertical form, your place value chart, and place value disks. Bundle a ten, if needed. Think about which ones you can solve mentally, too!

   a. 47 + 34

   b. 54 + 27

2. Explain how Problem 1, Part (a) can help you solve Problem 1, Part (b).

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Name _____ Date _____

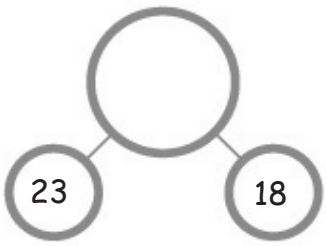
1. Solve the following problems using the vertical form, your place value chart, and place value disks. Bundle a ten, if needed. Think about which ones you can solve mentally, too!

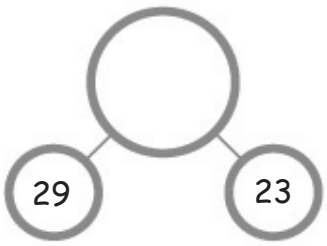
   a. 31 + 9 32 + 8

   b. 42 + 18 43 + 17

   c. 26 + 67 28 + 65

2. Add the bottom numbers to find the missing number above it.





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3. Jahsir counted 63 flowers by the door and 28 flowers on the windowsill. How many flowers were by the door and on the windowsill?

4. Antonio's string is 38 centimeters longer than his reading book. The length of his reading book is 26 centimeters.

   a. What is the length of Antonio's string?

   b. The length of Antonio's reading book is 20 centimeters shorter than the length of his desk. How long is Antonio's desk?

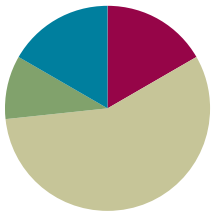
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Lesson 8

Objective: Use math drawings to represent the composition and relate drawings to a written method.

Suggested Lesson Structure

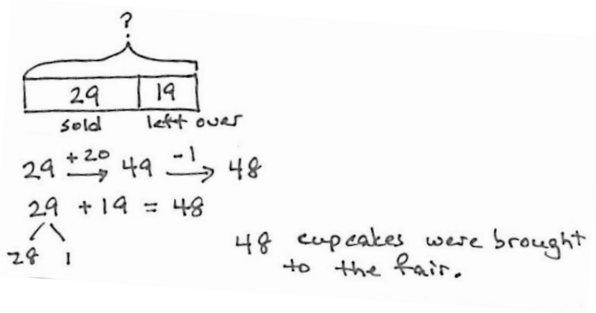
Application Problem	(6 minutes)
Fluency Practice	(10 minutes)
Concept Development	(34 minutes)
Student Debrief	(10 minutes)
Total Time	**(60 minutes)**



Application Problem (6 minutes)

At the school fair, 29 cupcakes were sold, and 19 were left over. How many cupcakes were brought to the fair?

Note: This problem is intended for guided practice to help students gain familiarity with the *take from with start unknown* problem type. The language of these problem types can be confusing to students. Guide students to see that when both parts are known, we add to find the total.



Fluency Practice (10 minutes)

- Number Patterns **2.NBT.2** (6 minutes)
- Sums to the Teens **2.NBT.4** (4 minutes)

Number Patterns (6 minutes)

Materials: (S) Personal white board

Note: Students apply knowledge of adding and subtracting multiples of 10 and 1 to complete patterns.

T: (Write on board 124, 134, 144, ____.) What is the place value of the digit that's changing?
S: Tens.
T: Count with me, saying the value of the digit I'm pointing to.
S: (Point to the tens digit as students count.) 20, 30, 40.

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T: On your personal white board, write the number that comes next in the pattern.
S: (Write and show 154.)
T: What is the pattern?
S: Add 10.

Repeat with the following possible sequence, using place value disks if students are struggling:

278	268	258	_____
99	109	119	_____
380	379	378	_____
522	542	562	_____
125	225	325	_____

Sums to the Teens (4 minutes)

Materials: (S) Personal white board

Note: This fluency activity readies students for the day's lesson and allows them to work at different rates. Give about 20 seconds per problem.

T: (Write 9 + 3.)
T: This is the basic problem for a pattern. Once you have solved this problem, solve 19 + 3, 29 + 3, … What would come next?
S: 39 + 3.
T: Yes. Continue until I say stop, and I will give you a new basic problem. Begin with 9 + 6. Go!

When you see everyone has completed at least 2 problems, stop the class and give the next expression.

Use the following possible sequence: 9 + 6, 9 + 4, 8 + 4, 8 + 6, 7 + 4, and 7 + 6.

Concept Development (34 minutes)

Materials: (T) Place value disks (S) Math journal or paper

MP.6

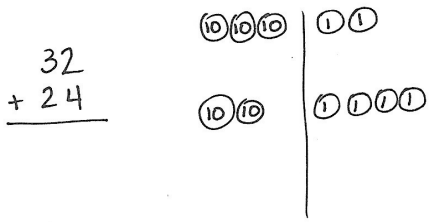
As students learn to make math drawings to represent the written vertical form, it is important to teach precision: aligning digits in their proper place, drawing place value disks in clear 5-groups, and showing new groups below in the correct place. For this reason, in the beginning, students should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

T: (Show place value disks.) We've been modeling addition with place value disks, but we don't have to use these disks. We can draw them! Watch.

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Problem 1: 32 + 24

T: (Write 32 + 24 vertically. Draw a long vertical line, which serves as the place value chart, next to the vertical form. (See the image to the right.)



T: How many tens in 32?

S: 3 tens.

T: Count them as I draw. (Draw.)

S: 10, 20, 30.

T: How many ones should I draw?

S: 2 ones.

T: (Draw 2 ones disks.) Let's count to be sure my drawing is correct. (Point to each disk as students count.)

S: 10, 20, 30, 31, 32.

T: Now I'll add 24 to my drawing. How many tens?

S: 2 tens.

T: (Draw 2 tens disks below the 3 tens.) How many ones should I draw?

S: 4 ones.

MP.6

T: (Draw 4 ones disks below the 2 ones.) Let's count to be sure my model is correct.

S: 10, 20, 21, 22, 23, 24.

T: Look how easy! And, now we solve. Do 2 ones and 4 ones make a ten?

S: No!

T: So we simply write the number of ones, 6, below the line in the ones place.

T: 3 tens + 2 tens is …?

S: 5 tens!

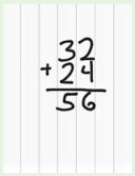
T: So we write 5 below the line in the tens place. Read the whole problem with me.

S: 32 + 24 equals 56.

T: Talk with your partner about how the drawing matches the vertical form.

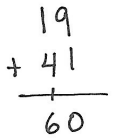
NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

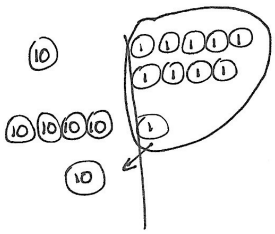
To help students line up their problems according to place value, have them use lined paper turned 90 degrees (landscape orientation) and write their numbers between the lines.



Problem 2: 19 + 41

T: Let's work through another problem together. (Repeat the above process to model 19 + 41.)





T: Begin by adding the ones. Look at the vertical form and the model. Tell your partner what you notice. How are they the same?

S: 9 + 1 is 10. → We need to bundle 10 ones as 1 ten. → They both show 9 + 1, but one is numbers, and the other is a picture of the numbers.

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T: Yes, they are the same! And, what we do on the model, we do to the numbers. We composed a ten, so we circle the 10 ones and draw an arrow into the tens place, where we draw the new unit of ten. (See the image on the previous page.)

T: On the vertical form, we show this new unit of ten by writing a 1 on the line below the tens place. This way, we remember to add it in when we count the ten.

T: We write 0 below the line in the ones place. Looking at the model, we see there are no ones left.

T: Now, we add the tens. Remember to add in the new unit. 1 ten + 4 tens + 1 ten is…?

S: 6 tens!

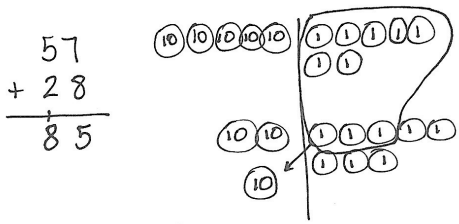
T: Read the entire problem.

S: 19 + 41 equals 60.

MP.6

T: Talk with your partner. How do we show the bundling, or renaming, of 10 ones as a unit of ten in the drawing and in the vertical form? (Allow one or two minutes for discussion.)

T: Now it's your turn. Draw and solve 57 + 28 while I walk around to see how it's going.



Follow the procedure above to guide students as they write 57 + 28, model it, and solve. At each step, remind students to be precise in lining up the digits and in drawing their number disks in neat 5-groups. (See the image to the right.) Have them share the ways in which each step in the drawing matches what they do in the vertical form.

Continue with the following possible sequence: 15 + 68, 29 + 52, 64 + 27, and 56 + 38. Continue to support struggling students, but as students demonstrate proficiency, instruct them to work on the Problem Set independently.

Problem Set (10 minutes)

Students should do their personal best to complete the Problem Set within the allotted 10 minutes. For some classes, it may be appropriate to modify the assignment by specifying which problems they work on first. Some problems do not specify a method for solving. Students should solve these problems using the RDW approach used for Application Problems.

NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

Provide colored pencils or crayons for students to draw tens and ones disks in two different colors. These may start by matching the colors of the disks. Then, encourage students to use the same colors as they used for the disks for the numbers in the tens and ones places when solving their problems. This may be especially helpful for students who struggle with place value.

Change the color daily to be used for the disks so that students continue to read the values rather than relying on a certain color as a signal.

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Student Debrief (10 minutes)

Lesson Objective: Use math drawings to represent the composition and relate drawings to a written method.

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

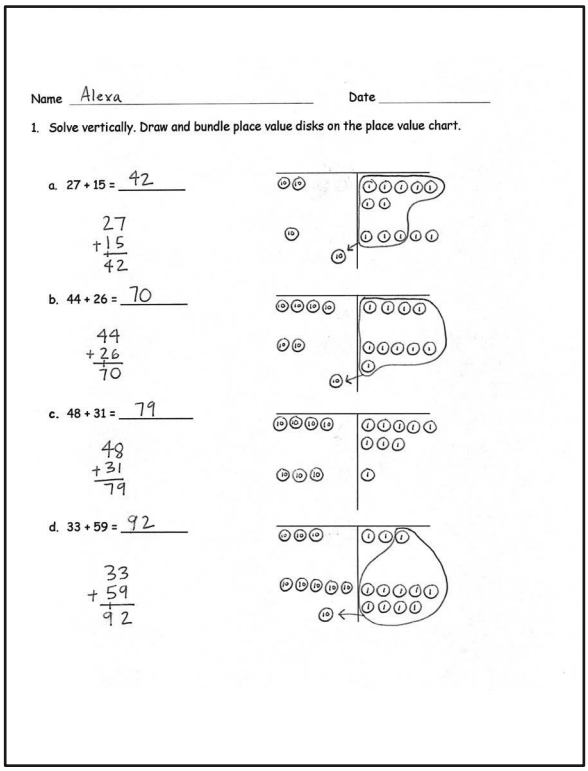
Invite students to review their solutions for the Problem Set. They should check work by comparing answers with a partner before going over answers as a class. Look for misconceptions or misunderstandings that can be addressed in the Debrief. Guide students in a conversation to debrief the Problem Set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

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

- For Problem 1, Part (a), did you compose a ten? Why? How many ones were leftover? How did you show it on your place value chart?
- Explain to your partner how to solve Problem 1, Part (b). How did you show a new unit of ten on your model and on the vertical form?
- For Problem 1, Part (d), what did you need to be sure to do when you were solving 33 + 59 using the vertical form?
- How did you rename the ones in Problem 1, Part (f)? How is practicing the Say Ten way helpful when we are adding larger numbers?
- With your partner, compare Problem 1, Parts (a) and (e). Could you have used Problem 1, Part (a) to solve Part (e) mentally (i.e., without composing a ten)?

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.



Name Alexa Date

1. Solve vertically. Draw and bundle place value disks on the place value chart.

a. 27 + 15 = 42

27
+15
42

b. 44 + 26 = 70

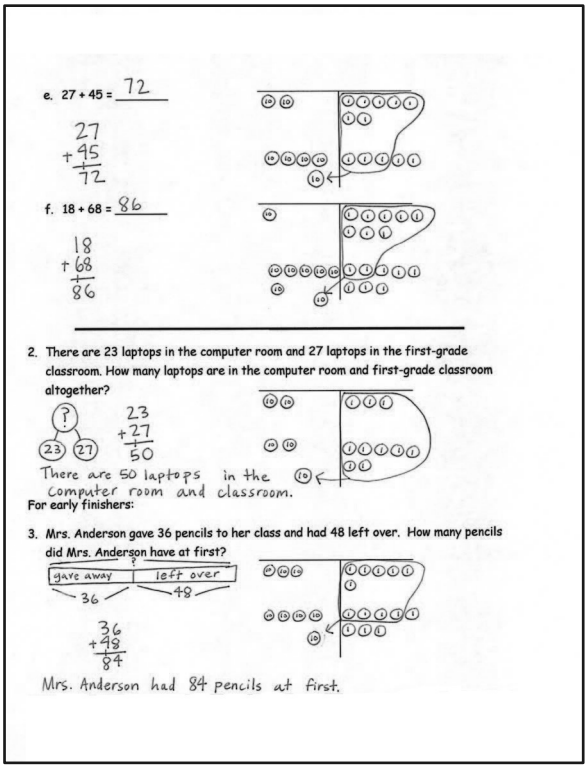
44
+26
70

c. 48 + 31 = 79

48
+31
79

d. 33 + 59 = 92

33
+59
92



e. 27 + 45 = 72

27
+45
72

f. 18 + 68 = 86

18
+68
86

2. There are 23 laptops in the computer room and 27 laptops in the first-grade classroom. How many laptops are in the computer room and first-grade classroom altogether?

? (23) (27)

23
+27
50

There are 50 laptops in the computer room and classroom.

For early finishers:

3. Mrs. Anderson gave 36 pencils to her class and had 48 left over. How many pencils did Mrs. Anderson have at first?

gave away	left over
36	48

36
+48
84

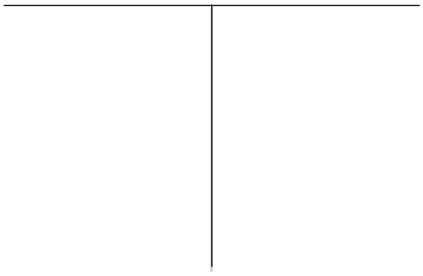
Mrs. Anderson had 84 pencils at first.

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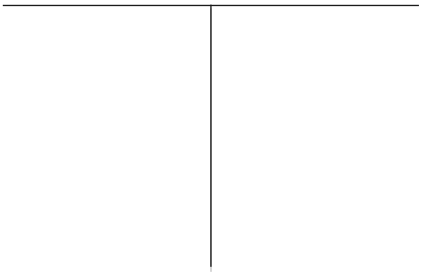
Name _____ Date _____

1. Solve vertically. Draw and bundle place value disks on the place value chart.

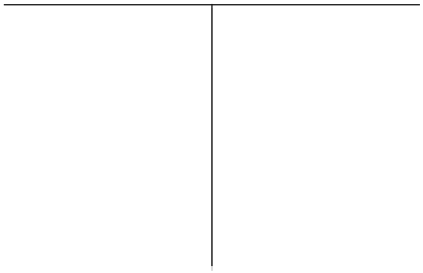
a. 27 + 15 = _____



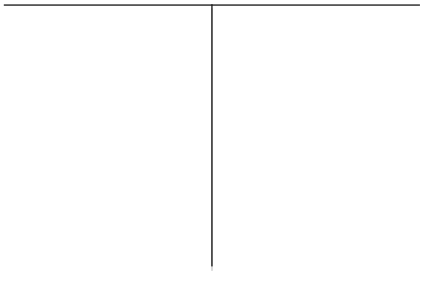
b. 44 + 26 = _____



c. 48 + 31 = _____



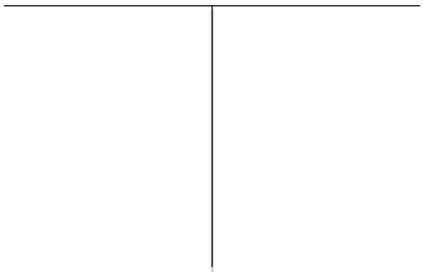
d. 33 + 59 = _____



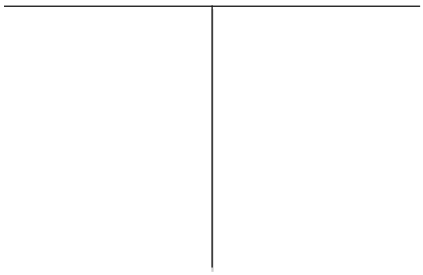
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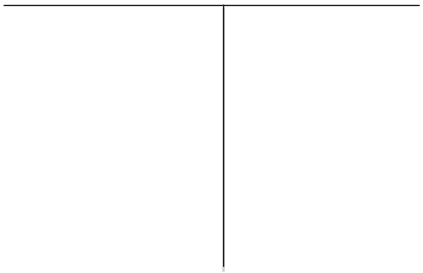
e. 27 + 45 = _____



f. 18 + 68 = _____

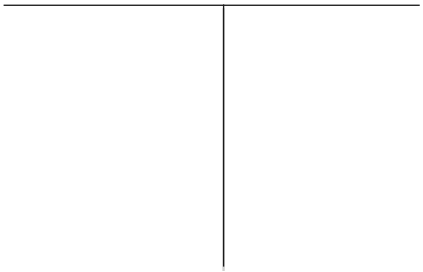


2. There are 23 laptops in the computer room and 27 laptops in the first-grade classroom. How many laptops are in the computer room and first-grade classroom altogether?



For early finishers:

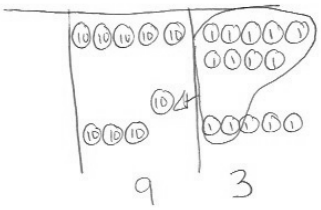
3. Mrs. Anderson gave 36 pencils to her class and had 48 left over. How many pencils did Mrs. Anderson have at first?



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Name _____ Date _____

Use place value language to explain Zane's mistake. Then, solve using the vertical form. Draw and bundle place value disks on your place value chart.

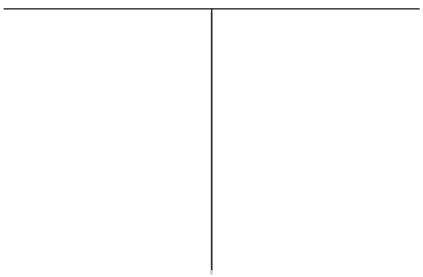
Zane's Answer	Zane's Mistake
59 + 35 = _____ 	
My Answer	

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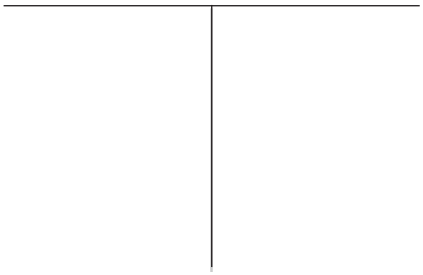
Name _____ Date _____

1. Solve vertically. Draw and bundle place value disks on the place value chart.

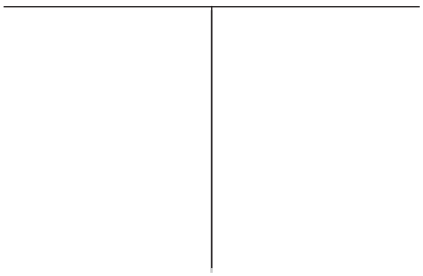
a. 26 + 35 = _____



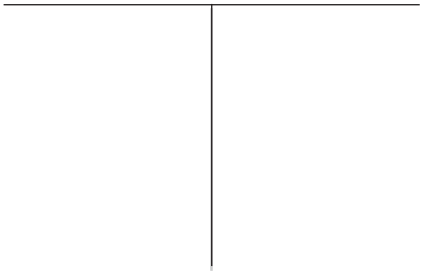
b. 28 + 14 = _____



c. 35 + 27 = _____

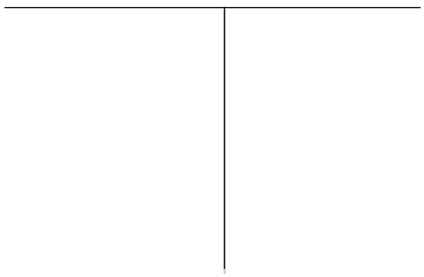


d. 23 + 46 = _____

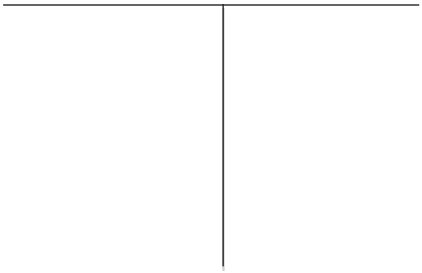


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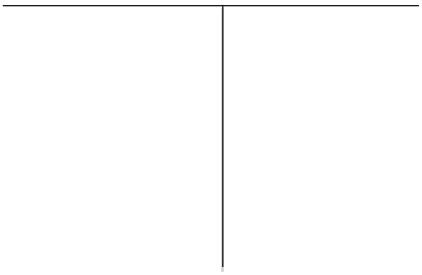
e. 32 + 59 = _____



2. Twenty-eight second-grade students went on a field trip to the zoo. The other 24 second-grade students stayed at school. How many second-grade students are there in all?



3. Alice cut a 27-cm piece of ribbon and had 39 cm of ribbon left over. How much ribbon did Alice have at first?



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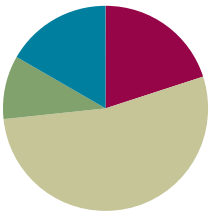
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Lesson 9

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

Suggested Lesson Structure

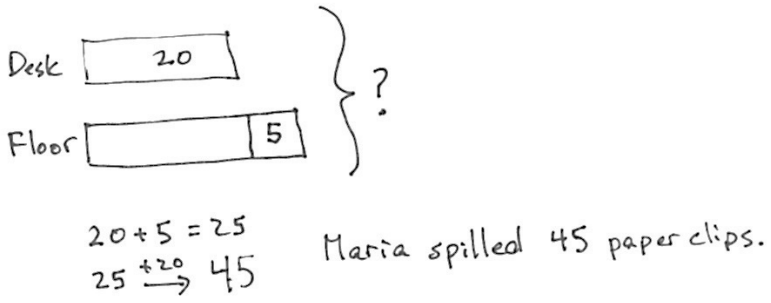
Application Problem	(6 minutes)
Fluency Practice	(12 minutes)
Concept Development	(32 minutes)
Student Debrief	(10 minutes)
Total Time	**(60 minutes)**



Application Problem (6 minutes)

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

Note: Guide the students through the use of a comparison tape diagram to represent this problem. First, solve to find the number that spilled on the floor. Then, add the two amounts. Remember that if possible, Application Problems can be done at a different time of day apart from the regular math time if they do not directly flow into the lesson, as is the case here.



Fluency Practice (12 minutes)

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

Place Value Practice (3 minutes)

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

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

S: 352.

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T: Say the number in expanded form.
S: 300 + 50 + 2.
T: The Say Ten way?
S: 3 hundreds 5 tens 2.
T: What is 20 more than 352?
S: 372.

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

Sprint: Sums to the Teens (9 minutes)

Materials: (S) Sums to the Teens Sprint

Note: This Sprint reviews crossing ten when adding.

NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

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

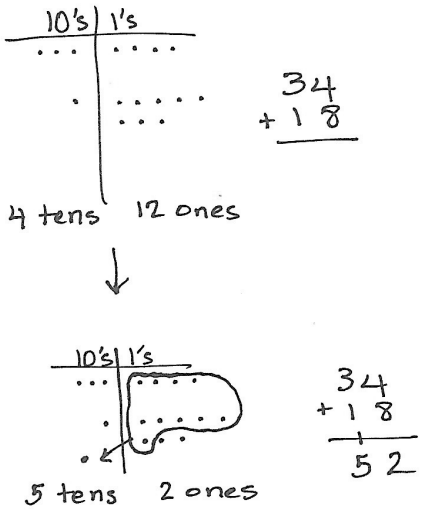
Concept Development (32 minutes)

Materials: (S) Math journal or paper

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

Problem 1: 34 + 18

T: Write 34 + 18 in vertical form on your paper.
T: Now we'll model it by drawing a place value chart. Draw your chart like mine. (Draw a tens and ones chart.)
T: This time, label the tens place and the ones place. This means we don't have to label the disks because a disk in the ones place is a one, and a disk in the tens place is a ten. The place tells us the value or how much the disk is worth. MP.6
T: Now, let's draw a model of each addend. Since we don't need to label the disks, we'll just draw dots. We call this a chip model, and the dots are the chips. This model is easier and takes less time!
T: Whisper count as you draw your model. (Draw a chip model of 34 + 18. See the image to the right.)
S: (Make a chip model.) 10, 20, 30, 31, …, 34. 10, 11, 12, …, 18.



T: Use place value language to tell your partner how your model matches the vertical form.

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

T: What is 4 ones + 8 ones?

S: 12 ones!

T: The Say Ten way?

S: Ten 2.

T: Tell your partner what to do on your model and with the numbers.

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

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

S: (Circle 10 ones. Draw an arrow to the tens place, and draw a dot to represent another ten. Write 1 on the line below the tens place and a 2 below the ones place. Add the tens digits. See the image on the previous page.)

MP.6

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

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

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

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

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

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

T: What we just did is a way to solve problems using steps, an **algorithm**. These steps, or the algorithm, help us work more quickly.

NOTES ON MULTIPLE MEANS OF REPRESENTATION:

For students performing below grade level, use manipulatives such as straws to model bundling with three-digit addends. Once the students understand the concept of creating a new unit, move to the disks and chip model, connecting them to the vertical form.

NOTES ON VERTICAL FORM AND ALGORITHM:

Vertical form is used to describe the written numbers, whereas *algorithm* is used to describe the cyclical process of making a larger or smaller unit.

Problem 2: 134 + 18

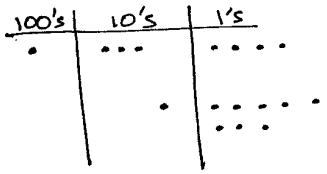
T: Let's look at this problem. Write 134 + 18 like this. (Write 134 + 18 vertically.) Be sure you line up the ones and tens.

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

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

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

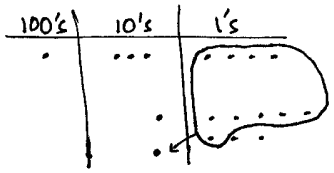


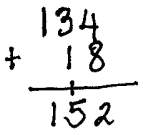
T: Now my place value chart has hundreds, tens, and ones. Count with me as we model 134 + 18. (See the image to the right.)

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

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

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





T: How do we show the new ten and 2 ones in vertical form?

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

MP.6

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

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

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

T: 134 + 18 is…?

S: 152.

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

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

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

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

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.

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Student Debrief (10 minutes)

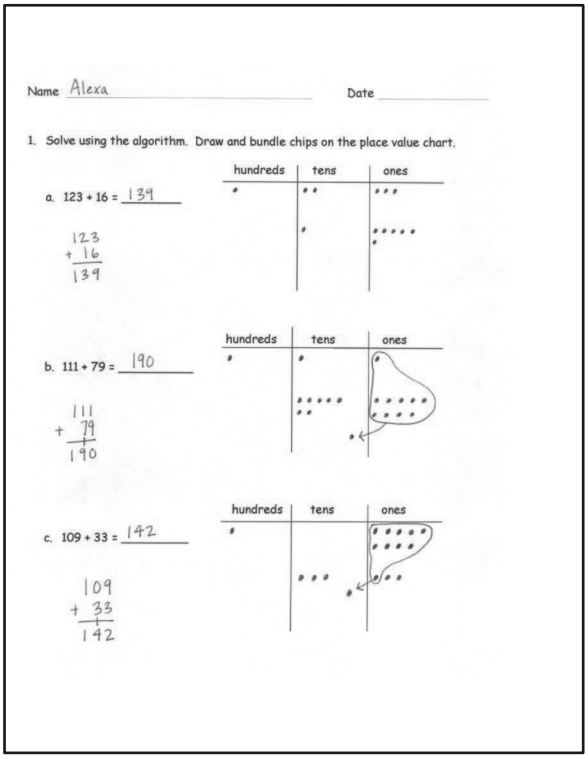
Lesson Objective: Use math drawings to represent the composition when adding a two-digit to a three-digit addend.

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

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

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

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


Name Alexa Date

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

a. 123 + 16 = 139

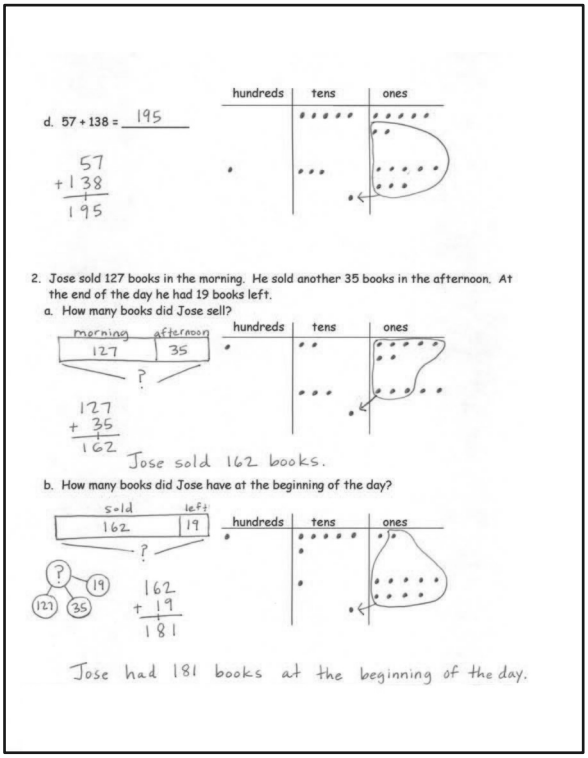
123
+ 16
139

b. 111 + 79 = 190

111
+ 79
190

c. 109 + 33 = 142

109
+ 33
142


d. 57 + 138 = 195

57
+138
195

2. Jose sold 127 books in the morning. He sold another 35 books in the afternoon. At the end of the day he had 19 books left.

a. How many books did Jose sell?

127
+ 35
162

Jose sold 162 books.

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

162
+ 19
181

Jose had 181 books at the beginning of the day.

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.

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A

Number Correct: _____

Sums to the Teens

1.	9 + 1 =	
2.	9 + 2 =	
3.	9 + 3 =	
4.	9 + 9 =	
5.	8 + 2 =	
6.	8 + 3 =	
7.	8 + 4 =	
8.	8 + 9 =	
9.	9 + 1 =	
10.	9 + 4 =	
11.	9 + 5 =	
12.	9 + 8 =	
13.	8 + 2 =	
14.	8 + 5 =	
15.	8 + 6 =	
16.	8 + 8 =	
17.	9 + 1 =	
18.	9 + 7 =	
19.	8 + 2 =	
20.	8 + 7 =	
21.	9 + 1 =	
22.	9 + 6 =	

23.	7 + 3 =	
24.	7 + 4 =	
25.	7 + 5 =	
26.	7 + 9 =	
27.	6 + 4 =	
28.	6 + 5 =	
29.	6 + 6 =	
30.	6 + 9 =	
31.	5 + 5 =	
32.	5 + 6 =	
33.	5 + 7 =	
34.	5 + 9 =	
35.	4 + 6 =	
36.	4 + 7 =	
37.	4 + 9 =	
38.	3 + 7 =	
39.	3 + 9 =	
40.	5 + 8 =	
41.	2 + 8 =	
42.	4 + 8 =	
43.	1 + 9 =	
44.	2 + 9 =	

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B

Number Correct: _____

Improvement: _____

Sums to the Teens

1.	8 + 2 =	
2.	8 + 3 =	
3.	8 + 4 =	
4.	8 + 8 =	
5.	9 + 1 =	
6.	9 + 2 =	
7.	9 + 3 =	
8.	9 + 8 =	
9.	8 + 2 =	
10.	8 + 5 =	
11.	8 + 6 =	
12.	8 + 9 =	
13.	9 + 1 =	
14.	9 + 4 =	
15.	9 + 5 =	
16.	9 + 9 =	
17.	9 + 1 =	
18.	9 + 7 =	
19.	8 + 2 =	
20.	8 + 7 =	
21.	9 + 1 =	
22.	9 + 6 =	

23.	7 + 3 =	
24.	7 + 4 =	
25.	7 + 5 =	
26.	7 + 8 =	
27.	6 + 4 =	
28.	6 + 5 =	
29.	6 + 6 =	
30.	6 + 8 =	
31.	5 + 5 =	
32.	5 + 6 =	
33.	5 + 7 =	
34.	5 + 8 =	
35.	4 + 6 =	
36.	4 + 7 =	
37.	4 + 8 =	
38.	3 + 7 =	
39.	3 + 9 =	
40.	5 + 9 =	
41.	2 + 8 =	
42.	4 + 9 =	
43.	1 + 9 =	
44.	2 + 9 =	

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Name _____ Date _____

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

a. 123 + 16 = _____

hundreds	tens	ones

b. 111 + 79 = _____

hundreds	tens	ones

c. 109 + 33 = _____

hundreds	tens	ones

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d. 57 + 138 = _____

hundreds	tens	ones

2. Jose sold 127 books in the morning. He sold another 35 books in the afternoon. At the end of the day he had 19 books left.

   a. How many books did Jose sell?

hundreds	tens	ones

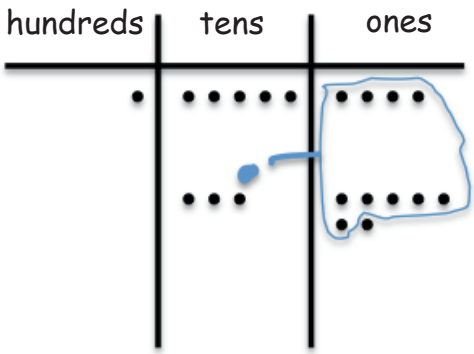
   b. How many books did Jose have at the beginning of the day?

hundreds	tens	ones

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Name _____ Date _____

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



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

136 + 39 = _____

hundreds	tens	ones

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Name _____ Date _____

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

a. 127 + 14 = _____

hundreds	tens	ones

b. 135 + 46 = _____

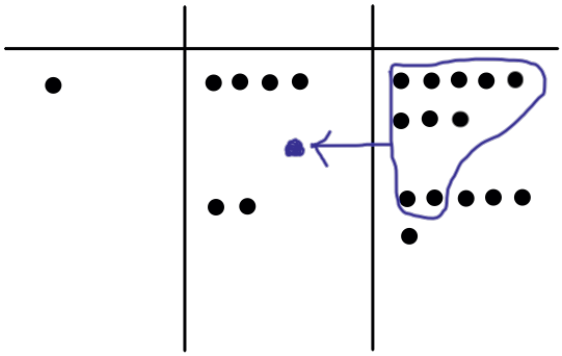
hundreds	tens	ones

c. 108 + 37 = _____

hundreds	tens	ones

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



3. Jane made 48 lemon bars and 23 cookies.

   a. How many lemon bars and cookies did Jane make?

hundreds	tens	ones

   b. Jane made 19 more lemon bars. How many lemon bars does she have?

hundreds	tens	ones

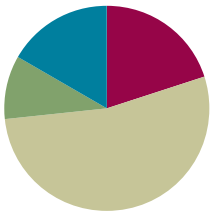
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Lesson 10

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

Suggested Lesson Structure

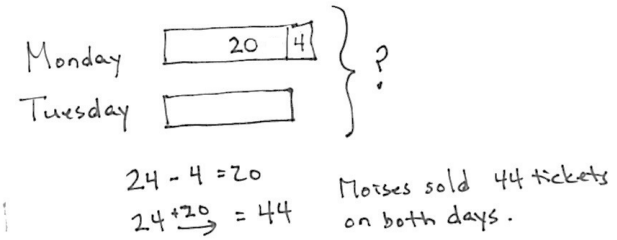
Application Problem	(6 minutes)
Fluency Practice	(12 minutes)
Concept Development	(32 minutes)
Student Debrief	(10 minutes)
Total Time	**(60 minutes)**



Application Problem (6 minutes)

Moises sold 24 raffle tickets on Monday and 4 fewer tickets on Tuesday. How many tickets did he sell in all on both days?

Note: This two-step problem gets students thinking about relationships and gives them an embedded opportunity to add multiples of 10. It is done at the beginning of the lesson since the fluency exercises flow into the lesson's Concept Development.



Fluency Practice (12 minutes)

- Compensation **2.NBT.5** (3 minutes)
- Sprint: Subtraction from Teens **2.OA.2** (9 minutes)

Compensation (3 minutes)

Note: This fluency exercise reviews the mental math strategy taught in Lesson 4, which was to use compensation by breaking apart one addend to make the other addend into a multiple of 10 and, therefore, easier to add mentally. To use compensation with subtraction, add the same number to the minuend and subtrahend to make a multiple of 10.

T: (Write 52 – 39 = ____.) Let's use a mental math strategy to subtract. How much more does 39 need to make the next ten?

S: 1 more.

T: Add 1 to each number, and give me the number sentence.

S: 53 – 40 = 13.

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T: 37 – 19.

S: 38 – 20 = 18.

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

Sprint: Subtraction from Teens (9 minutes)

Materials: (S) Subtraction from Teens Sprint

Note: This Sprint builds fluency with subtracting within 20 using mental strategies.

Concept Development (32 minutes)

Materials: (S) Math journal or paper

The goal of place value models is to help students understand the quantities involved in vertical form. As this understanding deepens, students no longer need to use models; they will be able to solve with numbers alone.

This lesson is designed to give students ample time working with bare numbers and chip models to develop conceptual understanding and procedural fluency with the algorithm. It anticipates that students will grasp this understanding at different rates. As students demonstrate proficiency (i.e., as they are able to explain why they composed a ten using place value language), encourage them to dispense with the models.

T: Copy the following problem on your paper in vertical form: 26 + 147.

T: Use place value language to prove to your partner that you have lined the numbers up correctly.

S: (Explain that 6 and 7 are in the ones place, 2 and 4 are in the tens place, and 1 is in the hundreds place.)

MP.3

T: Now draw a chip model to solve. As you work through the algorithm with the model, record each change in vertical form.

T: When you're finished, check your work with a partner, and use place value language to explain how your model and numbers show the algorithm.

NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

Allow students to use place value disks, labeled disk drawings, and chip models for as long as is necessary to demonstrate proficiency with this method.

NOTES ON MULTIPLE MEANS OF REPRESENTATION:

For students who need additional support with vertical form, provide lined paper so that they can write their problems in columns. Instruct them to turn their paper 90 degrees and to use the vertical lines as columns, making sure the right-hand column (ones place) is aligned first. It may help to write the problems starting with the ones place and moving left.

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Circulate to listen in on conversations and offer support as needed.

T: Who would like to share his or her work with the class? Use place value language to explain how the model helps you to understand the vertical form. (Choose a student.)

Repeat the procedure for the original activity in which students solve by drawing chip models. Use the following possible sequence: 35 + 106, 81 + 109, 117 + 48, and 23 + 159.

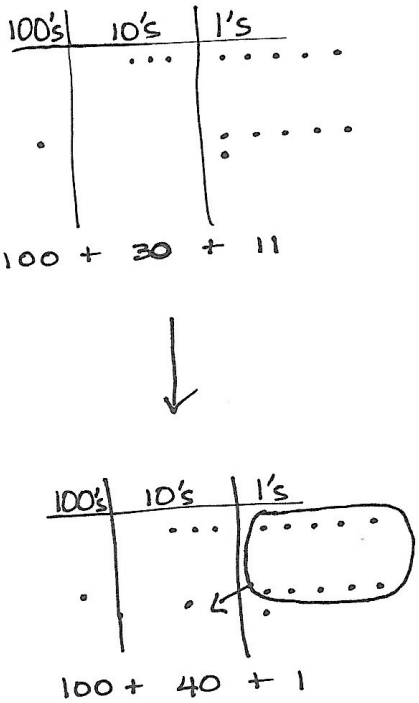
When students have finished, invite two volunteers to the board. One draws a model of 35 + 106 *before* bundling a ten. The other draws the model *after* bundling the ten. Encourage the remaining students to be active observers and to notice the similarities and differences between the models.

MP.3

T: Talk with your partner. Describe how the models are similar and different before and after bundling a ten.

S: Before you bundle a ten there is 1 hundred, 3 tens, and 11 ones. → After bundling, there is 1 hundred, 4 tens, 1 one. → We renamed 3 tens 11 ones as 4 tens 1, but the hundred stayed the same. → 100 + 30 + 11 is the same as 100 + 40 + 1.

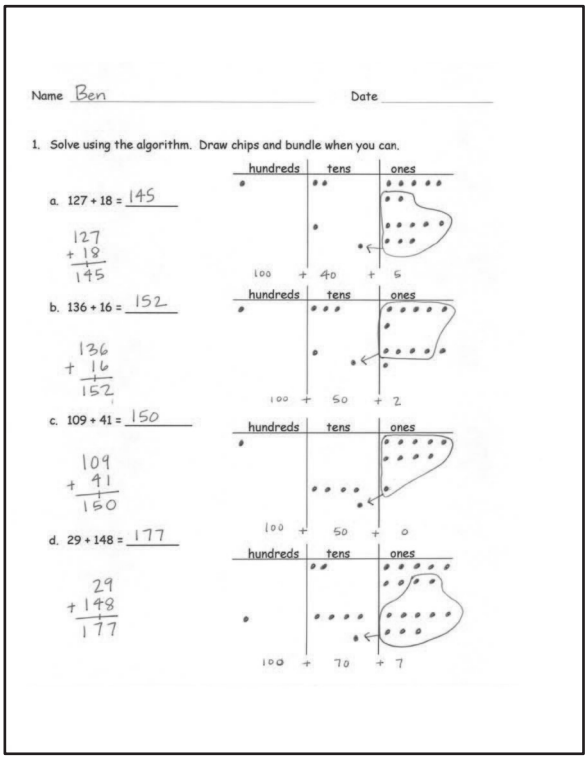
T: (Label the drawings. See the images to the right.)



Continue to support students who need assistance. Release students who demonstrate proficiency with the models and vertical form to work on the Problem Set independently.

Problem Set (10 minutes)

Students should do their personal best to complete the Problem Set within the allotted 10 minutes. For some classes, it may be appropriate to modify the assignment by specifying which problems they work on first. Some problems do not specify a method for solving. Students should solve these problems using the RDW approach used for Application Problems.


Name Ben Date

1. Solve using the algorithm. Draw chips and bundle when you can.

a. 127 + 18 = 145

127 + 18 = 145

b. 136 + 16 = 152

136 + 16 = 152

c. 109 + 41 = 150

109 + 41 = 150

d. 29 + 148 = 177

29 + 148 = 177

hundreds tens ones

100 + 40 + 6

hundreds tens ones

100 + 50 + 2

hundreds tens ones

100 + 50 + 0

hundreds tens ones

100 + 70 + 7

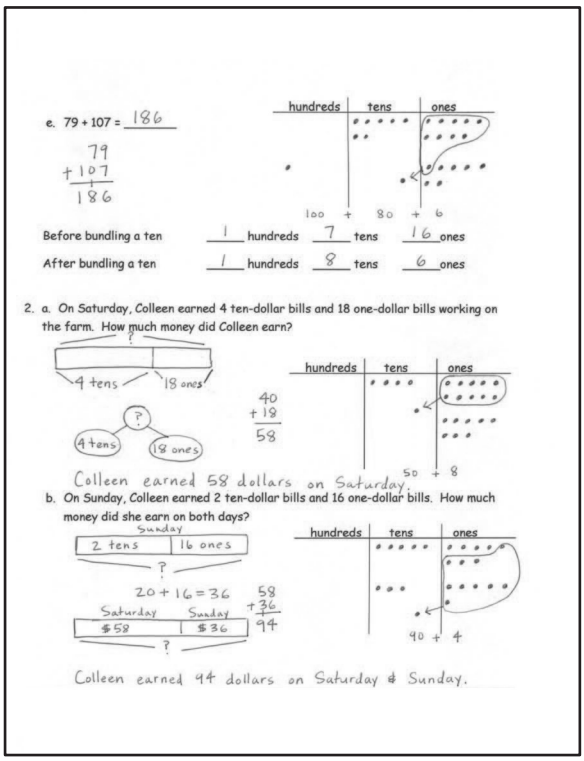
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Student Debrief (10 minutes)

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

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

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



- When you used the chip model for Problem 1, Part (a), how did you know whether or not to bundle a new unit of ten?
- For Problem 1, Part (b), where did you write the new ten in vertical form? How did it match your chip model?
- For Problem 1, can you tell if you will need to bundle ones just by looking at the digits in the ones place? What mental strategy helps you to know? (Partners to ten.)
- For Problem 1, Part (d), does it matter what number you draw first on your place value chart? Why not? Does adding a three-digit number change how you add?
- Look at Problem 1, Part (e). Think of the word *renaming*. How did we use bundling to rename the solution? Use place value language (i.e., hundreds, tens, and ones) to explain.

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.

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A

Number Correct: _____

Subtraction from Teens

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

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B

Number Correct: _____

Improvement: _____

Subtraction from Teens

1.	11 – 1 =	
2.	12 – 2 =	
3.	13 – 3 =	
4.	18 – 8 =	
5.	11 – 10 =	
6.	12 – 10 =	
7.	13 – 10 =	
8.	18 – 10 =	
9.	11 – 2 =	
10.	11 – 3 =	
11.	11 – 4 =	
12.	11 – 7 =	
13.	19 – 9 =	
14.	12 – 3 =	
15.	12 – 4 =	
16.	12 – 5 =	
17.	12 – 8 =	
18.	17 – 7 =	
19.	13 – 4 =	
20.	13 – 5 =	
21.	13 – 6 =	
22.	13 – 9 =	

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

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Name _____ Date _____

1. Solve using the algorithm. Draw chips and bundle when you can.

a. 127 + 18 = _____

hundreds	tens	ones

b. 136 + 16 = _____

hundreds	tens	ones

c. 109 + 41 = _____

hundreds	tens	ones

d. 29 + 148 = _____

hundreds	tens	ones

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e. 79 + 107 = _____

hundreds	tens	ones

Before bundling a ten _____ hundreds _____ tens _____ ones

After bundling a ten _____ hundreds _____ tens _____ ones

2. a. On Saturday, Colleen earned 4 ten-dollar bills and 18 one-dollar bills working on the farm. How much money did Colleen earn?

hundreds	tens	ones

b. On Sunday, Colleen earned 2 ten-dollar bills and 16 one-dollar bills. How much money did she earn on both days?

hundreds	tens	ones

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Name _____ Date _____

1. Solve using the algorithm. Draw chips and bundle when you can.

27 + 137

hundreds	tens	ones

2. Using the previous problem, fill in the blanks. Use place value language to explain how you used bundling to rename the solution.

Before bundling a ten _____ hundreds _____ tens _____ ones

After bundling a ten _____ hundreds _____ tens _____ ones

Explanation

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Name _____ Date _____

1. Solve using the algorithm. Draw chips and bundle when you can.

a. 125 + 17 = _____

hundreds	tens	ones

b. 148 + 14 = _____

hundreds	tens	ones

c. 107 + 56 = _____

hundreds	tens	ones

d. 38 + 149 = _____

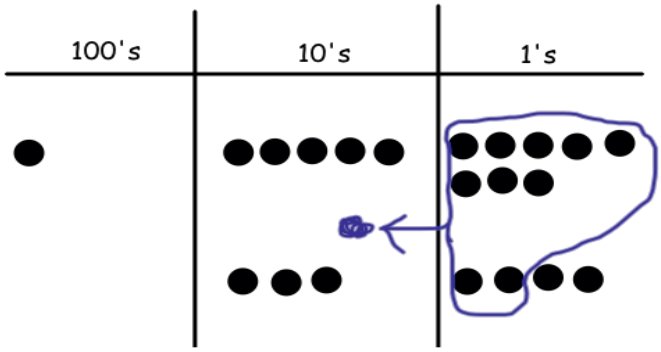
hundreds	tens	ones

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2. Jamie started to solve this problem when she accidentally dropped paint on her sheet. Can you figure out what problem she was given and her answer by looking at her work?



_____ + _____ = _____



3. a. In the morning, Mateo borrowed 4 bundles of ten markers and 17 loose markers from the art teacher. How many markers did Mateo borrow?

hundreds	tens	ones

b. In the afternoon, Mateo borrowed 2 bundles of ten crayons and 15 loose crayons. How many markers and crayons did Mateo borrow in all?

hundreds	tens	ones

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Topic C

Strategies for Decomposing a Ten

2.OA.1, 2.NBT.7, 2.NBT.9, 2.NBT.5

Focus Standards:		2.OA.1	Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
		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.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:		6	
Coherence	**-Links from:**	G1–M4	Place Value, Comparison, Addition and Subtraction to 40
	-Links to:	G2–M5	Addition and Subtraction Within 1,000 with Word Problems to 100
		G3–M2	Place Value and Problem Solving with Units of Measure

Topic C parallels Topic B as students apply their understanding of place value strategies to the subtraction algorithm, moving from concrete to pictorial to abstract. It is important to note that the algorithm is introduced at this level and is connected deeply to the understanding of place value. Fluency with the algorithm, however, is a Grade 4 standard.

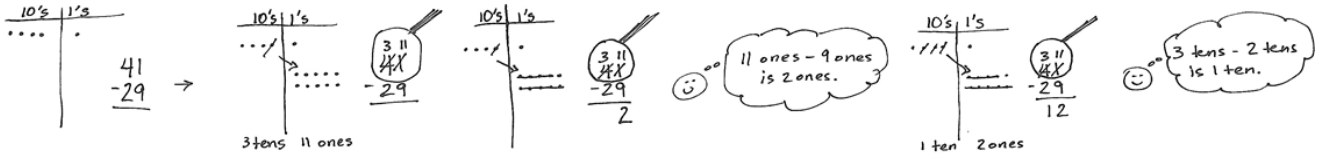
In Lesson 11, students use place value disks on a place value chart to subtract like units (e.g., 76 – 43 is 7 tens – 4 tens and 6 ones – 3 ones). They practice modeling the standard subtraction algorithm within 100 and learn to decompose 1 ten for 10 ones (e.g., in 76 – 47, students must recompose 7 tens 6 ones as 6 tens 16 ones). The use of manipulatives allows students to physically experience the renaming and understand the *why* behind recomposing a quantity.

Lesson 12 builds upon this understanding as students relate manipulatives to a written method, recording recompositions in vertical form. In subtraction, a common error is for students to switch the top and bottom digits in a given place when renaming is necessary. They perceive the digits as a column of unrelated numbers, rather than part of a larger total, and simply subtract the smaller from the larger. Hence, many students would solve 41 – 29 as 28 instead of understanding that they can take 9 ones from *41 ones*. To prevent this error and aid students in seeing the top number as the whole, students use a "magnifying

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glass" to examine the minuend. They draw a circle around the top number and add a handle (see image below). Before subtracting, they look inside the magnifying glass at the whole number and determine if each digit is big enough to subtract the number below it. If not, they decompose one of the next larger units to make ten of the unit they need. In Lesson 13, this is used in conjunction with the chip model (shown below); students record each change they make to their model while simultaneously using the algorithm.

In Lessons 14 and 15, students continue working with the chip model on their place value charts and follow the same procedure for decomposing a ten and relating it to vertical form. Here, however, students subtract a two-digit subtrahend from a three-digit minuend (e.g., 164 – 36). This provides practice working with and drawing three-digit numbers without the complexity of decomposing a hundred.



As in Topic A, Topic C closes with a lesson that focuses on one- and two-step word problems within 100. Students apply their place value reasoning, mental strategies, and understanding of compositions and decompositions to negotiate different problem types with unknowns in various positions. Because two different problem types (i.e., *add to, take from, put together/take apart, compare*) are often combined in two-step word problems, some quantities involve single-digit addends, especially when students are working with the more challenging comparison problems. Students are encouraged to be flexible in their thinking and to use drawings and/or models to explain their thinking. Students continue to use tape diagrams to solve word problems, relating the diagrams to a situation equation (e.g., 8 + ____ = 41) and rewriting it as a solution equation (e.g., 41 – 8 = ___), thus illustrating the relationship between operations. Students find success when using their mental strategies of making a multiple of 10 and counting on (e.g., 9, 10, 20, 30, 40, 41) as they experience the relationships between quantities within a context.

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A Teaching Sequence Toward Mastery of Strategies for Decomposing a Ten	
Objective 1:	**Represent subtraction with and without the decomposition of 1 ten as 10 ones with manipulatives. (Lesson 11)**
Objective 2:	**Relate manipulative representations to a written method. (Lesson 12)**
Objective 3:	**Use math drawings to represent subtraction with and without decomposition and relate drawings to a written method. (Lesson 13)**
Objective 4:	**Represent subtraction with and without the decomposition when there is a three-digit minuend. (Lessons 14–15)**
Objective 5:	**Solve one- and two-step word problems within 100 using strategies based on place value. (Lesson 16)**

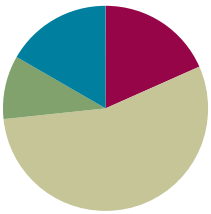
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Lesson 11

Objective: Represent subtraction with and without the decomposition of 1 ten as 10 ones with manipulatives.

Suggested Lesson Structure

Fluency Practice	(11 minutes)
Application Problem	(6 minutes)
Concept Development	(33 minutes)
Student Debrief	(10 minutes)
Total Time	**(60 minutes)**



Fluency Practice (11 minutes)

- 2 Less **2.NBT.5** (2 minutes)
- Using 10 to Subtract **2.NBT.5** (3 minutes)
- Subtract Common Units **2.NBT.5** (6 minutes)

2 Less (2 minutes)

Note: Practicing giving 2 less helps students to use the nearest ten in order to subtract fluently.

T: For every number I say, you say 2 less. If I say 10, you say 8. Ready?
T: 10.
S: 8.
T: 11.
S: 9.

Continue with the following possible sequence: 20, 21, 30, 31, 40, 41, 51, and 61.

Using 10 to Subtract (3 minutes)

Note: Reviewing the first-grade skill of counting up and down to 10 to subtract gives students a mental strategy to subtract fluently.

T: (Write 16 – 9 on the board.)
T: The answer is…? Wait for the signal. (Wait for all to be ready.)
S: 7.
T: (Use a number bond to express 16 as 10 and 6.) 10 – 9 is…?
S: 1.

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T: 1 + 6 is…?
S: 7.

Continue with the following possible sequence: 15 – 9, 13 – 8, 15 – 7, 16 – 7, 12 – 9, and 13 – 7.

Subtract Common Units (6 minutes)

Materials: (S) Personal white board

Note: Reviewing this mental math fluency prepares students for understanding the importance of the subtraction algorithm.

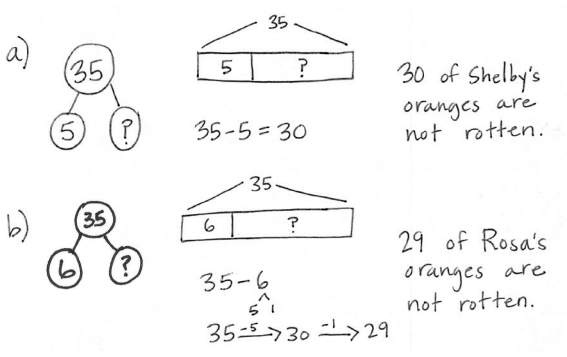
T: (Project 77.) Say the number in unit form.
S: 7 tens 7 ones.
T: (Write 77 – 22 = ____.) Say the subtraction sentence and answer in unit form.
S: 7 tens 7 ones – 2 tens 2 ones = 5 tens 5 ones.
T: Write the subtraction sentence on your personal white board.

Repeat the process and sequence for 88 – 33, 99 – 22, 66 – 44, 166 – 44, 55 – 33, and 155 – 33.

Application Problem (6 minutes)

Shelby picks 35 oranges. 5 are rotten.

a. How many of Shelby's oranges are not rotten?
b. Rosa picks 35 oranges, too, but 6 are rotten. How many of Rosa's oranges are not rotten?



Note: This problem shifts students' attention to subtraction and anticipates the opening of the Concept Development. In debriefing the problem, have students notice that Rosa has 29 while Shelby has 30 oranges.

Concept Development (33 minutes)

Materials: (T) Place value disks (19 ones, 9 tens), unlabeled tens place value chart (Lesson 1 Template)
(S) Place value disks (19 ones, 9 tens), unlabeled tens place value chart (Lesson 1 Template), place value disks (Lesson 6 Template)

NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

If students struggle with these mental math problems, encourage them to discuss solutions with a partner before responding to the questions. Partners can also jot problems and answer to one another on personal white boards to check for accuracy.

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Problem 1: 35 – 9

T: 35 – 5 is…?
S: 30.
T: 35 – 6 is…?
S: 29.
T: (Continue with two to three more sequences: 24 – 4, 24 – 5; 17 – 7, 17 – 8.)
T: (Write 35 – 9 on the board.) How can you solve 35 – 9?
S: Count back. → Use the arrow method to add 1, then 20, and 5 more. → Subtract 10 and then put 1 back. I can show that with arrows too! → Add 1 to both numbers to make it an easier problem, like 36 – 10.
T: Those are great strategies. Let me show you another one.

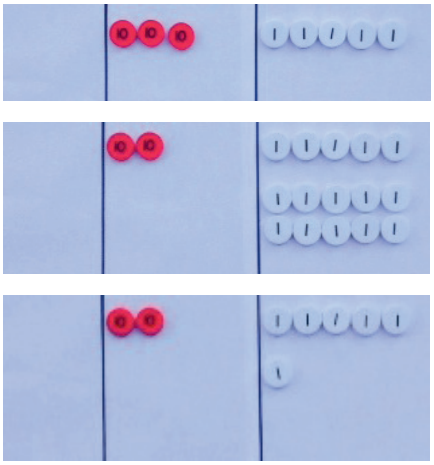
NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

Offer a relatable example to scaffold understanding.

- Imagine you have 2 cookies. You have 3 friends come over. Do you have enough cookies for each friend to get one?
- Imagine you have 5 cookies. You have 9 people over. Can you give each person a whole cookie?

Offer similar examples until students demonstrate understanding.

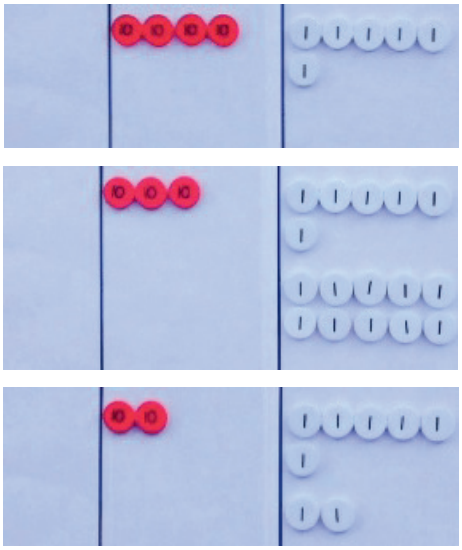
Show 35 on the place value chart using place value disks as shown to the right.



T: How many tens do you see?
S: 3 tens.
T: How many ones?
S: 5 ones.
T: How many am I subtracting?
S: 9 ones.
T: Can I subtract 9 ones from 5 ones?
S: No.
MP.4
T: How many ones are in a unit of ten?
S: 10.
T: I can break apart, or unbundle, a unit of ten into 10 ones. We also call this **decomposing**. So, if I decompose one of these tens to make 10 ones, how many ones will I have?
S: 15.
T: Yes! So, will I have enough ones to subtract 9 ones?
S: Yes!
T: Take 1 ten and change it for 10 ones. (Remove a ten, counting out 10 ones. Place the 10 ones in 5-groups as shown above and to the right.)
T: Now, I have 15 ones on my chart, and I can subtract 9 ones. (Take away 9 ones as shown above.)
T: How many tens and ones do you see?
S: 2 tens and 6 ones.

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Problem 2: 46 – 18



T: Let's do another problem. This time, use your place value disks. (Write 46 – 18 on the board.)

T: Do you have to show 18 with your disks?

S: No!

T: No, we don't because now we are finding a missing part, not the total. We are going to remove a part, 18, from the whole, 46.

T: Model with your place value disks the number 46. Count the Say Ten way as you put out your place value disks.

S: 1 ten, 2 tens, 3 tens, 4 tens, 4 tens 1, 4 tens 2, …, 4 tens 6. (Arrange the place value disks on the place value chart as shown to the right. Direct students to arrange their place value disks in the same way.)

MP.4

T: Let's start with the ones. Can I subtract 8 ones from 6 ones?

S: No. You need to decompose a ten. → No, we have to change 1 ten for 10 ones.

T: (Model unbundling a ten. Direct students to do the same, arranging the ten ones in 5-groups.)

T: Now, I can subtract 8 ones. Do it with me. (Count chorally while removing 8 ones from the place value chart.)

T: Am I done?

S: No. You need to subtract a ten.

T: (Remove a ten while students do the same.)

T: So 46 – 18 is…?

S: 28.

T: The Say Ten way? (Point to the disks.)

S: 2 tens 8.

If necessary, repeat with the following possible sequence until students show proficiency: 46 – 12, 22 – 15, 41 – 23, and 32 – 29. Then, allow students to begin working on the Problem Set independently as they are able.

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.

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Student Debrief (10 minutes)

Lesson Objective: Represent subtraction with and without the decomposition of 1 ten as 10 ones with manipulatives.

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

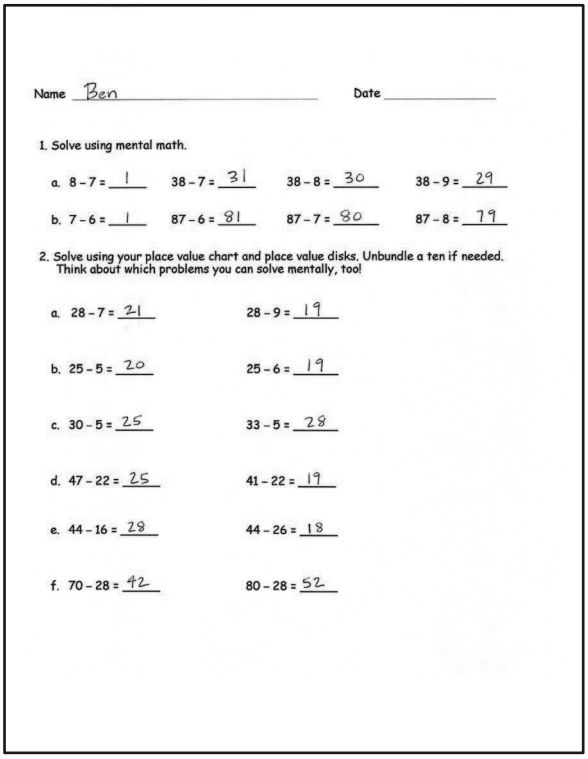
Invite students to review their solutions for the Problem Set. They should check work by comparing answers with a partner before going over answers as a class. Look for misconceptions or misunderstandings that can be addressed in the Debrief. Guide students in a conversation to debrief the Problem Set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

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

- How did the sequence in Problem 1(a) help you to solve 38 – 9 mentally? Did you need to **decompose** a ten to solve?
- Look at Problem 2. How could you avoid the extra work of modeling the problems in the second column? Use the words *more* or *less* to describe how the second column relates to the first one.
- Explain to your partner how to solve Problem 3. Did you need to unbundle a ten to solve? How did you know?
- For Problem 4, did you decompose a unit of ten? Could you have solved this problem differently?
- How do you know when you must unbundle a ten to subtract? Must you always unbundle when solving a problem like 86 – 39?

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.



Name Ben Date

1. Solve using mental math.

a. 8 – 7 = 1 38 – 7 = 31 38 – 8 = 30 38 – 9 = 29

b. 7 – 6 = 1 87 – 6 = 81 87 – 7 = 80 87 – 8 = 79

2. Solve using your place value chart and place value disks. Unbundle a ten if needed. Think about which problems you can solve mentally, too!

a. 28 – 7 = 21 28 – 9 = 19

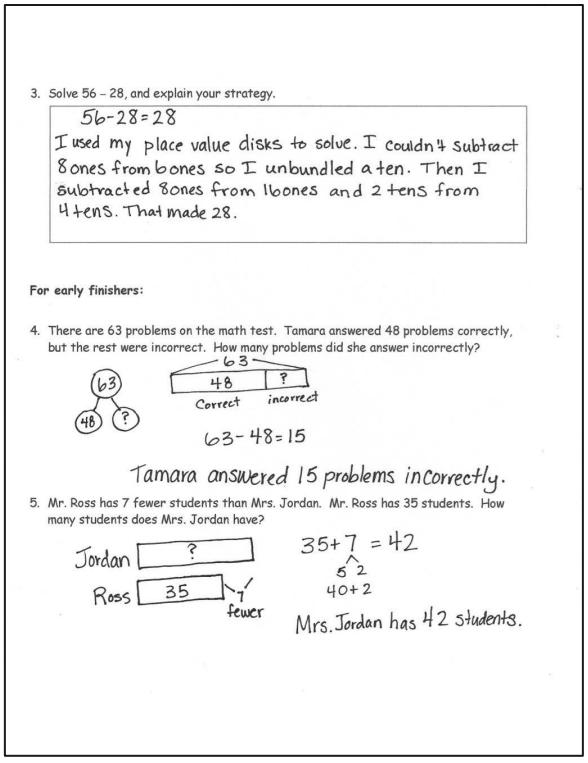
b. 25 – 5 = 20 25 – 6 = 19

c. 30 – 5 = 25 33 – 5 = 28

d. 47 – 22 = 25 41 – 22 = 19

e. 44 – 16 = 28 44 – 26 = 18

f. 70 – 28 = 42 80 – 28 = 52



3. Solve 56 – 28, and explain your strategy.

56-28=28

I used my place value disks to solve. I couldn't subtract 8 ones from 6 ones so I unbundled a ten. Then I subtracted 8 ones from 16 ones and 2 tens from 4 tens. That made 28.

For early finishers:

4. There are 63 problems on the math test. Tamara answered 48 problems correctly, but the rest were incorrect. How many problems did she answer incorrectly?

63, 48, ? (Correct, incorrect)

63-48=15

Tamara answered 15 problems incorrectly.

5. Mr. Ross has 7 fewer students than Mrs. Jordan. Mr. Ross has 35 students. How many students does Mrs. Jordan have?

Jordan ?, Ross 35, 7 fewer

35+7 =42

5 2

40+2

Mrs. Jordan has 42 students.

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Name _____ Date _____

1. Solve using mental math.

   a. 8 – 7 = _____ 38 – 7 = _____ 38 – 8 = _____ 38 – 9 = _____

   b. 7 – 6 = _____ 87 – 6 = _____ 87 – 7 = _____ 87 – 8 = _____

2. Solve using your place value chart and place value disks. Unbundle a ten if needed. Think about which problems you can solve mentally, too!

   a. 28 – 7 = _____ 28 – 9 = _____

   b. 25 – 5 = _____ 25 – 6 = _____

   c. 30 – 5 = _____ 33 – 5 = _____

   d. 47 – 22 = _____ 41 – 22 = _____

   e. 44 – 16 = _____ 44 – 26 = _____

   f. 70 – 28 = _____ 80 – 28 = _____

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3. Solve 56 – 28, and explain your strategy.

For early finishers:

4. There are 63 problems on the math test. Tamara answered 48 problems correctly, but the rest were incorrect. How many problems did she answer incorrectly?

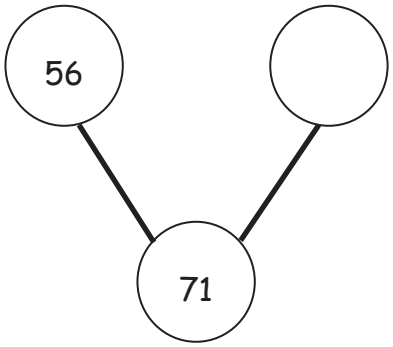
5. Mr. Ross has 7 fewer students than Mrs. Jordan. Mr. Ross has 35 students. How many students does Mrs. Jordan have?

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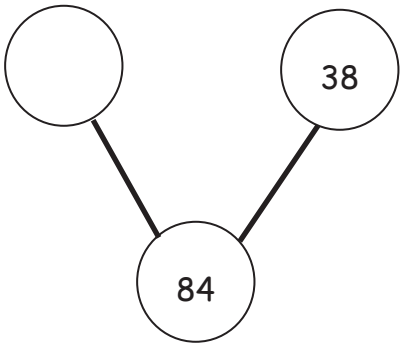
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Solve for the missing part. Use your place value chart and place value disks.

1.



2.



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Name _____ Date _____

1. Solve using mental math.

   a. 6 – 5 = _____ 26 – 5 = _____ 26 – 6 = _____ 26 – 7 = _____

   b. 8 – 7 = _____ 58 – 7 = _____ 58 – 8 = _____ 58 – 9 = _____

2. Solve using your place value chart and place value disks. Unbundle a ten, if needed. Think about which problems you can solve mentally, too!

   a. 36 – 5 = _____ 36 – 7 = _____

   b. 37 – 6 = _____ 37 – 8 = _____

   c. 40 – 5 = _____ 41 – 5 = _____

   d. 58 – 32 = _____ 58 – 29 = _____

   e. 60 – 26 = _____ 62 – 26 = _____

   f. 70 – 41 = _____ 80 – 41 = _____

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3. Solve and explain your strategy.

a. 41 – 27 = _____
b. 67 – 28 = _____

4. The number of marbles in each jar is marked on the front. Miss Clark took 37 marbles out of each jar. How many marbles are left in each jar? Complete the number sentence to find out.





a. _____ – _____ = _____

b. _____ – _____ = _____





c. _____ – _____ = _____

d. _____ – _____ = _____

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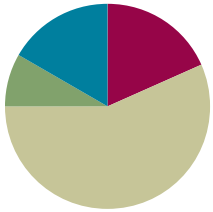
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Lesson 12

Objective: Relate manipulative representations to a written method.

Suggested Lesson Structure

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



Fluency Practice (11 minutes)

- Using 10 to Subtract **2.NBT.5** (3 minutes)
- Get the Ten Out to Subtract **2.NBT.5** (5 minutes)
- How Many More Tens **2.NBT.5** (3 minutes)

Using 10 to Subtract (3 minutes)

Repeat the fluency activity from Lesson 11.

Get the Ten Out to Subtract (5 minutes)

Note: Students practice taking out the ten and subtracting to prepare for unbundling a ten in today's lesson.

T: For every number sentence I give, subtract the ones from ten. When I say 12 – 4, you say 10 – 4 = 6. Ready?
T: 12 – 4.
S: 10 – 4 = 6.
T: 13 – 7.
S: 10 – 7 = 3.

Practice taking the ten out of number sentences fluently before adding the ones back.

T: Now let's add back the ones.
T: 12 – 4. Take from ten.
S: 10 – 4 = 6.
T: Now add back the ones.
S: 6 + 2 = 8.

Continue with the following possible sequence: 13 – 7, 11 – 8, 13 – 9, 15 – 7, and 14 – 8.

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How Many More Tens? (3 minutes)

Materials: (S) Personal white board

Note: Practice adding and subtracting multiples of 10 prepares students for the lesson.

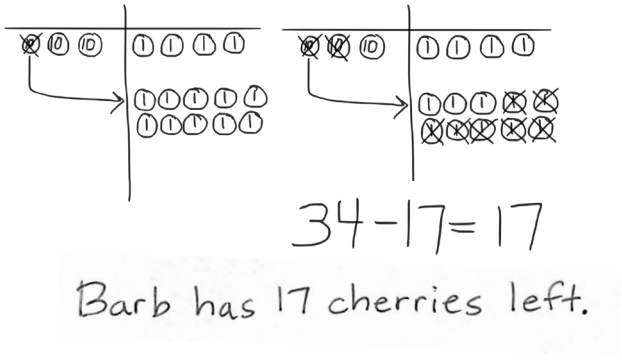
T: If I say 45 – 35, you say 10. To say how many more tens in a sentence, you say 45 is 10 more than 35. Ready?
T: 65 – 45.
S: 20.
T: Say it in a sentence.
S: 65 is 20 more than 45.

Continue with the following possible sequence: 85 – 45, 74 – 24, 59 – 29, 38 – 18, and 99 – 19.

Application Problem (5 minutes)

Barb has a bag of 34 cherries. She eats 17 cherries for a snack. How many cherries does she have left?

Note: This problem is designed for independent practice and serves to reinforce the concept of decomposing 1 ten as 10 ones with manipulatives. Allow students to use place value disks when solving. If students need support, guide them through the process of unbundling a ten with place value disks.



Concept Development (34 minutes)

Materials: (T) Place value disks (19 ones and 9 tens), unlabeled tens place value chart (Lesson 1 Template)
(S) Place value disks (19 ones and 9 tens), unlabeled tens place value chart (Lesson 1 Template), personal white board, place value disks (Lesson 6 Template)

Problem 1: 25 – 11

T: (Write 25 – 11 on the board.) Read this problem with me.
S: 25 minus 11. (Read the problem chorally.)
T: (Draw a blank number bond on the board.) What is the whole?
MP.2
S: 25.
T: What is the part that we know?
S: 11.
T: What do we need to find?
S: The missing part.

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T: That's right. When we use place value disks to solve a subtraction problem, we only put the whole on our chart. Turn to your neighbor, and tell him or her why we only show the whole when subtracting.

S: You take away one part from the whole. → You are not adding two parts; you are taking away. → 11 is inside 25, and we are finding it and taking it out.

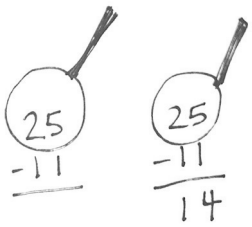
T: Count the total value of the disks as I place them. Say the units, too. 1 ten, 2 tens, 2 tens 1 one, 2 tens 2 ones, 2 tens 3 ones, 2 tens 4 ones, 2 tens 5 ones. (Place 2 tens 5 ones on your place value chart. Direct students to do the same.)

T: Today, as we solve subtraction problems, we are going to record our work in vertical form. (Write the problem in vertical form.)

T: What is the whole we are subtracting from?

S: 25.

T: We want to look carefully at the whole when subtracting, like a detective, to see if we need to do any unbundling. Let's draw an imaginary magnifying glass around 25. (Draw the magnifying glass as shown to the right.)



T: Let's start by looking at the smallest place value, the ones: Can we take 1 one disk from 5 ones disks?

S: Yes!

T: Let's move to the tens column. Can I take 1 ten from 2 tens?

MP.2 S: Yes!

T: We are ready to subtract because we have checked to make sure we have enough units in each place value.

T: Take 1 one from the 5 ones. (Remove 1 one from the place value chart. Students do the same.)

T: How many ones are left?

S: 4 ones.

T: (Record 4 in the ones column.) Take 1 ten from 2 tens. (Remove 1 ten from the place value chart, and record the answer in the answer space. Students do the same.)

T: What is 25 – 11?

S: 14.

Problem 2: 22 – 13

T: Let's try another problem together. This time I want you to record your answers vertically as I do. (Write 22 – 13 on the board in vertical form. Students do the same.)

T: What should I do first?

S: Find out if we need to unbundle.

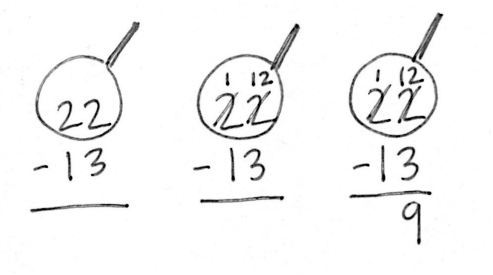
T: (Draw the magnifying glass with enough space to write renaming, and instruct students do the same.)

T: Okay, I'm looking closely at it. Where do I start?

S: Start in the ones column. → Check to see if you can subtract the ones.

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T: Can I subtract 3 ones from 2 ones?
S: No!
T: What should I do?
S: Decompose a ten.
T: (Change a ten for 10 ones. Arrange them in 5-groups on the place value chart. Instruct students to do the same.)
T: Whatever I do to my place value disks, I must also do to the numbers in vertical form. How should I record unbundling a ten?



S: Cross out the 2 in the tens place, and write 1 above it. Cross out the 2 in the ones place, and write 12 above it. → Change 2 tens to 1 ten and 2 ones to 12 ones.
T: Now how many tens and ones do you see on my place value chart?
S: 1 ten 12 ones.
MP.2 T: Can I subtract 3 ones now?
S: Yes!
T: Can I subtract 1 ten now?
S: Yes!
T: Then, we are ready to subtract! What are we?
S: Ready to subtract!
T: Then, let's subtract!
T: 12 ones minus 3 ones is…?
S: 9 ones.
T: 1 ten minus 1 ten is…?
S: 0 tens.
T: What is the answer to 22 – 13?
S: 9.

NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

Encourage students to use the place value disks for the Problem Set until they are comfortable enough with the process to use the vertical form alone. If a student is comfortable using the algorithm without the disks, allow him to work without them.

Repeat the process above with the following possible sequence: 31 – 18, 46 – 28, and 32 – 19.

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.

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Student Debrief (10 minutes)

Lesson Objective: Relate manipulative representations to a written method.

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

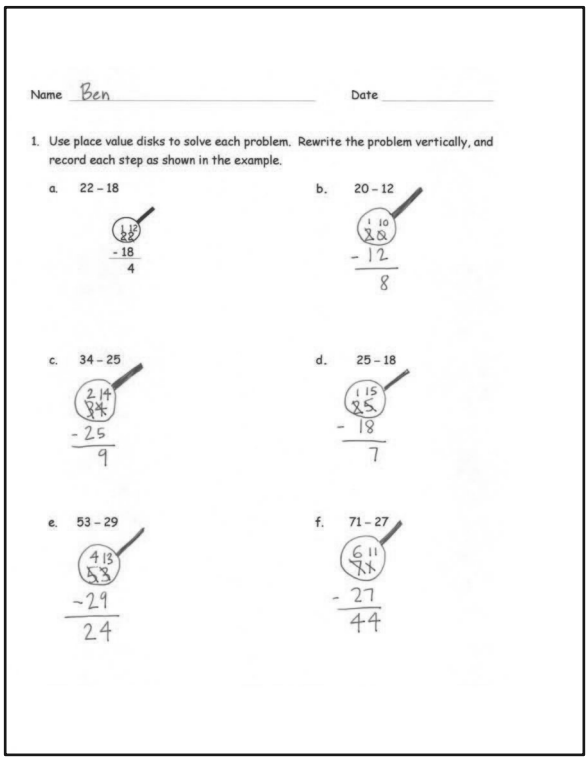
Invite students to review their solutions for the Problem Set. They should check work by comparing answers with a partner before going over answers as a class. Look for misconceptions or misunderstandings that can be addressed in the Debrief. Guide students in a conversation to debrief the Problem Set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

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

- How did unbundling a ten help you to solve Problem 1(b)?
- How did you solve Problem 1(c)? How did you use the place value disks on the chart to show decomposing a ten?
- Explain to your partner how you used place value disks to solve Problem 1(d). How did your work with the place value disks match the vertical form?
- How did you solve Problem 1(e) using place value disks and the vertical form? How could you have solved this problem differently using a simplifying strategy?
- For Problem 2, explain to your partner how you know who is correct, Terry or Pam?
- How does Problem 3(a) help us to solve Problem 3(b)?

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.



Name Ben Date

1. Use place value disks to solve each problem. Rewrite the problem vertically, and record each step as shown in the example.

a. 22 – 18

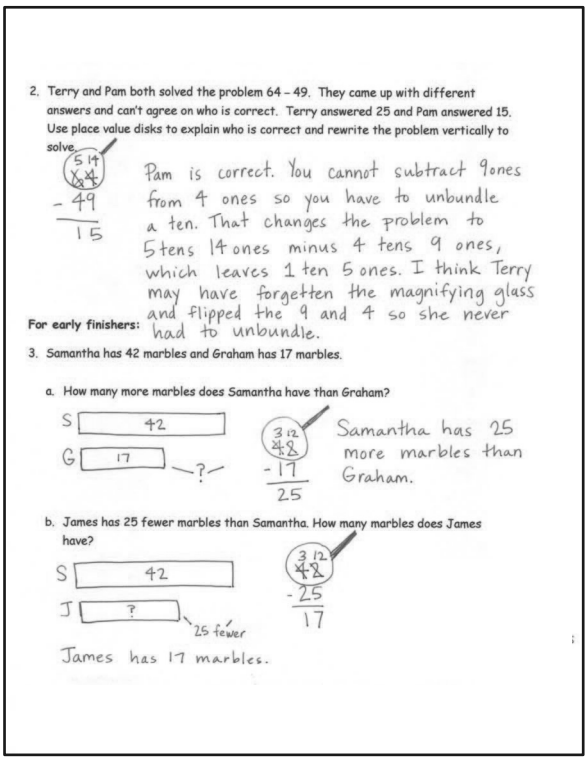
b. 20 – 12

c. 34 – 25

d. 25 – 18

e. 53 – 29

f. 71 – 27



2. Terry and Pam both solved the problem 64 – 49. They came up with different answers and can't agree on who is correct. Terry answered 25 and Pam answered 15. Use place value disks to explain who is correct and rewrite the problem vertically to solve.

Pam is correct. You cannot subtract 9 ones from 4 ones so you have to unbundle a ten. That changes the problem to 5 tens 14 ones minus 4 tens 9 ones, which leaves 1 ten 5 ones. I think Terry may have forgetten the magnifying glass and flipped the 9 and 4 so she never had to unbundle.

For early finishers:

3. Samantha has 42 marbles and Graham has 17 marbles.

a. How many more marbles does Samantha have than Graham?

S 42
G 17 ?

Samantha has 25 more marbles than Graham.

b. James has 25 fewer marbles than Samantha. How many marbles does James have?

S 42
J ? 25 fewer

James has 17 marbles.

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Name _____ Date _____

1. Use place value disks to solve each problem. Rewrite the problem vertically, and record each step as shown in the example.

a. 22 – 18



$$\begin{array}{r} 22 \\ -\ 18 \\ \hline 4 \end{array}$$

b. 20 – 12

c. 34 – 25

d. 25 – 18

e. 53 – 29

f. 71 – 27

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2. Terry and Pam both solved the problem 64 – 49. They came up with different answers and cannot agree on who is correct. Terry answered 25, and Pam answered 15. Use place value disks to explain who is correct, and rewrite the problem vertically to solve.

For early finishers:

3. Samantha has 42 marbles, and Graham has 17 marbles.

   a. How many more marbles does Samantha have than Graham?

   b. James has 25 fewer marbles than Samantha. How many marbles does James have?

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Sherry made a mistake while subtracting. Explain her mistake.

Sherry's Work:	Explanation:
14 44 -26 28	_____ _____ _____ _____ _____ _____

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Name _____ Date _____

1. Use place value disks to solve each problem. Rewrite the problem vertically, and record each step as shown in the example.

a. 34 – 18



- 18

16

b. 41 – 16

c. 33 – 15

d. 46 – 18

e. 62 – 27

f. 81 – 34

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2. Some first- and second-grade students voted on their favorite drink. The table shows the number of votes for each drink.

Types of Drink	Number of Votes
Milk	28
Apple Juice	19
Grape Juice	16
Fruit Punch	37
Orange Juice	44

a. How many more students voted for fruit punch than for milk? Show your work.

b. How many more students voted for orange juice than for grape juice? Show your work.

c. How many fewer students voted for apple juice than for milk? Show your work.

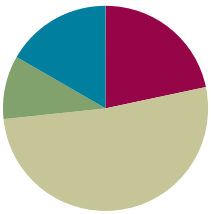
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Lesson 13

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

Suggested Lesson Structure

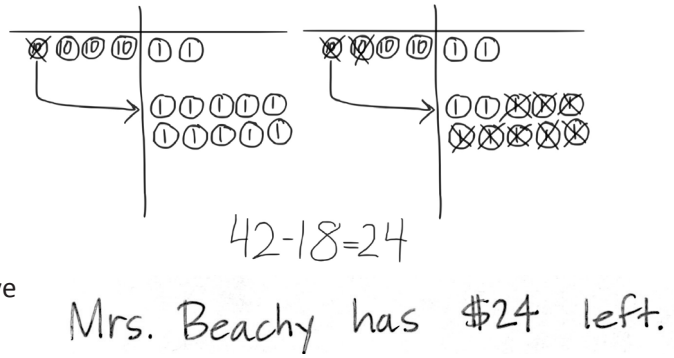


Application Problem	(6 minutes)
Fluency Practice	(13 minutes)
Concept Development	(31 minutes)
Student Debrief	(10 minutes)
Total Time	**(60 minutes)**

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.

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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)

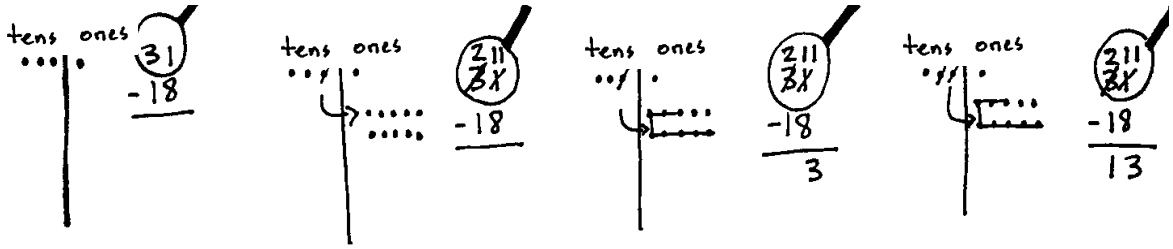
Materials: (S) Subtraction Patterns Sprint

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.

T: What is the whole?

S: 31.

MP.2

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.

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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.

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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?

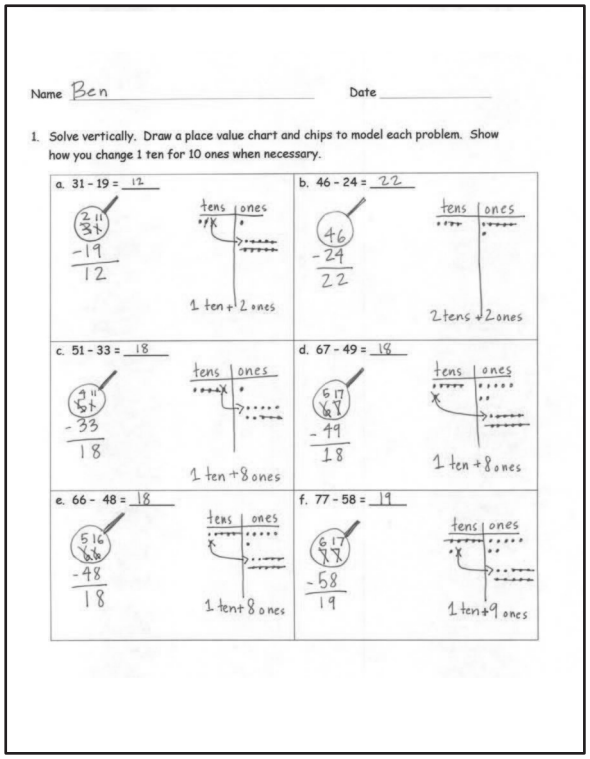
Repeat the process above with the problem 33 – 17.

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.


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
-19
12
tens | ones
1 ten + 2 ones

b. 46 - 24 = 22
-24
22
tens | ones
2 tens + 2 ones

c. 51 - 33 = 18
-33
18
tens | ones
1 ten + 8 ones

d. 67 - 49 = 18
-49
18
tens | ones
1 ten + 8 ones

e. 66 - 48 = 18
-48
18
tens | ones
1 ten + 8 ones

f. 77 - 58 = 19
-58
19
tens | ones
1 ten + 9 ones

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Student Debrief (10 minutes)

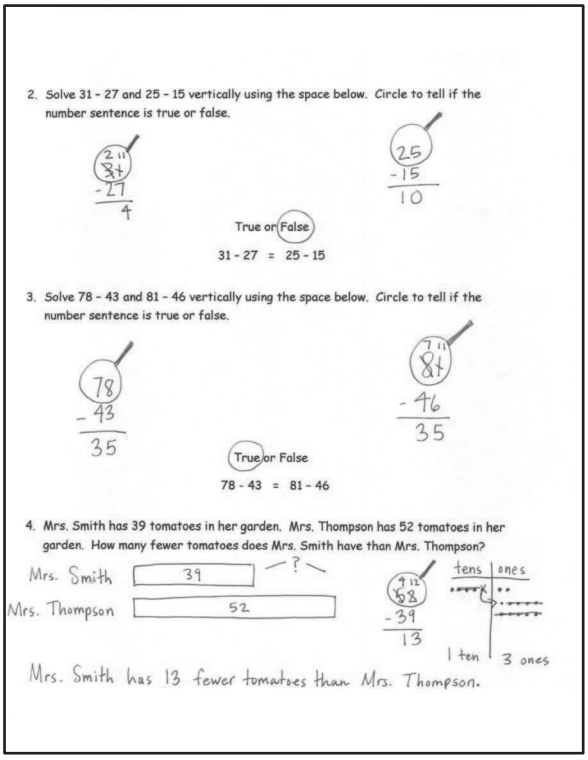
Lesson Objective: Use math drawings to represent subtraction with and without decomposition and relate drawings to a written method.

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?


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?

Mrs. Smith 39 ?

Mrs. Thompson 52

tens ones

1 ten 3 ones

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

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.

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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 =	

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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 =	

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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 = _____

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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?

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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 = _____

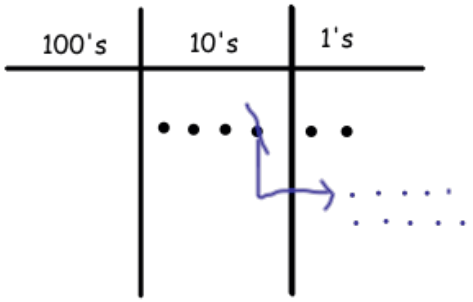
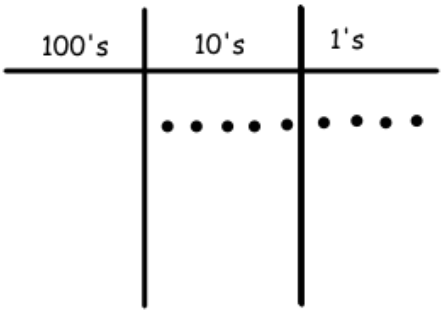
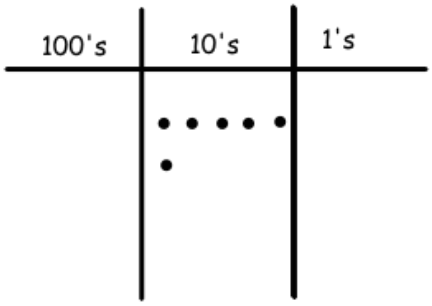
2. 63 – 35 = _____

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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 = _____	

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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 = _____

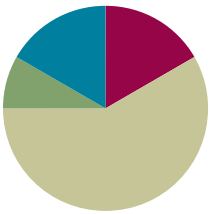
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Lesson 14

Objective: Represent subtraction with and without the decomposition when there is a three-digit minuend.

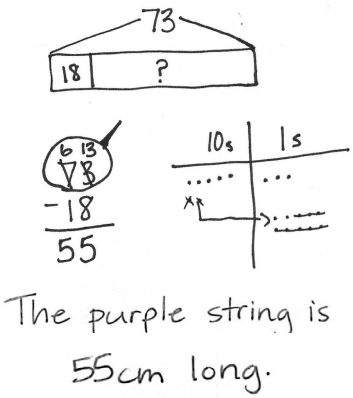
Suggested Lesson Structure



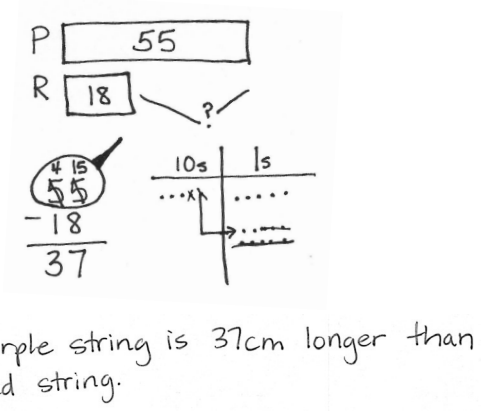
Application Problem	(5 minutes)
Fluency Practice	(10 minutes)
Concept Development	(35 minutes)
Student Debrief	(10 minutes)
Total Time	**(60 minutes)**

Application Problem (5 minutes)

The total length of a red string and a purple string is 73 cm. The red string is 18 cm long. How long is the purple string?



Extension:



Note: This Application Problem allows students to practice the skill from Lesson 13. In order to keep their work simple, perhaps draw the tape diagram together, and then let them solve the subtraction and write their solutions independently.

Extension: Find the difference in length between the two strings.

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Fluency Practice (10 minutes)

- Place Value **2.NBT.1** (3 minutes)
- Rename the Units: Choral Response **2.NBT.1** (5 minutes)
- Take from the Tens or Ones **2.NBT.5** (2 minutes)

Place Value (3 minutes)

Note: Practicing these skills in isolation helps lay a foundation for conceptual understanding of today's lesson.

T: (Write 184.) Say the number in standard form.
S: 184.
T: What digit is in the tens place?
S: 8.
T: (Underline 8.) What's the value of the 8?
S: 80.
T: State the value of the digit 1.
S: 100.
T: 4?
S: 4.

Repeat using the following possible sequence: 173, 256, and 398.

Rename the Units: Choral Response (5 minutes)

Note: This fluency activity reviews foundations that lead into today's lesson.

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

Repeat the process for the following possible sequence: 30, 32, 38, 40, 41, 46, 50, 63, and 88.

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Take from the Tens or Ones (2 minutes)

Note: This fluency activity helps students know when and when not to unbundle a ten when subtracting. This is a foundational skill for today's lesson.

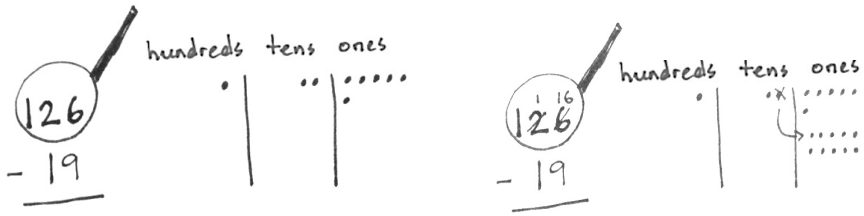
T: For every number sentence I say, you tell me if I take from the tens or the ones. If I say 46 – 5, you say take from the ones. If I say 46 – 7, you say take from the tens. Ready?
T: 46 – 6.
S: Take from the ones.
T: 46 – 9.
S: Take from the tens.

Continue with the following possible sequence: 52 – 1, 52 – 4, 63 – 6, 64 – 5, 65 – 4, 68 – 8, and 70 – 3.

Concept Development (35 minutes)

Materials: (S) Math journal or paper

T: Write 126 – 19 the vertical way on your paper.
T: Let's draw a magnifying glass around the total, 126. (Draw the magnifying glass as students do the same.)
T: Draw your place value chart. (Or use a template with the units already labeled.)



MP.6 T: Whisper count the Say Ten way as you draw the place value units of 126. (Model drawing chips to represent the minuend as students do the same.)
S: 1 hundred, 1 hundred 1 ten, 1 hundred 2 tens, 1 hundred 2 tens 1, …, 1 hundred 2 tens 6.
T: Use place value language to tell your partner how your model matches the vertical form.
S: I drew 1 chip in the hundreds place, 2 chips in the tens place, and 6 chips in the ones place, so that is one hundred twenty-six. → 1 hundred 2 tens 6 ones is the same as one hundred twenty-six.
T: What next?
S: Check to see if you can subtract ones. → See if there are enough ones to subtract.
T: Can I subtract 9 ones from 6 ones?
S: You have to unbundle a ten. → Rename a ten as 10 ones.
T: What I draw, you draw. (Model crossing out a chip in the tens place, drawing an arrow to show the exchange, and adding 10 ones to the ones column as students do the same.)

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T: What should I do in the vertical form?
S: Cross out 2 tens, make 1 ten; cross out the 6 ones, make it 16 ones. → Change 1 ten for 10 ones.
T: Now that we've renamed, let's say the new problem using place value language.
S: 1 hundred 1 ten 16 ones minus 1 ten 9 ones.
T: Are we ready to subtract?
S: Yes!

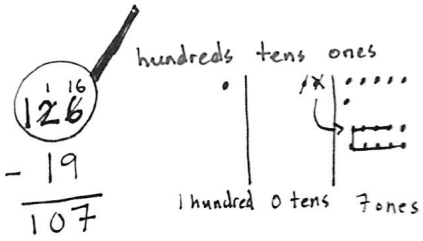
Work through the tens and ones, subtracting using the language of units.

T: Now, this part is new. We have 1 hundred. Discuss. What do you think we have to do next?
S: 1 hundred minus 0 is 1 hundred. → Subtract 0 from 1.
T: If I have 1 hundred, and I take away 0, how many hundreds do I have left?
S: 1.
T: Should I change my chip model?
S: No.
MP.6
T: Then, where do I record my answer?
S: In the hundreds place in vertical form!

NOTES ON MULTIPLE MEANS OF REPRESENTATION:

Use the Rekenrek to represent subtraction with decomposing a ten as an alternate method for students who have trouble grasping the concept.

Model writing 1 in the hundreds place as students do the same.



T: Read the answer the Say Ten way.
S: 1 hundred, 7.
T: The regular way?
S: One hundred seven.
T: Talk with your partner. How does having a hundred change how you solved the problem?
S: We had to draw a hundreds place on our charts. → We solved the same way; we subtracted the ones and tens like before.

Follow the procedure above to guide students as they write, model, and solve 137 – 28. At each step, remind students to be precise in aligning the digits and in drawing their chips in neat 5-groups. Have them share how each step in the drawing matches each step in the vertical form.

Continue with the following possible sequence: 165 – 18, 153 – 29, and 186 – 47. Continue to support students who struggle. As students demonstrate proficiency, instruct them to work on the Problem Set independently.

Problem Set (10 minutes)

Students should do their personal best to complete the Problem Set within the allotted 10 minutes. For some classes, it may be appropriate to modify the assignment by specifying which problems they work on first. Some problems do not specify a method for solving. Students should solve these problems using the RDW approach used for Application Problems.

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Student Debrief (10 minutes)

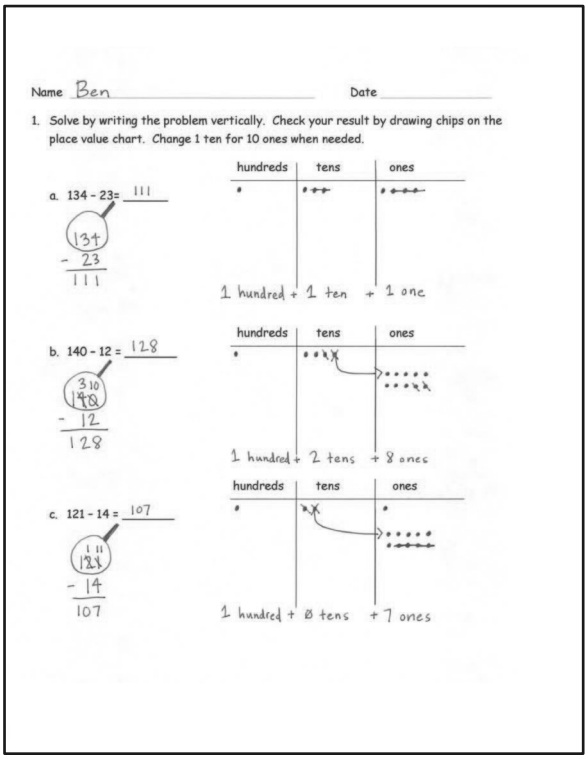
Lesson Objective: Represent subtraction with and without the decomposition when there is a three-digit minuend.

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.

- Explain to your partner how you solved Problems 1(a) and (b). What significant differences do you notice about the vertical form and place value charts for these two problems (i.e., did you have to unbundle a ten)? Why?
- For Problem 1(c), use place value language to explain to your partner how your model matches the vertical form. Why does your answer include a zero in the tens place?
- One student's answer for Problem 1(e), 187 – 49, was 148. What mistake did she make in the vertical form? How would the chip model have helped her to figure out the correct answer?
- For Problem 2(b), how did having a three-digit addend (as opposed to two-digit) change the way you solved the problem?
- How are your math drawings and vertical forms today similar to and different from the ones you did in the last lesson?


Name Ben Date

1. Solve by writing the problem vertically. Check your result by drawing chips on the place value chart. Change 1 ten for 10 ones when needed.

a. 134 - 23 = 111

hundreds | tens | ones

1 hundred + 1 ten + 1 one

b. 140 - 12 = 128

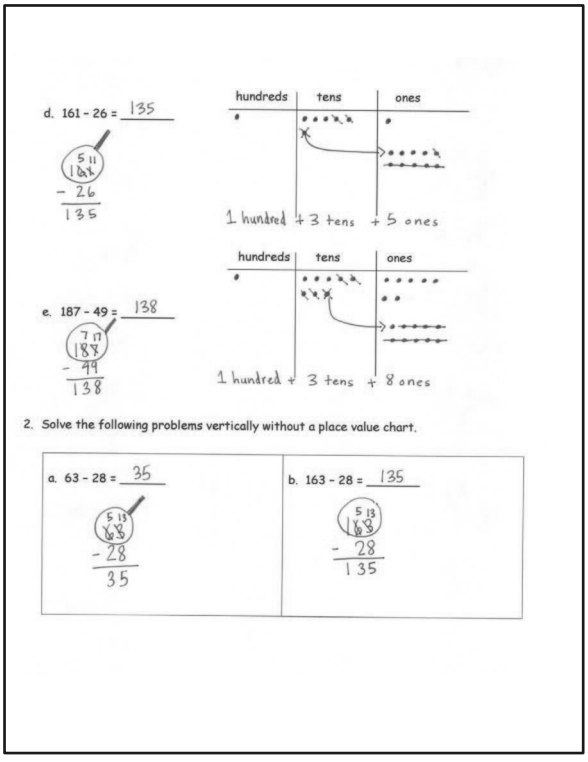
hundreds | tens | ones

1 hundred + 2 tens + 8 ones

c. 121 - 14 = 107

hundreds | tens | ones

1 hundred + 0 tens + 7 ones


d. 161 - 26 = 135

hundreds | tens | ones

1 hundred + 3 tens + 5 ones

e. 187 - 49 = 138

hundreds | tens | ones

1 hundred + 3 tens + 8 ones

2. Solve the following problems vertically without a place value chart.

a. 63 - 28 = 35

b. 163 - 28 = 135

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.

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Name _____ Date _____

1. Solve by writing the problem vertically. Check your result by drawing chips on the place value chart. Change 1 ten for 10 ones, when needed.

a. 134 – 23= _____

hundreds	tens	ones

b. 140 – 12 = _____

hundreds	tens	ones

c. 121 – 14 = _____

hundreds	tens	ones

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d. 161 – 26 = _____

hundreds	tens	ones

e. 187 – 49 = _____

hundreds	tens	ones

2. Solve the following problems vertically without a place value chart.

a. 63 – 28 = _____	b. 163 – 28 = _____

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Name _____ Date _____

Solve by writing the problem vertically. Check your result by drawing chips on the place value chart. Change 1 ten for 10 ones, when needed.

1. 145 – 28 = _____

hundreds	tens	ones

2. 151 – 39 = _____

hundreds	tens	ones

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Name _____ Date _____

1. Solve by writing the problem vertically. Check your result by drawing chips on the place value chart. Change 1 ten for 10 ones, when needed.

a. 156 – 42 = _____

hundreds	tens	ones

b. 150 – 36 = _____

hundreds	tens	ones

c. 163 – 45 = _____

hundreds	tens	ones

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2. Solve the following problems without a place value chart.

a.	b.
$\begin{array}{r} 134 \\ -\ 29 \\ \hline \end{array}$	$\begin{array}{r} 154 \\ -\ 37 \\ \hline \end{array}$

3. Solve and show your work. Draw a place value chart and chips, if needed.

   a. Aniyah has 165 seashells. She has 28 more than Ralph. How many seashells does Ralph have?

   b. Aniyah and Ralph each give 19 seashells to Harold. How many seashells does Aniyah have left?

   c. How many seashells does Ralph have left?

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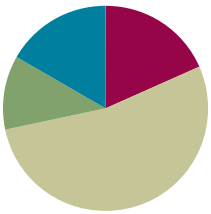
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Lesson 15

Objective: Represent subtraction with and without the decomposition when there is a three-digit minuend.

Suggested Lesson Structure

Fluency Practice	(11 minutes)
Application Problem	(7 minutes)
Concept Development	(32 minutes)
Student Debrief	(10 minutes)
Total Time	**(60 minutes)**



Fluency Practice (11 minutes)

- Subtraction from Tens **2.NBT.5** (2 minutes)
- Sprint: Two-Digit Subtraction **2.NBT.5** (9 minutes)

Subtraction from Tens (2 minutes)

Materials: (S) Personal white board

Note: This fluency activity allows students to see how their take-from-ten facts help them to solve many problems.

T: When I say a basic fact, you add ten to the whole and continue until I say to stop. So, after 11 – 9, you would solve 21 – 9. Then?

S: 31 – 9, 41 – 9, 51 – 9.

T: Yes. Solve as many as you can on your personal white board before I give the signal to stop. Let's begin. 11 – 9.

S: (Work.)

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

Continue with the following possible sequence: 12 – 8, 11 – 8, and 13 – 9.

Sprint: Two-Digit Subtraction (9 minutes)

Materials: (S) Two-Digit Subtraction Sprint

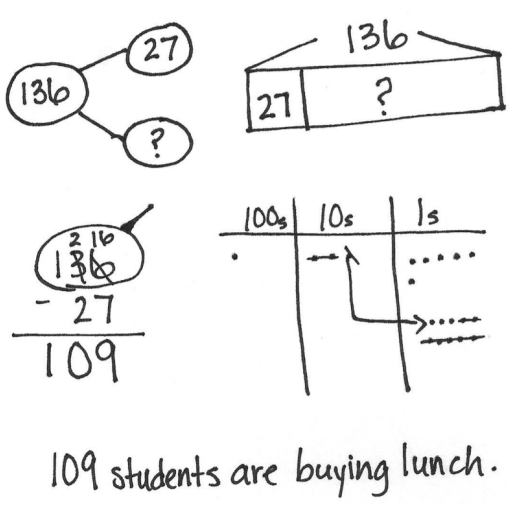
Note: This Sprint reviews subtraction with unbundling to prepare students for today's lesson.

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Application Problem (7 minutes)

There are 136 students in the second grade at Miles Davis Elementary. 27 of them brought bag lunches to school. The rest buy the hot lunch. How many students are buying a hot lunch?

Note: This Application Problem asks students to apply their understanding of decomposing when there is a three-digit minuend. Analyze part–whole relationships, draw the tape diagram together, and let students solve the problem independently. When they have finished, share exemplary but diverse student work so that students see how others are drawing their place value disks or chips.



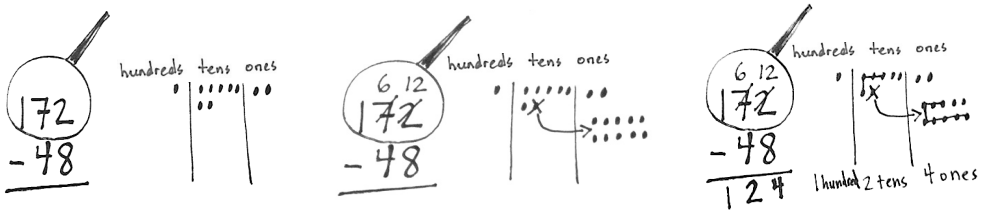
Concept Development (32 minutes)

Materials: (S) Math journal or paper

Note: The goal of place value models is to help students understand the quantities involved in written computation. As this understanding deepens, students no longer need to use models; they are able to solve with numbers alone.

This lesson is designed to give students ample time working with bare numbers and chip models to develop conceptual understanding and procedural fluency with the vertical form. It anticipates that students will grasp this understanding at different rates. As students demonstrate proficiency (i.e., as they are able to explain why they decomposed a ten using place value language), encourage them to dispense with the models.

Problem 1: 172 – 48



T: Copy the following problem onto your paper in vertical form: 172 – 48.

T: Before I can begin subtracting in vertical form, what must I always do?

S: Get ready to subtract!

T: For now, draw the chip model. Whisper count as you add chips to the place value chart. (Circulate as students set up their chip models, listening and looking to see that they are drawing them correctly.)

S: (Whisper as they add 1 hundred 7 tens and 2 ones to their chip models.)

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T: Use place value language to tell your partner how you set up your drawing.

S: I put 1 unit in the hundreds place, 7 units in the tens place, and 2 units in the ones place. → I put 1 chip for 1 hundred, 7 chips for 70, and 2 chips for 2. → I showed the correct number of units for each digit.

T: Solve the problem using your chip model. As you solve, record your changes and answer in the vertical form.

T: When you're finished, check your work with a partner, and explain how your model matches the vertical form. Use place value language to explain each step.

Circulate to listen in on conversations, and offer support as needed.

T: The answer to 172 – 48 is…?

S: 124.

T: Let's draw a number bond to show that. What was our total?

S: 172.

T: Our parts are…?

S: 48 and 124.

T: If we add together the parts, what should the total be?

S: 172.

T: Do that now. Add together the parts to see if you get the correct total.

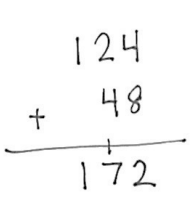
S: It's the same! → Yeah, we got it right! → If we got it wrong, the total would be different.

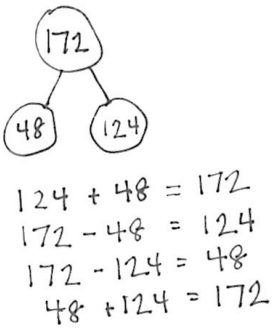
T: Let's make two addition and two subtraction sentences for this number bond.

Have the students either generate as a whole class or work to write them down. Seeing the number bond with larger numbers helps bridge their part–whole understandings from smaller numbers to larger.

Repeat the procedure for the original activity in which students solve by drawing chip models and the vertical form. Use the following possible sequence: 154 – 39, 142 – 18, and 135 - 27.

Continue to support students who need assistance. Allow students who demonstrate proficiency with the models and vertical form to work on the Problem Set independently.





NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

Allow students to use place value disks, labeled disk drawings, and chip models for as long as is necessary to demonstrate proficiency in this method.

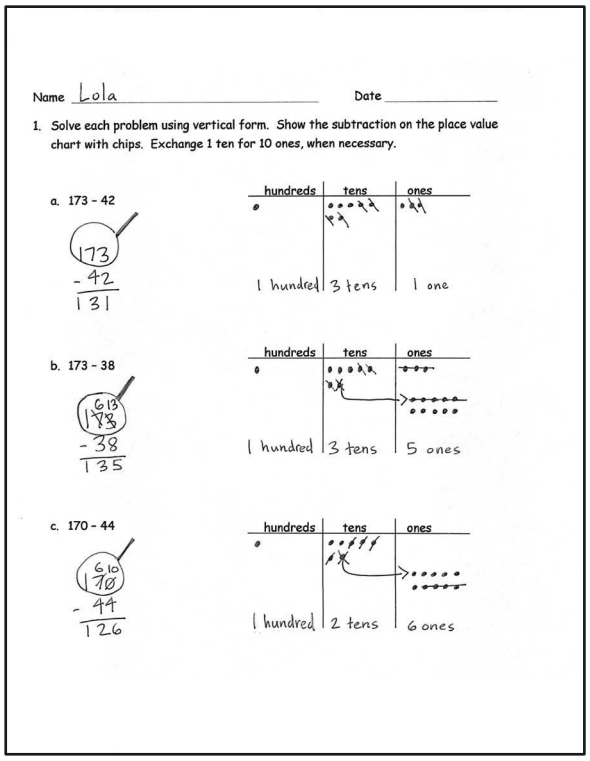
NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

On the Problem Set, encourage early finishers to check their answers by using addition. Both parts should add up to the original whole (i.e., the difference plus the subtrahend should equal the minuend). If they made a mistake, encourage them to work with a partner to discover the reason why and to correct the problem. This can help prevent the habit of valuing speed over accuracy, as it discourages students from habituating to incorrect procedures.

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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.



Name Lola Date

1. Solve each problem using vertical form. Show the subtraction on the place value chart with chips. Exchange 1 ten for 10 ones, when necessary.

a. 173 - 42

173
- 42
131

hundreds | tens | ones
1 hundred 3 tens 1 one

b. 173 - 38

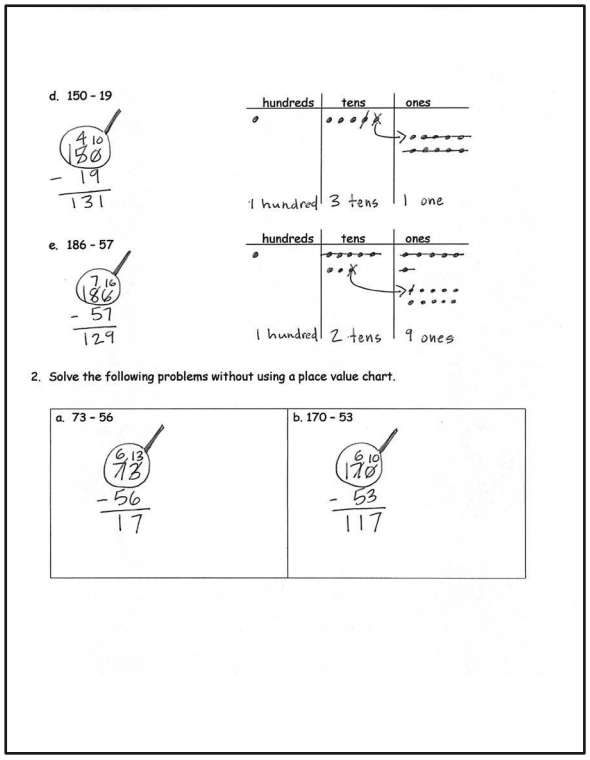
613
173
- 38
135

hundreds | tens | ones
1 hundred 3 tens 5 ones

c. 170 - 44

6 10
170
- 44
126

hundreds | tens | ones
1 hundred 2 tens 6 ones



d. 150 - 19

4 10
150
- 19
131

hundreds | tens | ones
1 hundred 3 tens 1 one

e. 186 - 57

7 16
186
- 57
129

hundreds | tens | ones
1 hundred 2 tens 9 ones

2. Solve the following problems without using a place value chart.

a. 73 - 56

6 13
73
- 56
17

b. 170 - 53

6 10
170
- 53
117

Student Debrief (10 minutes)

Lesson Objective: Represent subtraction with and without the decomposition when there is a three-digit minuend.

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.

MP.3

- When you used the chip model for Problem 1(a), how did you know whether or not to decompose a ten? Was this the same in Problem 1(b)?
- For Problem 1(b), where did you write the unbundled ten as ones in vertical form? How did it match your chip model?
- For Problem 1(c), what number(s) did you draw on your place value chart? Why? Does subtracting from a three-digit number change how you subtract?
- For Problems 1(d) and (e), can you tell if you need to decompose a ten just by looking at the digits in the ones place? Explain how you know.
- Look at Problems 2(a) and (b). How did you solve these problems without using a place value chart? Did you draw a magnifying glass? What can you visualize?

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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.

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A

Number Correct: _____

Two-Digit Subtraction

1.	53 – 2 =	
2.	65 – 3 =	
3.	77 – 4 =	
4.	89 – 5 =	
5.	99 – 6 =	
6.	28 – 7 =	
7.	39 – 8 =	
8.	31 – 2 =	
9.	41 – 3 =	
10.	51 – 4 =	
11.	61 – 5 =	
12.	30 – 9 =	
13.	40 – 8 =	
14.	50 – 7 =	
15.	60 – 6 =	
16.	40 – 30 =	
17.	41 – 30 =	
18.	40 – 20 =	
19.	42 – 20 =	
20.	80 – 50 =	
21.	85 – 50 =	
22.	80 – 40 =	

23.	84 – 40 =	
24.	80 – 50 =	
25.	86 – 50 =	
26.	70 – 60 =	
27.	77 – 60 =	
28.	80 – 70 =	
29.	88 – 70 =	
30.	48 – 4 =	
31.	80 – 40 =	
32.	81 – 40 =	
33.	46 – 3 =	
34.	60 – 30 =	
35.	68 – 30 =	
36.	67 – 4 =	
37.	67 – 40 =	
38.	89 – 6 =	
39.	89 – 60 =	
40.	76 – 2 =	
41.	76 – 20 =	
42.	54 – 6 =	
43.	65 – 8 =	
44.	87 – 9 =	

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B

Number Correct: _____

Improvement: _____

Two-Digit Subtraction

1.	43 – 2 =	
2.	55 – 3 =	
3.	67 – 4 =	
4.	79 – 5 =	
5.	89 – 6 =	
6.	98 – 7 =	
7.	29 – 8 =	
8.	21 – 2 =	
9.	31 – 3 =	
10.	41 – 4 =	
11.	51 – 5 =	
12.	20 – 9 =	
13.	30 – 8 =	
14.	40 – 7 =	
15.	50 – 6 =	
16.	30 – 20 =	
17.	31 – 20 =	
18.	50 – 30 =	
19.	52 – 30 =	
20.	70 – 40 =	
21.	75 – 40 =	
22.	90 – 50 =	

23.	94 – 50 =	
24.	90 – 60 =	
25.	96 – 60 =	
26.	80 – 70 =	
27.	87 – 70 =	
28.	90 – 80 =	
29.	98 – 80 =	
30.	39 – 4 =	
31.	90 – 40 =	
32.	91 – 40 =	
33.	47 – 3 =	
34.	70 – 30 =	
35.	78 – 30 =	
36.	68 – 4 =	
37.	68 – 40 =	
38.	89 – 7 =	
39.	89 – 70 =	
40.	56 – 2 =	
41.	56 – 20 =	
42.	34 – 6 =	
43.	45 – 8 =	
44.	57 – 9 =	

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Name _____ Date _____

1. Solve each problem using vertical form. Show the subtraction on the place value chart with chips. Exchange 1 ten for 10 ones, when necessary.

a. 173 – 42

hundreds	tens	ones

b. 173 – 38

hundreds	tens	ones

c. 170 – 44

hundreds	tens	ones

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d. 150 – 19

hundreds	tens	ones

e. 186 – 57

hundreds	tens	ones

2. Solve the following problems without using a place value chart.

a. 73 – 56	b. 170 – 53

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Name _____ Date _____

Solve using vertical form. Show the subtraction on a place value chart with chips. Exchange 1 ten for 10 ones, when necessary.

1. 164 – 49

hundreds	tens	ones

2. 181 – 73

hundreds	tens	ones

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Name _____ Date _____

1. Solve each problem using vertical form. Show the subtraction on the place value chart with chips. Exchange 1 ten for 10 ones, when necessary.

a. 153 – 31

hundreds	tens	ones

b. 153 – 38

hundreds	tens	ones

c. 160 – 37

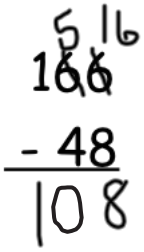
hundreds	tens	ones

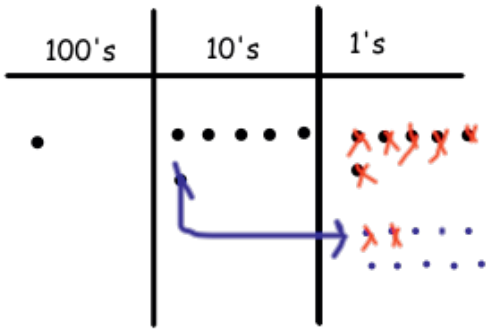
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d. 182 – 59

hundreds	tens	ones

2. Lisa solved 166 – 48 vertically and on her place value chart. Explain what Lisa did correctly and what she needs to fix.





a. Lisa correctly _____

_____

b. Lisa needs to fix _____

_____

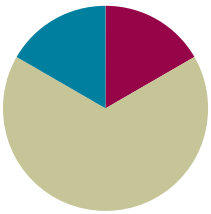
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Lesson 16

Objective: Solve one- and two-step word problems within 100 using strategies based on place value.

Suggested Lesson Structure

Fluency Practice	(10 minutes)
Concept Development	(40 minutes)
Student Debrief	(10 minutes)
Total Time	**(60 minutes)**



Fluency Practice (10 minutes)

- Find the Total **2.NBT.5** (5 minutes)
- Find the Difference **2.NBT.5** (5 minutes)

Find the Total (5 minutes)

Materials: (S) Personal white board

Note: Reviewing this mental math fluency prepares students for understanding the importance of the addition algorithm. Students add to solve word problems in today's lesson.

T: (Write 25 + 73 =____.) Solve using any method.

T: Change 25 to 125 by writing a one in the hundreds place. What is the total now?

S: 198.

Repeat the process and sequence with 35 + 54 and 135 + 54; 38 + 22 and 138 + 22; 42 + 38 and 142 + 38.

Find the Difference (5 minutes)

Materials: (S) Personal white board

Note: Reviewing subtraction problems in sets prepares students for understanding the importance of the subtraction algorithm. Students subtract to solve word problems in today's lesson.

T: (Write 48 – 24 =____.) Solve the subtraction problem horizontally or vertically.

Repeat the process and sequence for 48 – 24, 40 – 24; 56 – 15, 50 – 15, 52 – 15; 40 – 38, 60 – 38, and 61 – 38.

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Concept Development (40 minutes)

Materials: (S) Math journal or personal white board

Note: This Concept Development is devoted to problem solving. Therefore, the Application Problem is embedded in the lesson. Prepare Problems 1 through 4 in advance for either display or distribution to students.

Suggested Delivery of Instruction for Solving Lesson 16's Word Problems

1. Model the problem.

Invite two pairs of students who can successfully model the problem to work at the board while the others work independently or in pairs at their seats. Review the following questions before solving the first problem.

- Can you draw something?
- What can you draw?
- What conclusions can you make from your drawing?

As students work, circulate. Reiterate the questions above, and guide students in drawing their tape diagrams.

After two minutes, have the two pairs of students share *only* their labeled diagrams.

For about one minute, encourage the demonstrating students to respond to feedback and questions from their peers.

2. Solve and write a statement.

Discuss strategies for solving problems, drawing attention to the strategy chart created during the Debrief in Lesson 5. Give students two minutes to solve and complete the question and share their work and thought processes with a peer. Then, instruct students to write their equations and statements of the answer.

NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

For students who still struggle with making tape diagrams, start with easier subtraction problems that require no regrouping. When they are proficient with drawing the tape diagrams for easier problems, raise the level of difficulty.

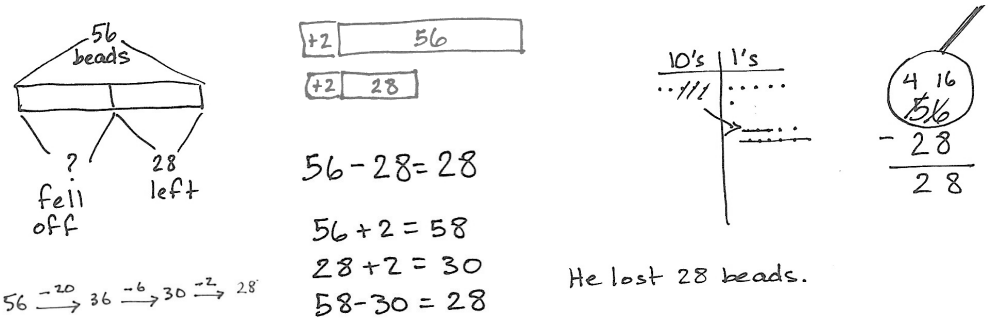
3. Assess the solution for reasonableness.

Give students one to two minutes to assess and explain the reasonableness of their solutions.

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Problem 1: Solve a single-step *take from with change unknown* word problem using a tape diagram and chip model.

Seneca put 56 beads on a necklace. Some beads fell off, but he still has 28 left. How many beads did he lose?



Circulate and ask guiding questions as needed to help students see that they know the whole and one part; therefore, they subtract. By now, students have many strategies at their disposal. As they become successful with the tape diagram and chip model, encourage students to show more than one way to solve. For example, some students may use compensation and show 56 – 28 = 58 – 30 = 28.

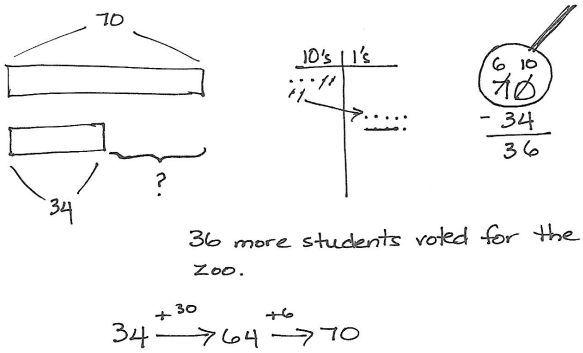
NOTES ON MULTIPLE MEANS OF REPRESENTATION:

Remind students that tape diagrams are like part-part-whole (or part-part–part–whole) representations of the problem. If they can identify which are the parts and which is the whole and which of those they need to find, then they can easily solve the problems.

Problem 2: Solve a single-step word problem by drawing a tape diagram and chip model.

70 students voted for a field trip to the zoo. 34 students voted for the museum. How many more students voted for the zoo than the museum?

Support students by eliciting the response that they are comparing numbers; they subtract to find how much more 70 is than 34. Again, encourage students to solve in multiple ways once they have correctly modeled and solved using the tape diagram and chip model.

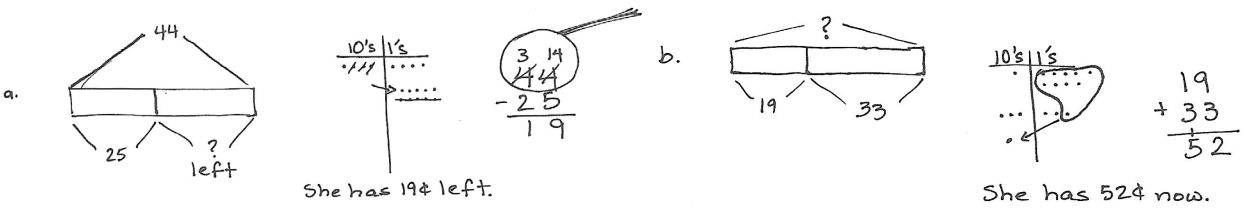


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Problem 3: Solve a two-step problem by drawing a tape diagram and chip model.

a. Suki has 44 cents. She spends 25 cents on a pencil. How much money does she have left?

b. She finds 33 cents more. How much money does she have now?

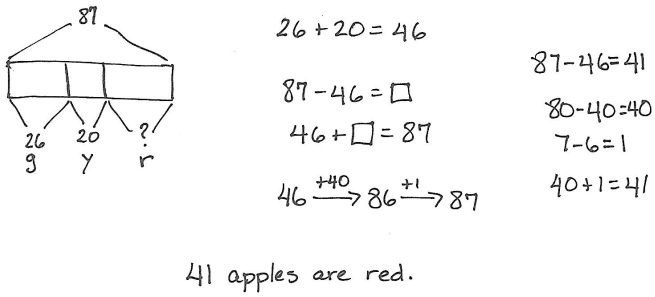


Circulate and ask guiding questions as needed to remind students that for each step they must decide if they are finding a missing part or a total.

Problem 4: Solve a two-step problem by using a preferred method.

Farmer Ben picks 87 apples. 26 apples are green, 20 are yellow, and the rest are red. How many apples are red?

Circulate and encourage students to use their favorite method to solve. Students should be alert to the relationships of the numbers and recognize when mental strategies are most efficient. Remind them to be prepared to explain their strategy using place value language.



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.

Student Debrief (10 minutes)

Lesson Objective: Solve one- and two-step word problems within 100 using strategies based on place value.

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.

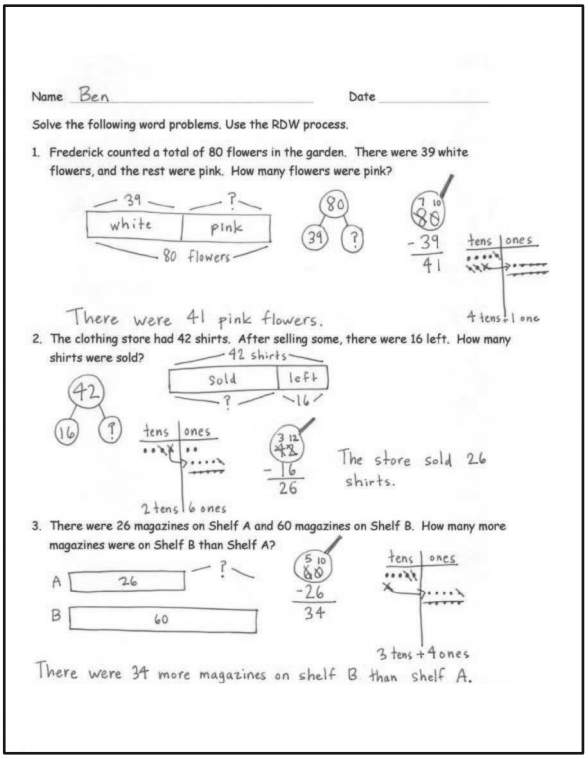
- How could you use a tape diagram to solve Problem 1? Which strategy did you use to solve? Could you have used a different simplifying strategy?

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- Which operation did you choose to solve Problem 2? Why? How does a tape diagram help you to show the situation?
- How did you show your thinking in Problem 3? What simplifying strategy can you use to solve? Why choose that one?
- Explain to your partner the steps you took to solve Problem 4. How did you represent this multi-step problem? What simplifying strategy did you use instead of unbundling a ten for the first portion of the problem?
- For Problem 5, share your drawings with a partner. What did you need to know before you could figure out how many books were in the yellow bin? How did you show it?

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.


Name Ben Date

Solve the following word problems. Use the RDW process.

1. Frederick counted a total of 80 flowers in the garden. There were 39 white flowers, and the rest were pink. How many flowers were pink?

39 ? white pink 80 flowers

80 39 ?

7 10 80 − 39 = 41

tens ones

There were 41 pink flowers.

4 tens 1 one

2. The clothing store had 42 shirts. After selling some, there were 16 left. How many shirts were sold?

42 shirts sold left ? 16

42 16 ?

tens ones

2 tens 6 ones

3 12 42 − 16 = 26

The store sold 26 shirts.

3. There were 26 magazines on Shelf A and 60 magazines on Shelf B. How many more magazines were on Shelf B than Shelf A?

A 26 ?

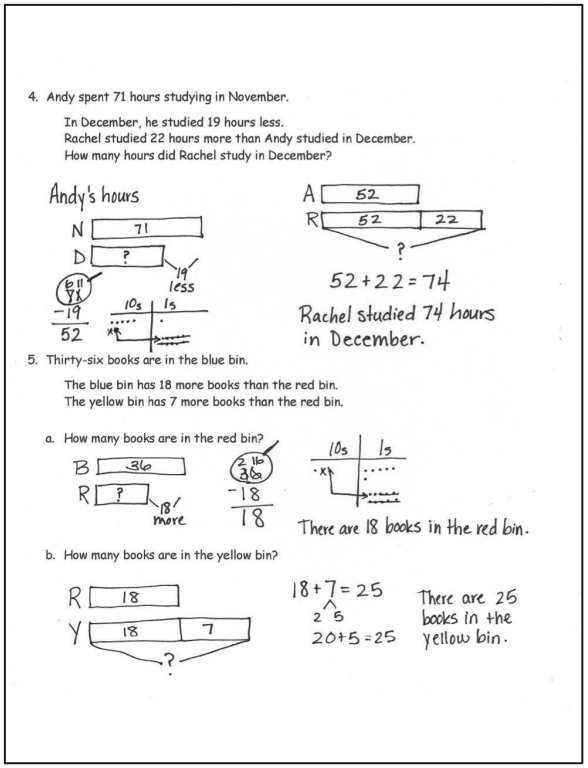
B 60

5 10 60 − 26 = 34

tens ones

3 tens 4 ones

There were 34 more magazines on shelf B than shelf A.


4. Andy spent 71 hours studying in November.

In December, he studied 19 hours less.
Rachel studied 22 hours more than Andy studied in December.
How many hours did Rachel study in December?

Andy's hours

N 71

D ? 19 less

6 11 71 − 19 = 52

10s 1s

A 52

R 52 22 ?

52 + 22 = 74

Rachel studied 74 hours in December.

5. Thirty-six books are in the blue bin.

The blue bin has 18 more books than the red bin.
The yellow bin has 7 more books than the red bin.

a. How many books are in the red bin?

B 36

R ? 18 more

2 16 36 − 18 = 18

10s 1s

There are 18 books in the red bin.

b. How many books are in the yellow bin?

R 18

Y 18 7 ?

18 + 7 = 25

2 5

20 + 5 = 25

There are 25 books in the yellow bin.

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Name _____ Date _____

Solve the following word problems. Use the RDW process.

1. Frederick counted a total of 80 flowers in the garden. There were 39 white flowers, and the rest were pink. How many flowers were pink?

2. The clothing store had 42 shirts. After selling some, there were 16 left. How many shirts were sold?

3. There were 26 magazines on Shelf A and 60 magazines on Shelf B. How many more magazines were on Shelf B than Shelf A?

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4. Andy spent 71 hours studying in November.

   In December, he studied 19 hours less.
   Rachel studied 22 hours more than Andy studied in December.
   How many hours did Rachel study in December?

5. Thirty-six books are in the blue bin.

   The blue bin has 18 more books than the red bin.
   The yellow bin has 7 more books than the red bin.

   a. How many books are in the red bin?

   b. How many books are in the yellow bin?

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Name _____ Date _____

Solve the following word problems. Use the RDW process.

1. The bookstore sold 83 books on Monday.
   On Tuesday, it sold 46 fewer books than on Monday.

   a. How many books were sold on Tuesday?

   b. The bookstore sold 28 more books on Tuesday than on Wednesday.
      How many books did the bookstore sell on Wednesday?

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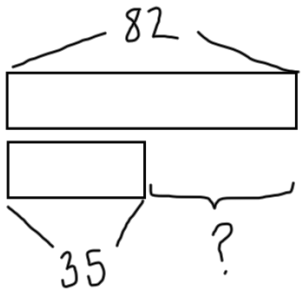
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Name _____ Date _____

Solve the following word problems. Use the RDW process.

1. Vicki modeled the following problem with a tape diagram.

   Eighty-two students are in the math club. 35 students are in the science club. How many more students are in the math club than science club?



   Show another model to solve the problem. Write your answer in a sentence.

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2. Forty-six birds sat on a wire. Some flew away, but 29 stayed. How many birds flew away? Show your work.

3. Ian bought a pack of 47 water balloons. 19 were red, 16 were yellow, and the rest were blue. How many water balloons were blue? Show your work.

4. Daniel read 54 pages of his book in the morning. He read 27 fewer pages in the afternoon. How many pages did Daniel read altogether? Show your work.

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Name _____ Date _____

1. Solve. Show your mental math strategy.

a. 35 + 25 = _____	b. _____ = 27 + 46	c. _____ – 19 = 73
d. 89 – 52 = _____	e. 61 – _____ = 32	f. 75 – _____ = 29
g. 32 $\xrightarrow{+1}$ _____ $\xrightarrow{+____}$ 43	h. 60 $\xrightarrow{-____}$ _____ $\xrightarrow{-____}$ 49	i. _____ $\xrightarrow{+10}$ _____ $\xrightarrow{+1}$ 73

2. Solve and show your work with a model.

a. 116 + 74 = _____ Model:	b. 147 + 28 = _____ Model:

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c.	d.
84 – 59 = _____ Model:	62 – 45 = _____ Model:

3. Label each as true or false. Use a place value strategy to show how you know.

   a. 23 – 14 = 14 + 23 _____

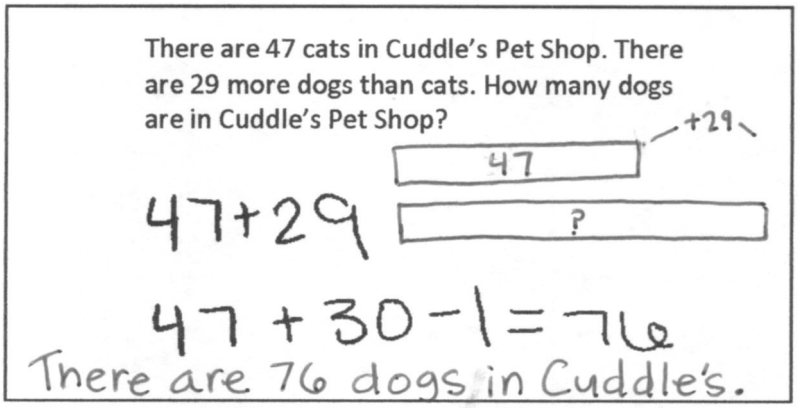
   b. 45 – 19 = 22 + 4 _____

   c. 93 – 56 = 84 – 37 _____

   d. 8 ones + 5 tens = 85 _____

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4. Sarah solved the word problem below.



a. Explain why Sarah's addition strategy worked.

b. There are 18 fewer cats than birds. How many birds are in Cuddle's Pet Shop? Use another place value strategy to find the answer. Show your work.

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Mid-Module Assessment Task Standards Addressed	Topics A–C

Represent and solve problems involving addition and subtraction.

2.OA.1 Use addition and subtraction within 100 to solve one- and two-step problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

Use place value understanding and properties of operations to add and subtract.

2.NBT.5 Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

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.)

Evaluating Student Learning Outcomes

A Progression Toward Mastery is provided to describe steps that illuminate the gradually increasing understandings that students develop on their way to proficiency. In this chart, this progress is presented from left (Step 1) to right (Step 4). The learning goal for students is to achieve Step 4 mastery. These steps are meant to help teachers and students identify and celebrate what the students CAN do now and what they need to work on next.

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A Progression Toward Mastery				
Assessment Task Item and Standards Assessed	**STEP 1 Little evidence of reasoning without a correct answer. (1 Point)**	**STEP 2 Evidence of some reasoning without a correct answer. (2 Points)**	**STEP 3 Evidence of some reasoning with a correct answer or evidence of solid reasoning with an incorrect answer. (3 Points)**	**STEP 4 Evidence of solid reasoning with a correct answer. (4 Points)**
1 **2.NBT.5** **2.NBT.8**	The student correctly solves one or two of the nine problems and models mental strategies fewer than three times.	The student correctly solves three to five of the nine problems and models mental strategies at least three times.	The student correctly solves six to eight of the nine problems and models mental strategies at least six times.	The student correctly solves to find: a. 60 b. 73 c. 92 d. 37 e. 29 f. 46 g. 33, +10 h. –10, 50, –1 or –1, 59, –10 i. 62, 72 The student correctly uses and models a place value strategy such as arrow notation, adding the same amount to the subtrahend as to the minuend to make a multiple of ten, adding or subtracting a multiple of 10 and adjusting the solution as necessary, or other strategies as noted in the Module Overview.

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A Progression Toward Mastery				
2 **2.NBT.7** **2.NBT.8**	The student correctly answers one or two of eight parts.	The student correctly answers three to five of eight parts.	The student correctly answers six or seven of eight parts (one part being the equation and one part being the model).	Student shows accurate models and finds: a. 190 b. 175 c. 25 d. 17
3 **2.NBT.5**	The student correctly answers one of four problems and models mental strategies fewer than two times.	The student correctly answers two of four problems and models mental strategies at least twice.	The student correctly answers three or four problems and models mental strategies at least three times.	The student correctly: ▪ Answers a. False b. True c. False d. False ▪ Uses and models a mental strategy such as arrow notation, adding the same amount to the subtrahend as to the minuend to make a multiple of ten, adding or subtracting a multiple of 10 and adjusting the solution as necessary, or other strategies as noted in the Module Overview.
4 **2.OA.1** **2.NBT.5** **2.NBT.9**	The student correctly answers both parts.	The student correctly answers one of the parts.	The student correctly answers Parts (a) and (b) but does not show work in Part (b), or the student answers one part incorrectly but shows correct work in Part (b).	The student correctly: ▪ Demonstrates an understanding of the role of place value and the arithmetic properties in Sarah's strategy. ▪ Uses an alternate place value strategy to solve Part (b) (e.g., 47 + 18 = 45 + 20 = 65).

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Name Lola Date _____

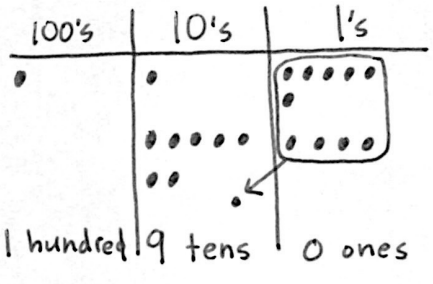
1. Solve. Show mental strategy.

a. 35 + 25 = 60 35 +20→ 55 +5→ 60	b. 73 = 27 + 46 3 ^ 43 30 + 43 = 73	c. 92 – 19 = 73 73 + 20 = 93 93 – 1 = 92
d. 89 – 52 = 37 89 -50→ 39 -2→ 37	e. 61 – 29 = 32 61 -30→ 31 +1→ 32	f. 75 – 46 = 29 29 +1→ 30 +40→ 70 +5→ 75
g. 32 +1→ 33 +10→ 43	h. 60 -10→ 50 -1→ 49	i. 62 +10→ 72 +1→ 73

2. Solve and show your work with a model.

a. 116 + 74 = 190

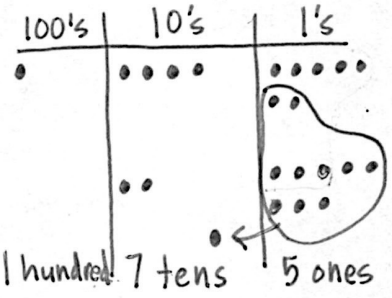
Model:



116
+ 74
190

b. 147 + 28 = 175

Model:



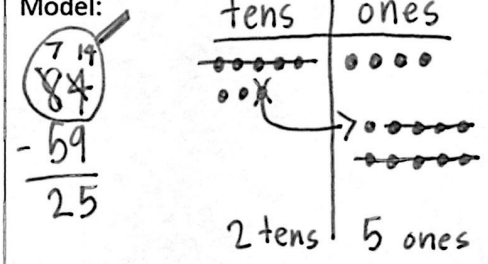
147
+ 28
175

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c.

84 – 59 = 25

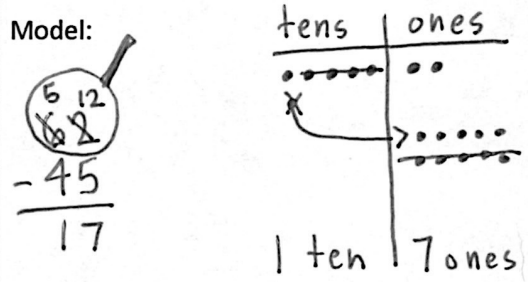
Model:



d.

62 – 45 = 17

Model:



3. Label each as true or false. Use a place value strategy to show how you know.

a. 23 – 14 = 14 + 23 false

23 -10→ 13 -4→ 9 14 +20→ 34 +3→ 37

b. 45 – 19 = 22 + 4 true

45 -20→ 25 +1→ 26 22+4=26

c. 93 – 56 = 84 – 37 false

93 -50→ 43 -6→ 37 84 -30→ 54 -7→ 47

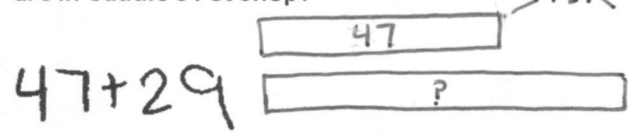
d. 8 ones + 5 tens = 85 false

8+50=58

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4. Sarah solved the word problem below.

There are 47 cats in Cuddle's Pet Shop. There are 29 more dogs than cats. How many dogs are in Cuddle's Pet Shop?



47+29

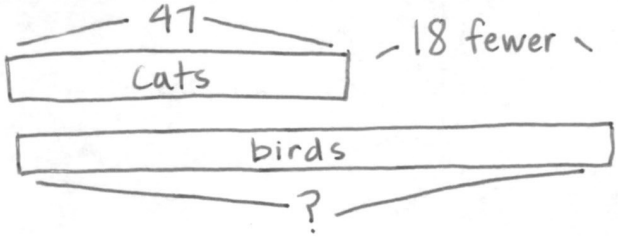
47 + 30 − 1 = 76

There are 76 dogs in Cuddle's.

a. Explain why Sarah's addition strategy worked.

Sarah added 30 because it is easier to add only tens (instead of tens and ones). Then she subtracted 1 because she only needed to add 29 to find the answer.

b. There are 18 fewer cats than birds. How many birds are in Cuddle's Pet Shop? Use another place value strategy to find the answer. Show your work.



47 + 18

47 $\xrightarrow{+10}$ 57 $\xrightarrow{+3}$ 60 $\xrightarrow{+5}$ 65

There are 65 birds in Cuddle's Pet Shop.

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Topic D

Strategies for Composing Tens and Hundreds

2.BT.6, 2.NBT.7, 2.NBT.8, 2.NBT.9

Focus Standards:		2.NBT.6	Add up to four two-digit numbers using strategies based on place value and properties of operations.
		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:		6	
Coherence	**-Links from:**	G1–M4	Place Value, Comparison, Addition and Subtraction to 40
	-Links to:	G2–M5	Addition and Subtraction Within 1,000 with Word Problems to 100.
		G3–M2	Place Value and Problem Solving with Units of Measure

In Lesson 17 of Topic D, students extend the base ten understanding developed in Topic A to numbers within 200. Having worked with manipulatives to compose 10 ones as 1 ten, students relate this to composing 10 tens as 1 hundred. For example, students might solve 50 + 80 by thinking 5 ones + 8 ones = 13 ones, so 5 tens + 8 tens = 13 tens = 130. They use place value language to explain where they make a new hundred. They also relate 100 more from Module 3 to + 100 and mentally add 100 to given numbers.

In Lesson 18, students use place value disks on a place value chart to represent addition with the composition of 1 ten and 1 hundred. They use place value language to explain where they make a new ten and a new hundred, as well as where to show each new unit on the place value chart. In Lesson 19, students relate manipulatives to the vertical form, recording compositions as new groups below. As they did in Topic B, students use place value language to express the action as they physically make 1 ten with 10 ones disks and 1 hundred with 10 tens disks. Working as partners, one student records each change on the vertical form step by step as the other partner moves the manipulatives.

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In Lessons 20 and 21, students move from concrete to pictorial as they use math drawings to represent compositions of 1 ten and 1 hundred. Some students may need the continued support of place value drawings with labeled disks, while others use the chip model. In both cases, students relate their drawings to the vertical form, recording each change they make to their model on the numerical representation. They use place value language to explain these changes.

Lesson 22 focuses on adding up to four two-digit addends with totals within 200. Students now have multiple strategies for composing and decomposing numbers, and they use properties of operations (i.e., the associative property) to add numbers in an order that is easiest to compute. For example, when solving 24 + 36 + 55, when adding the ones, a student may make a ten first with 4 and 6. Another student may decompose the 6 to make 3 fives (by adding 1 to the 4).

A Teaching Sequence Toward Mastery of Strategies for Composing Tens and Hundreds	
Objective 1:	**Use mental strategies to relate compositions of 10 tens as 1 hundred to 10 ones as 1 ten. (Lesson 17)**
Objective 2:	**Use manipulatives to represent additions with two compositions. (Lesson 18)**
Objective 3:	**Relate manipulative representations to a written method. (Lesson 19)**
Objective 4:	**Use math drawings to represent additions with up to two compositions and relate drawings to a written method. (Lessons 20–21)**
Objective 5:	**Solve additions with up to four addends with totals within 200 with and without two compositions of larger units. (Lesson 22)**

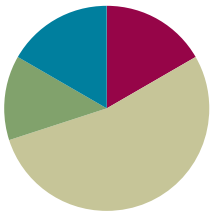
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Lesson 17

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

Suggested Lesson Structure

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



Fluency Practice (10 minutes)

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

Compensation (5 minutes)

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

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

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

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Rename the Units (5 minutes)

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

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

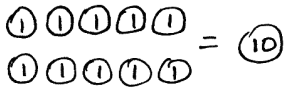
Repeat the process for 32, 38, 40, 41, 46, 50, 63, and 88.

Concept Development (32 minutes)

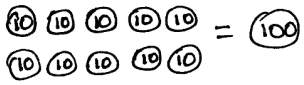
NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

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

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



T: Hold up your magic counting sticks again. This time, give them each a value of ten. Count with me.
S: 10, 20, …, 100.
T: How many tens in 1 hundred?
S: 10 tens!



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

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

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

T: What's 6 ones + 4 ones?

S: 10 ones! → 1 ten!

T: 6 tens + 4 tens is…?

S: 10 tens! → 1 hundred!

T: 60 + 40 is…?

S: 100.

T: 7 ones + 6 ones is…?

S: 13 ones.

T: 7 + 6 is…?

S: 13.

T: 7 tens + 6 tens is…?

S: 13 tens.

T: 13 tens equals is…?

S: 130.

T: 70 + 60 is…?

S: 130.

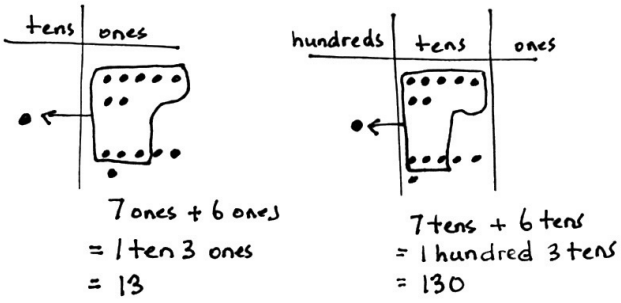
NOTES ON MULTIPLE MEANS OF REPRESENTATION:

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

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

MP.3

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



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

S: 100.

T: 11 tens is…?

S: 110.

T: 16 tens is…?

S: 160.

T: 19 tens is…?

S: 190.

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T: 20 tens…?

S: 200.

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

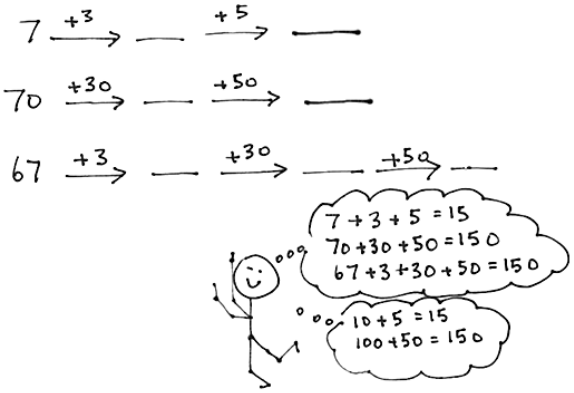
T: Talk with your partner. What numbers go into the blanks?

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

T: Find the total in each problem.

S: 15 and 150.

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



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

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

As students demonstrate an understanding of adding 10 or 100, allow them to work on the Problem Set independently.

Problem Set (10 minutes)

Students should do their personal best to complete the Problem Set within the allotted 10 minutes. For some classes, it may be appropriate to modify the assignment by specifying which problems they work on first. Some problems do not specify a method for solving. Students should solve these problems using the RDW approach used for Application Problems.

Application Problem (8 minutes)

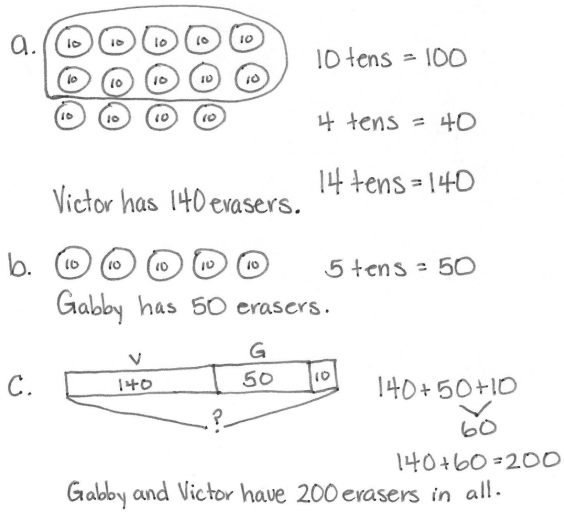
Erasers come in boxes of 10. Victor has 14 boxes. Gabby has 5 boxes.

a. How many erasers does Victor have?

b. How many erasers does Gabby have?

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

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



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Student Debrief (10 minutes)

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

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

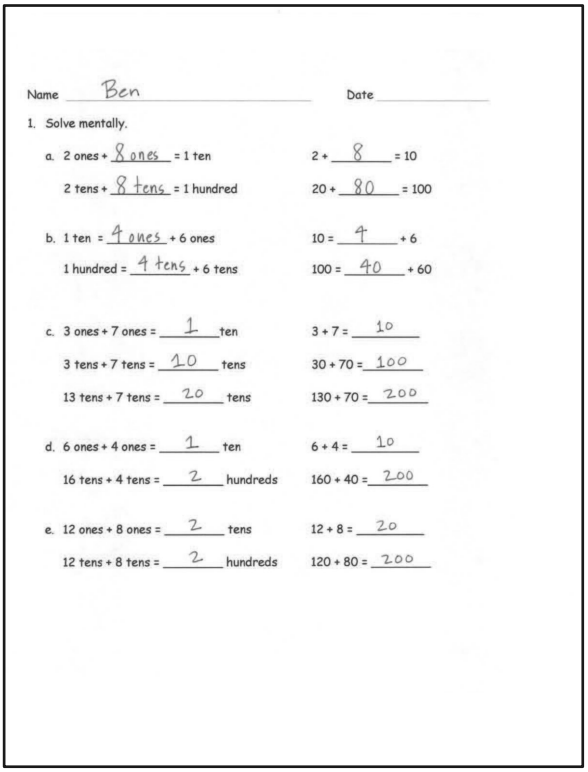
Invite students to review their solutions for the Problem Set. They should check work by comparing answers with a partner before going over answers as a class. Look for misconceptions or misunderstandings that can be addressed in the Debrief. Guide students in a conversation to debrief the Problem Set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

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

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

Exit Ticket (3 minutes)

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



Name Ben Date

1. Solve mentally.

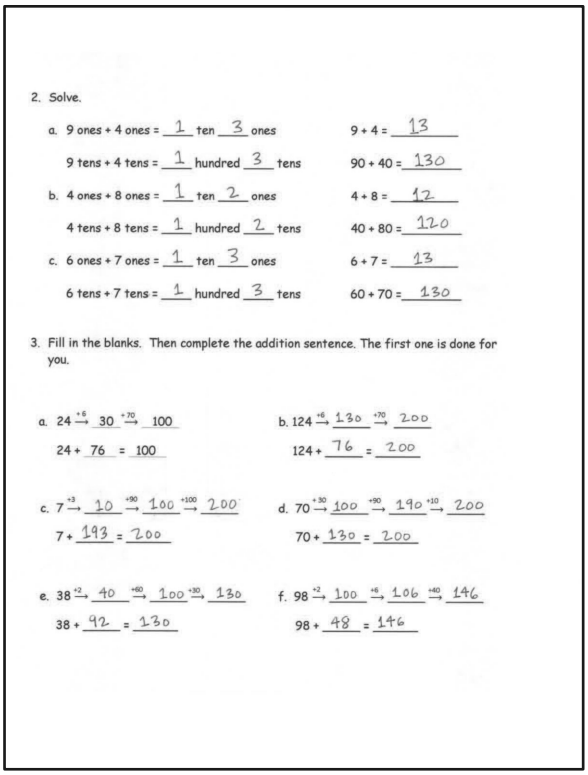
a. 2 ones + 8 ones = 1 ten — 2 + 8 = 10
2 tens + 8 tens = 1 hundred — 20 + 80 = 100

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

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

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

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



2. Solve.

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

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

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

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

a. 24 →(+6) 30 →(+70) 100
24 + 76 = 100

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

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

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

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

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

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Name _____ Date _____

1. Solve mentally.

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

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

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

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

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

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

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

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

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

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

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

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2. Solve.

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

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

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

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

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

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

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

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

$24 + 76 = 100$

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

$124 + _____ = _____$

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

$7 + _____ = _____$

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

$70 + _____ = _____$

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

$38 + _____ = _____$

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

$98 + _____ = _____$

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Name _____ Date _____

1. Solve mentally.

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

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

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

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

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

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

   63 + _____ = _____

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Name _____ Date _____

1. Solve mentally.

a.	4 ones + _____ = 1 ten	4 + _____ = 10
	4 tens + _____ = 1 hundred	40 + _____ = 100
b.	1 ten = _____ + 7 ones	10 = _____ + 7
	1 hundred = _____ + 7 tens	100 = _____ + 70
c.	1 ten more than 9 ones = _____	10 + 9 = _____
	1 hundred more than 9 ones = _____	100 + 9 = _____
	1 hundred more than 9 tens = _____	100 + 90 = _____
d.	2 ones + 8 ones = _____ ten	2 + 8 = _____
	2 tens + 8 tens = _____ hundred	20 + 80 = _____
e.	5 ones + 6 ones = _____ten(s) _____ one(s)	5 + 6 = _____
	5 tens + 6 tens = _____hundred(s) _____ ten(s)	50 + 60 = _____
f.	14 ones + 4 ones = _____ ten(s) _____ one(s)	14 + 4 = _____
	14 tens + 4 tens = _____ hundred(s) _____ tens(s)	140 + 40 = _____

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2. Solve.

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

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

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

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

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

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

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

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

36 + 94 = 130

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

78 + _____ = _____

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

61 + _____ = _____

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

27 + _____ = _____

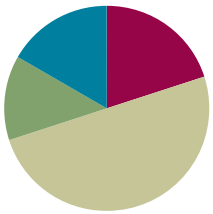
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Lesson 18

Objective: Use manipulatives to represent additions with two compositions.

Suggested Lesson Structure

Fluency Practice	(12 minutes)
Concept Development	(30 minutes)
Application Problem	(8 minutes)
Student Debrief	(10 minutes)
Total Time	**(60 minutes)**



Fluency Practice (12 minutes)

- Making the Next Ten to Add **2.NBT.5** (3 minutes)
- Sprint: Addition Crossing a Ten **2.NBT.5** (9 minutes)

Making the Next Ten to Add (3 minutes)

Note: This fluency exercise reviews foundations that lead into today's lesson.

T: When I say 9 + 4, you say 10 + 3. Ready? 9 + 4.
S: 10 + 3.
T: Answer.
S: 13.

Post on board:

9 + 4 = _____
/\
1 3

9 + 1 = 10
10 + 3 = _____

Continue with the following possible sequences:
19 + 4, 29 + 4, 79 + 4, 9 + 6, 19 + 6, 29 + 6, 8 + 3, 18 + 3, 48 + 3, 8 + 5, 18 + 5, 88 + 5, 7 + 6, 27 + 6, 7 + 4, 17 + 4, and 67 + 4.

Sprint: Addition Crossing a Ten (9 minutes)

Materials: (S) Addition Crossing a Ten Sprint

Note: This Sprint reviews completing or crossing a ten when adding a single-digit number to a two-digit number.

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Concept Development (30 minutes)

Materials: (S) Per pair: unlabeled hundreds place value chart (Template), place value disks (2 hundreds, 18 tens, 18 ones), place value disks (Lesson 6 Template)

Problem 1: 40 + 70

T: (Write 40 + 70 on the board.) Partner A, show 40 on your place value chart. Partner B, show 70. Be sure to arrange the place value disks in 5-groups.

T: Partner A, put your disks together with your partner's disks. 4 tens + 7 tens is…?

S: (Partner A moves the tens together to make two 5-groups and 1 more ten.) 11 tens!

T: 11 tens equals…?

S: 110. → 1 hundred 1 ten.

T: You've made a unit of 1 hundred! 11 tens is the same as 1 hundred 1 ten. Partner B, exchange 10 tens disks for 1 hundreds disk.

S: (Partner B changes 10 tens for 1 hundreds disk and places it in the hundreds place.)

T: How many ones in the ones place?

S: 0.

T: How many tens in the tens place?

S: 1 ten!

T: How many hundreds in the hundreds place?

S: 1 hundred!

MP.4

T: 1 hundred + 1 ten equals…?

S: 110.

T: 40 + 70 equals…?

S: 110.

Problem 2: 49 + 73

T: Let's now include ones in our addends.

T: Partner A, change your number from 40 to 49. Partner B, change your number from 70 to 73.

T: Now, we have a new related addition problem. (Write 49 + 73.) Discuss with your partner how this problem is different than 40 + 70.

S: This time, we have ones, too. → The total of the ones is more than 9, so we are going to be changing 10 ones for 1 ten. → So, this time, we are going to bundle two times!

T: Partner B, move the ones together. How many ones?

S: (Move disks.) 12 ones.

NOTES ON MULTIPLE MEANS OF REPRESENTATION:

Earlier in the day, before the lesson, review important terminology and their meanings:

- Addend
- Rename
- Bundle
- Expanded form
- Partners to ten

Keep these words accessible on a math word wall or on the board for students to see as they are working.

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T: What do you do next?
S: Bundle 10 ones to make 1 ten. → Rename 12 ones as 1 ten 2 ones, and put a ten in the tens place.
T: Partner B, show that change on your place value chart.
S: (Model.)
T: What's the next step?
S: Add the tens!
T: Partner A, move the tens. How many tens?
S: (Move disks.) 12 tens.
T: What do you do now?
S: Bundle 10 tens, and change it for a new unit of 1 hundred in the hundreds place. → Rename 12 tens as 1 hundred 2 tens.
T: Partner A, show that change on your place value chart.
S: (Model.)
T: Using your model, what's 49 + 73 in expanded form?
S: 100 + 20 + 2 = 122.
T: Talk with your partner. How is making a hundred the same as making a ten?

MP.4

S: We can use partners to ten for both. → 6 + 4 = 10, just like 6 tens + 4 tens is 10 tens, or 1 hundred. → When we put together 10 ones, we make a ten, and when we put together 10 tens, we make a hundred. → We trade 10 of a smaller unit for 1 of the next bigger unit: 10 ones for 1 ten and 10 tens for 1 hundred.

NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

At times, pair students performing above grade level with struggling students. Encourage them to dialogue in Turn and Talk moments in the lesson. Listen carefully to their conversations, and encourage leadership in the advanced students and participation from the struggling students.

Problem 3: 136 + 64

T: Yes! Let's use what you've discovered to solve another problem. (Write 136 + 64.) Work with your partner to model these addends, these two parts, while I walk around to see how it's going.
T: For each step in the addition, I will make a statement. As you move the disks to add, tell me if the statement is true or false. Raise your hand once you've moved the disks and have your answer.
T: I change 10 ones for 1 ten.
S: (Add the ones and rename.) True!
T: I change 10 tens for 1 hundred.
S: (Add the tens.) True!
T: The total of the two parts is 200.
S: True!
T: Explain to your partner how you know when to rename.
S: We rename when we have enough to make a group of 10. → We rename when we make ten in any place. → We rename when we have more than 9 ones or tens.

As students demonstrate understanding of renaming, allow them to work on the Problem Set independently. Continue to support struggling students' conceptual understanding at the concrete level.

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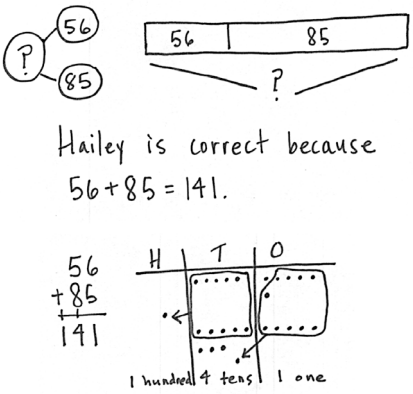
Problem Set (10 minutes)

Students should do their personal best to complete the Problem Set within the allotted 10 minutes. For some classes, it may be appropriate to modify the assignment by specifying which problems they work on first. Some problems do not specify a method for solving. Students should solve these problems using the RDW approach used for Application Problems.

Application Problem (8 minutes)

Hailey and Gio solve 56 + 85. Gio says the answer is 131. Hailey says the answer is 141. Explain whose answer is correct using numbers, pictures, or words.

Note: This problem prompts students to synthesize the concepts developed in today's lesson. Each time they make ten of a given unit, they rename it as 1 of the next larger unit. Have students solve independently and then share their thinking with the class.



Student Debrief (10 minutes)

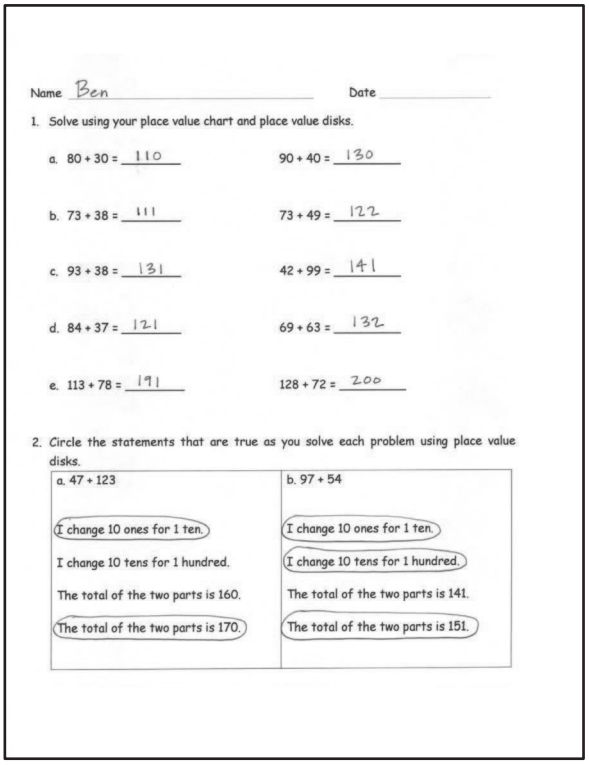
Lesson Objective: Use manipulatives to represent additions with two compositions.

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.

- Look at Problem 1(a)–(c). How do the problems in the first column help you to solve the problems in the second column? Did you need to model the problems in the second column? (Did you need to compose a ten or a hundred?)
- For Problem 2, how did you use your place value disks to determine whether the statements were true or false?



Name Ben Date

1. Solve using your place value chart and place value disks.

a. 80 + 30 = 110		90 + 40 = 130
b. 73 + 38 = 111		73 + 49 = 122
c. 93 + 38 = 131		42 + 99 = 141
d. 84 + 37 = 121		69 + 63 = 132
e. 113 + 78 = 191		128 + 72 = 200

2. Circle the statements that are true as you solve each problem using place value disks.

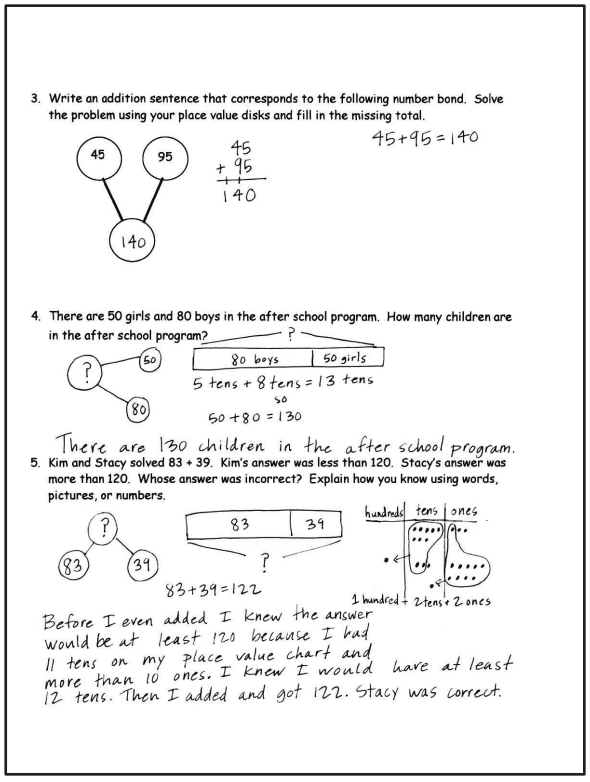
a. 47 + 123	b. 97 + 54
I change 10 ones for 1 ten.	I change 10 ones for 1 ten.
I change 10 tens for 1 hundred.	I change 10 tens for 1 hundred.
The total of the two parts is 160.	The total of the two parts is 141.
The total of the two parts is 170.	The total of the two parts is 151.

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- Use place value language to explain to your partner how you solved Problem 3. Did you need to compose a ten or a hundred to solve? Or, did you solve mentally? Which method is easier?
- For Problem 5, share your work with a partner. Who was correct, Kim or Stacy? Defend your response.
- Make a prediction. What happens when you have 10 hundreds disks? How do you know? What happens when you have 10 of a given unit?

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.


3. Write an addition sentence that corresponds to the following number bond. Solve the problem using your place value disks and fill in the missing total.

45 95 140

45 + 95 = 140

4. There are 50 girls and 80 boys in the after school program. How many children are in the after school program?

? 50 80 80 boys 50 girls

5 tens + 8 tens = 13 tens

so

50 + 80 = 130

There are 130 children in the after school program.

5. Kim and Stacy solved 83 + 39. Kim's answer was less than 120. Stacy's answer was more than 120. Whose answer was incorrect? Explain how you know using words, pictures, or numbers.

? 83 39 83 39 ?

83 + 39 = 122

hundreds tens ones

1 hundred + 2 tens + 2 ones

Before I even added I knew the answer would be at least 120 because I had 11 tens on my place value chart and more than 10 ones. I knew I would have at least 12 tens. Then I added and got 122. Stacy was correct.

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A

Number Correct: _____

Addition Crossing a Ten

1.	38 + 1 =	
2.	47 + 2 =	
3.	56 + 3 =	
4.	65 + 4 =	
5.	31 + 8 =	
6.	42 + 7 =	
7.	53 + 6 =	
8.	64 + 5 =	
9.	49 + 1 =	
10.	49 + 2 =	
11.	49 + 3 =	
12.	49 + 5 =	
13.	58 + 2 =	
14.	58 + 3 =	
15.	58 + 4 =	
16.	58 + 6 =	
17.	67 + 3 =	
18.	57 + 4 =	
19.	57 + 5 =	
20.	57 + 7 =	
21.	85 + 5 =	
22.	85 + 6 =	

23.	85 + 7 =	
24.	85 + 9 =	
25.	76 + 4 =	
26.	76 + 5 =	
27.	76 + 6 =	
28.	76 + 9 =	
29.	64 + 6 =	
30.	64 + 7 =	
31.	76 + 8 =	
32.	43 + 7 =	
33.	43 + 8 =	
34.	43 + 9 =	
35.	52 + 8 =	
36.	52 + 9 =	
37.	59 + 1 =	
38.	59 + 3 =	
39.	58 + 2 =	
40.	58 + 4 =	
41.	77 + 3 =	
42.	77 + 5 =	
43.	35 + 5 =	
44.	35 + 8 =	

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B

Number Correct: _____

Improvement: _____

Addition Crossing a Ten

1.	28 + 1 =	
2.	37 + 2 =	
3.	46 + 3 =	
4.	55 + 4 =	
5.	21 + 8 =	
6.	32 + 7 =	
7.	43 + 6 =	
8.	54 + 5 =	
9.	39 + 1 =	
10.	39 + 2 =	
11.	39 + 3 =	
12.	39 + 5 =	
13.	48 + 2 =	
14.	48 + 3 =	
15.	48 + 4 =	
16.	48 + 6 =	
17.	57 + 3 =	
18.	57 + 4 =	
19.	57 + 5 =	
20.	57 + 7 =	
21.	75 + 5 =	
22.	75 + 6 =	

23.	75 + 7 =	
24.	75 + 9 =	
25.	66 + 4 =	
26.	66 + 5 =	
27.	66 + 6 =	
28.	66 + 9 =	
29.	54 + 6 =	
30.	54 + 7 =	
31.	54 + 8 =	
32.	33 + 7 =	
33.	33 + 8 =	
34.	33 + 9 =	
35.	42 + 8 =	
36.	42 + 9 =	
37.	49 + 1 =	
38.	49 + 3 =	
39.	58 + 2 =	
40.	58 + 4 =	
41.	67 + 3 =	
42.	67 + 5 =	
43.	85 + 5 =	
44.	85 + 8 =	

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Name _____ Date _____

1. Solve using your place value chart and place value disks.

   a. 80 + 30 = _____ 90 + 40 = _____

   b. 73 + 38 = _____ 73 + 49 = _____

   c. 93 + 38 = _____ 42 + 99 = _____

   d. 84 + 37 = _____ 69 + 63 = _____

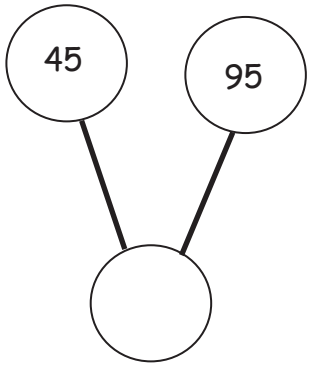
   e. 113 + 78 = _____ 128 + 72 = _____

2. Circle the statements that are true as you solve each problem using place value disks.

a. 47 + 123	b. 97 + 54
I change 10 ones for 1 ten.	I change 10 ones for 1 ten.
I change 10 tens for 1 hundred.	I change 10 tens for 1 hundred.
The total of the two parts is 160.	The total of the two parts is 141.
The total of the two parts is 170.	The total of the two parts is 151.

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3. Write an addition sentence that corresponds to the following number bond. Solve the problem using your place value disks, and fill in the missing total.



4. There are 50 girls and 80 boys in the after school program. How many children are in the after school program?

5. Kim and Stacy solved 83 + 39. Kim's answer was less than 120. Stacy's answer was more than 120. Whose answer was incorrect? Explain how you know using words, pictures, or numbers.

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Name _____ Date _____

Solve using your place value chart and place value disks.

1. 46 + 54 = _____

2. 49 + 56 = _____

3. 28 + 63 = _____

4. 67 + 89 = _____

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Name _____ Date _____

1. Solve using your place value chart and place value disks.

   a. 20 + 90 = _____ 60 + 70 = _____

   b. 29 + 93 = _____ 69 + 72 = _____

   c. 45 + 86 = _____ 46 + 96 = _____

   d. 47 + 115 = _____ 47 + 95 = _____

   e. 28 + 72 = _____ 128 + 72 = _____

2. Circle the statements that are true as you solve each problem using place value disks.

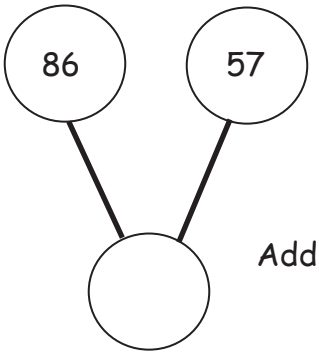
a. 68 + 51	b. 127 + 46
I change 10 ones for 1 ten.	I change 10 ones for 1 ten.
I change 10 tens for 1 hundred.	I change 10 tens for 1 hundred.
The total of the two parts is 109.	The total of the two parts is 163.
The total of the two parts is 119.	The total of the two parts is 173.

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3. Solve the problem using your place value disks, and fill in the missing total. Then, write an addition sentence that relates to the number bonds.

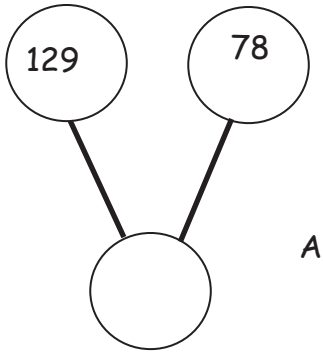
a.



Addition Sentence:

_____

b.



Addition Sentence:

_____

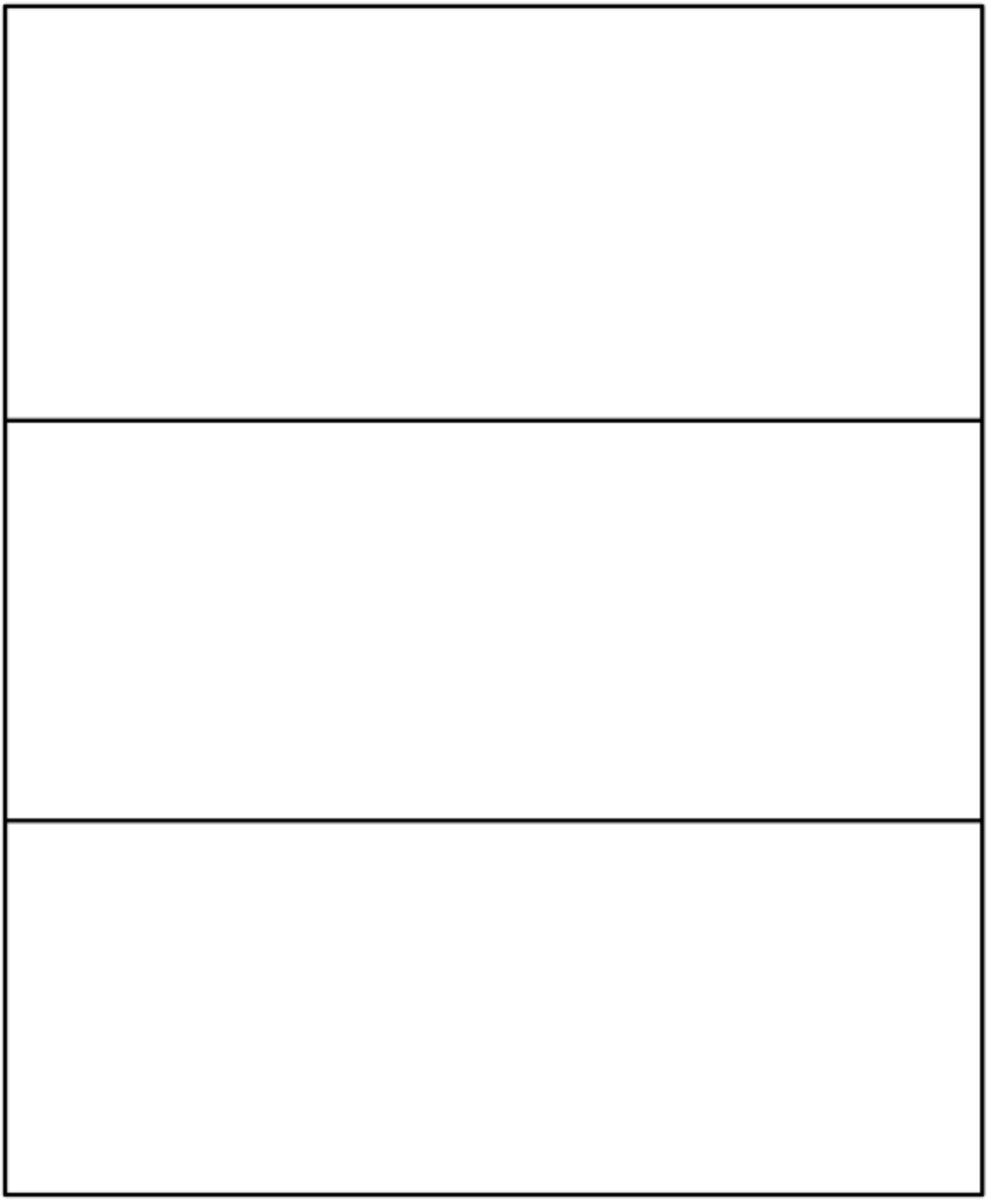
4. Solve using your place value chart and place value disks.

a. 45 + 55 = _____

b. 78 + 33 = _____

c. 37 + 84 = _____

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unlabeled hundreds place value chart

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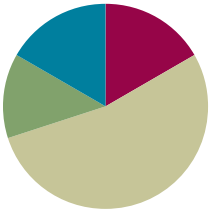
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Lesson 19

Objective: Relate manipulative representations to a written method.

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)

- Addition Fact Flash Cards **2.OA.2** (2 minutes)
- Adding Ones to Make Tens **2.NBT.5** (4 minutes)
- Adding Tens and Ones **2.NBT.5** (4 minutes)

Addition Fact Flash Cards (2 minutes)

Materials: (T) Addition flash cards (Fluency Template)

Note: This is a teacher-directed, whole-class activity. By practicing addition facts, students gain fluency adding within 20.

Adding Ones to Make Tens (4 minutes)

Note: Students practice changing ones for tens in preparation for today's lesson.

T: What is 1 more than 29 ones?
S: 30 ones.
T: How many tens are in 30 ones?
S: 3 tens.
T: 2 more than 58 ones.
S: 60 ones.
T: How many tens are in 60 ones?
S: 6 tens.

Continue with the following possible sequence: 3 more than 37 ones, 5 more than 75 ones, and 8 more than 92 ones.

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Adding Tens and Ones (4 minutes)

Note: This fluency activity supports students adding like units by seeing the addends in expanded form.

T: (Write 60 + 20 = _____.)
T: 60 + 20 is…?
S: 80.
T: (Write 6 + 4 below 60 + 20.) 6 + 4 is…?
S: 10.
T: 80 + 10 is…?
S: 90.
T: (Write 66 + 24 below 6 + 4.) 66 + 24 is…?
S: 90.

60 + 20 = 80

6 + 4 = 10

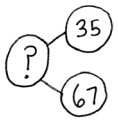
66 + 24 = 90

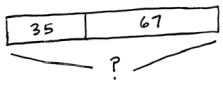
Continue with the following possible sequence: 35 + 25, 44 + 26, 57 + 33, 58 + 52, and 66 + 64.

Application Problem (8 minutes)

There are 35 note cards in one box. There are 67 note cards in another box. How many note cards are there in all?

Note: This problem provides a simple context for students to focus on their place value model and the calculation. Encourage students to use the RDW process and to solve independently using the vertical form and a place value chart.





35 + 67
5 62
40 + 62 = 102

There are 102 note cards in all.

Concept Development (32 minutes)

Materials: (T) Place value disks, unlabeled hundreds place value chart (Lesson 18 Template)
(S) Per pair: personal white board, unlabeled hundreds place value chart (Lesson 18 Template), place value disks (2 hundreds, 18 tens, 18 ones), place value disks (Lesson 6 Template)

Note: Throughout the Concept Development, students work with a partner. For each problem, students whisper-count as they take turns modeling and writing each addend. They may count the regular way (e.g., 10, 20, 30, …) or the Say Ten way (e.g., 1 ten, 2 tens, …). One student records each change in vertical form step by step as the other partner moves the place value disks.

Project or draw a place value chart on the board.

T: Partner A, write 54 + 68 on your personal white board. (Write 54 + 68 on the board vertically.)
MP.4 T: Whisper-count as Partner B models 54 and 68 on your place value chart. Remember to place your disks from left to right and create 5-groups whenever possible.

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T: Where do we begin adding?
S: In the ones place.
T: Look at your ones column. Can we make a unit of 10?
S: Yes!
T: Now look at the vertical form. Use place value language to explain to your partner how you know, just by looking at the digits in the ones place, if you need to rename (or bundle) the ones.
S: 8 only needs 2 to make 10, and 4 is more than 2. → 4 ones and 8 ones is 12 ones. That's 1 ten and 2 ones.
T: Rename 12 ones on your place value chart. How do we show this in vertical form?
S: Write the new ten on the line below the tens place, and write 2 below the line in the ones place.
T: Partner A, let's record that. (Model the step in vertical form.) What should we do next?
S: Add the tens.
T: This time, look at the digits in the tens place before using the disks. Tell your partner whether you'll need to rename, and explain why. MP.4
S: We need to rename because I know my partners to ten. 5 only needs 5 more to make a ten. → 5 tens + 6 tens + 1 ten is 12 tens. That's 120. → 50 + 60 + 10 is 120.
T: Rename 12 tens on your place value chart.
S: (Rename 12 tens as 1 hundred 2 tens.)
T: How do we show this with the algorithm?
S: Write the new hundred on the line below the hundreds place, and write 2 below the line in the tens place.
T: Let's record that. (Model the step in vertical form.) How many hundreds do we have?
S: 1 hundred.
T: Read the entire problem.
S: 54 + 68 = 122.
T: Talk with your partner. Explain each change you made on your place value chart and how you showed each step in vertical form.
T: Partners, it's time to solve some addition problems on your own! Be sure to explain how each change you make on the place value chart matches each step in vertical form.

Repeat the procedure above with the following possible sequence: 38 + 65, 19 + 92, 126 + 57, and 115 + 85. Circulate to check for understanding. As students demonstrate proficiency in relating the place value disks and charts to the vertical form, allow them to work independently on the Problem Set.

NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

For students who are not fluent with their partners to ten, choose from a variety of tools to promote automaticity such as the ones listed below:

- Number bond flash cards.
- Music videos such as "They're Friends of Ten," at http://www.youtube.com/watch?v=o0bKIeYdvCc.
- A Rekenrek, where they can see and handle the pairs that make ten.

As supplementary materials are chosen, consider what best suits each individual student needing remediation.

NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

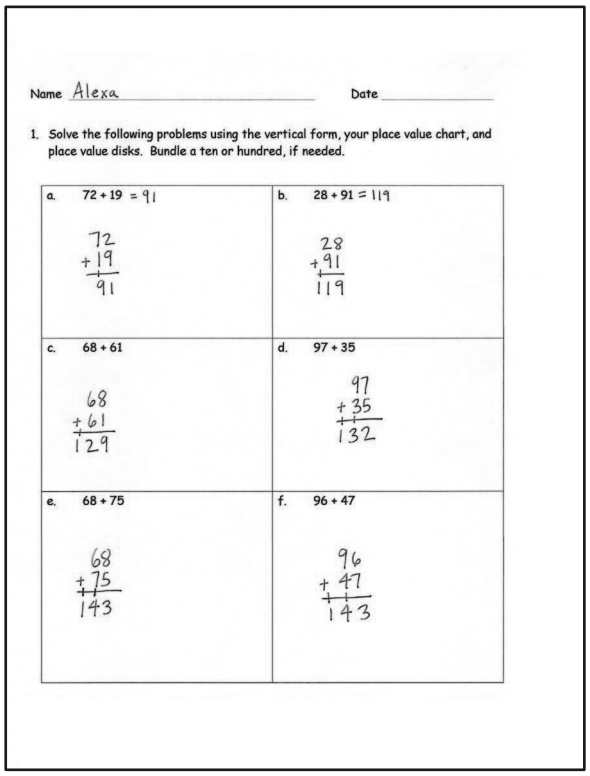
If students think of creative methods to solve the problem, invite them to demonstrate these to the rest of the class. For example,

S: I added 54 to 68 by remembering my doubles, so 50 + 50 = 100 with one ten left over, which makes 110; then, 4 + 8 = 12, so the whole thing is 122.

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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.



Name Alexa Date

1. Solve the following problems using the vertical form, your place value chart, and place value disks. Bundle a ten or hundred, if needed.

a. 72 + 19 = 91

$$\begin{array}{r} 72 \\ +\ 19 \\ \hline 91 \end{array}$$

b. 28 + 91 = 119

$$\begin{array}{r} 28 \\ +\ 91 \\ \hline 119 \end{array}$$

c. 68 + 61

$$\begin{array}{r} 68 \\ +\ 61 \\ \hline 129 \end{array}$$

d. 97 + 35

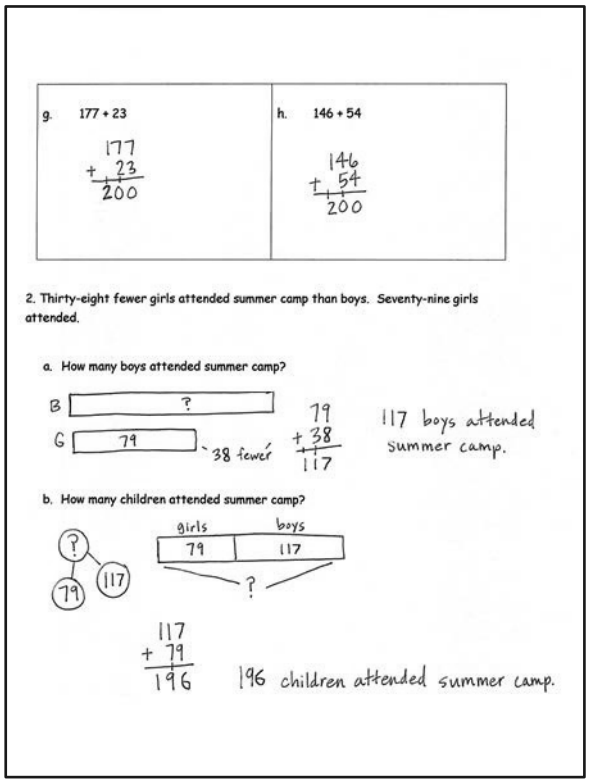
$$\begin{array}{r} 97 \\ +\ 35 \\ \hline 132 \end{array}$$

e. 68 + 75

$$\begin{array}{r} 68 \\ +\ 75 \\ \hline 143 \end{array}$$

f. 96 + 47

$$\begin{array}{r} 96 \\ +\ 47 \\ \hline 143 \end{array}$$



g. 177 + 23

$$\begin{array}{r} 177 \\ +\ 23 \\ \hline 200 \end{array}$$

h. 146 + 54

$$\begin{array}{r} 146 \\ +\ 54 \\ \hline 200 \end{array}$$

2. Thirty-eight fewer girls attended summer camp than boys. Seventy-nine girls attended.

a. How many boys attended summer camp?

$$\begin{array}{r} 79 \\ +\ 38 \\ \hline 117 \end{array}$$

117 boys attended summer camp.

b. How many children attended summer camp?

$$\begin{array}{r} 117 \\ +\ 79 \\ \hline 196 \end{array}$$

196 children attended summer camp.

Student Debrief (10 minutes)

Lesson Objective: Relate manipulative representations 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 Problems 1(a) and (b), did you compose a ten? A hundred? How did you show it on your place value chart?
- Explain to your partner how to solve Problems 1(c) and (d). How did you show a new unit of ten or hundred on your place value chart and in vertical form?
- What do you notice about the totals in Problems 1(e) and 1(f)?
- For Problem 1(e), what did you need to be sure to do when you were solving 68 + 75 using vertical form? Did anyone try to solve this mentally? How?
- What is the answer for Problem 1(f), 96 + 47? How many tens and ones are in the answer (i.e., 143 = ____ tens ____ ones)? How did you rename those tens in the algorithm?

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- Look again at Problem 1(h), 146 + 54. How could you have used a number bond as a simplifying strategy to solve this problem?

Exit Ticket (3 minutes)

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help 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.

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Name _____ Date _____

1. Solve the following problems using the vertical form, your place value chart, and place value disks. Bundle a ten or hundred, if needed.

a. 72 + 19	b. 28 + 91
c. 68 + 61	d. 97 + 35
e. 68 + 75	f. 96 + 47

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g. 177 + 23	h. 146 + 54

2. Thirty-eight fewer girls attended summer camp than boys. Seventy-nine girls attended.

   a. How many boys attended summer camp?

   b. How many children attended summer camp?

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Name _____ Date _____

Solve the following problems using the vertical form, your place value chart, and place value disks. Bundle a ten or hundred, if needed.

1. 47 + 85

2. 128 + 39

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Name _____ Date _____

1. Solve the following problems using the vertical form, your place value chart, and place value disks. Bundle a ten or hundred, if needed.

a. 84 + 37	b. 42 + 79
c. 58 + 56	d. 46 + 96
e. 75 + 69	f. 48 + 94

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g. 162 + 38	h. 156 + 44

2. Seventy-four trees were planted in the garden. Forty-nine more bushes were planted than trees in the garden.

   a. How many bushes were planted?

   b. How many trees and bushes were planted?

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9 + _ = 10	2 + 9
9 + 3	4 + 9
5 + _ = 14	9 + 6
7 + 9	9 + _ = 17

addition flash cards

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9 + 9	10 + 9
8 + _ = 9	2 + 8
8 + 3	4 + 8
5 + 8	8 + 6

addition flash cards

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8 + _ = 15	8 + 8
9 + _ = 17	10 + 8
1 + 7	2 + _ = 9
7 + 3	4 + 7

addition flash cards

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5 + _ = 12	6 + 7
7 + _ = 14	7 + 8
9 + 7	7 + 10
1 + 6	6 + 2

addition flash cards

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6 + _ = 9	4 + 6
6 + 5	6 + _ = 12
7 + 6	8 + 6
9 + _ = 15	6 + 10

addition flash cards

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5 + 1	2 + 5
5 + _ = 8	4 + _ = 9
5 + 5	6 + _ = 11
7 + 5	5 + 8

addition flash cards

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5 + _ = 14	10 + 5
4 + 1	2 + 4
4 + _ = 7	4 + _ = 8
4 + 5	6 + _ = 10

addition flash cards

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7 + 4	4 + 8
4 + _ = 13	10 + 4
1 + 3	2 + 3
3 + _ = 6	4 + 3

addition flash cards

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3 + 5	6 + 3
7 + _ = 10	3 + _ = 11
3 + 9	13 = 3 + _
2 + 1	2 + 2

addition flash cards

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3 + _ = 5	4 + 2
2 + 5	6 + 2
7 + _ = 9	8 + 2
2 + 9	10 + 2

addition flash cards

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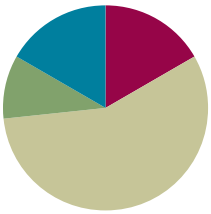
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Lesson 20

Objective: Use math drawings to represent additions with up to two compositions and relate drawings to a written method.

Suggested Lesson Structure

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



Fluency Practice (10 minutes)

- Addition Fact Flash Cards **2.OA.2** (2 minutes)
- Sprint: Addition Crossing a Ten **2.NBT.5** (8 minutes)

Addition Fact Flash Cards (2 minutes)

Materials: (T) Addition flash cards (Lesson 19 Fluency Template)

Note: By practicing addition facts, students gain fluency adding within 20.

Sprint: Addition Crossing a Ten (8 minutes)

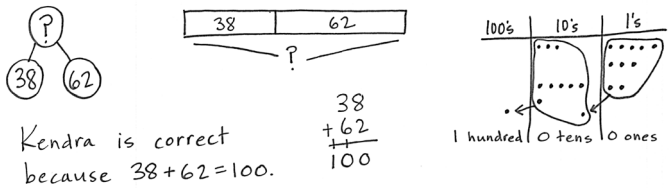
Materials: (S) Addition Crossing a Ten Sprint

Note: This Sprint reviews crossing the ten when adding a two-digit and a one-digit number.

Application Problem (6 minutes)

Kendra and Jojo are counting their marbles. Kendra has 38, and Jojo has 62. Kendra says they have 100 marbles altogether, but Jojo says they have 90. Use words, numbers, or a model to prove who is correct.

Note: This problem assesses students' understanding of composing a new unit—in this case, a ten. Students may use mental strategies, solve vertically, or draw a chip model to explain their reasoning. Encourage students to work independently; afterwards, invite them to share which method they used to solve the problem.

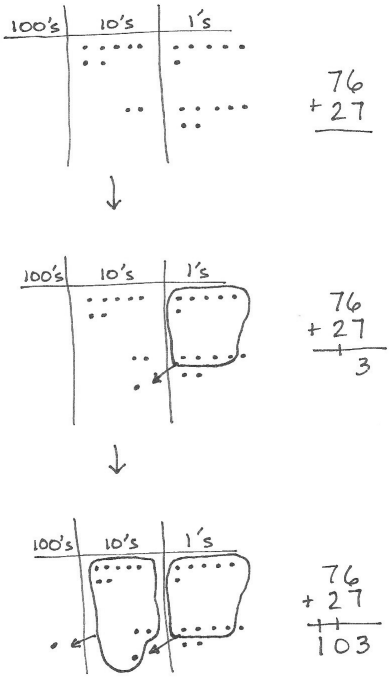


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Concept Development (34 minutes)

Materials: (S) Math journal or paper

As students write addition problems vertically and make math drawings, remind them to be precise in aligning the digits and in drawing their chips in neat 5-groups.



Problem 1: 76 + 27

T: Write 76 + 27 the vertical way on your paper.

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

T: Label the hundreds place, the tens place, and the ones place.

T: Draw a model of each addend. Since each place on our chart is labeled, we don't need to label disks. We'll just draw chips. Remember, the place tells us the value, or how much each chip is worth.

T: Whisper-count as you draw your model. (Draw a chip model of 76 + 27. See the image to the right.)

S: (Make a chip model.) 10, 20, 30, …, 76. 10, 20, 21, …, 27.

MP.6

T: Use place value language to tell your partner how your model matches the vertical form.

S: My model shows 7 tens 6 ones and 2 tens 7 ones. That's the same as 76 + 27.

T: Look at the ones first. What is 6 ones + 7 ones?

S: 13 ones!

T: The Say Ten way?

S: Ten 3.

T: Tell your partner what to do on your model and on your written problem.

S: Circle 10 ones and draw an arrow to the tens place; then, put a dot to show the new ten. → Write a 3 in the ones place and the new ten on the line below the tens place. → Rename 13 ones as 1 ten 3 ones.

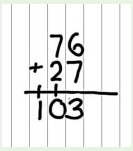
T: Let's show that on our models and on the written addition, or vertical form.

S: (Circle 10 ones, draw an arrow to the tens place and a chip representing the new unit, and write 1 on the line below the tens place. See the above image.)

T: Partners, check each other's work to be sure it is correct.

NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

As the number of digits increases, it becomes more challenging to keep the places aligned. Remember that lined paper turned 90 degrees, so the lines are vertical, makes a convenient guide to help students line up their numbers.



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T: On your written addition, you have written a 1 on the line. On your chart, point to what the 1 stands for. It's the new…?

S: (Point to the new ten on the model, and respond chorally.) Ten!

T: Yes! (Point to each part.) 6 ones + 7 ones is 13 ones, 1 ten, and 3 ones, so we write 1 new ten on the line below the tens place, and we write 3 ones below the line in the ones place. What do we do next?

S: Add the tens.

T: What is 7 tens + 2 tens + 1 ten?

S: 10 tens! 100.

T: Tell your partner what to do on your model and on your written addition.

S: Circle 10 tens, draw an arrow to the hundreds place, and then draw a chip to show the new hundred. → Write 1 on the line below the hundreds place.

T: Show this next step on your model and on the written addition.

MP.6

S: (Model and write. See image on the previous page.)

T: What's the value of the 1 on the line below the hundreds place? Point to it on your chart.

S: (Point to the new hundred.) 100.

T: Yes! And how many tens should we write below the line in the tens place? Look at your drawing.

S: 0.

T: Read the entire problem.

S: 76 + 27 = 103.

T: Point to where each digit is represented in your drawing.

T: How many times did you rename or bundle?

S: Two times.

T: Tell your partner how you know when to rename.

S: When I have more than 9 in one place, and I can make a bundle of 10 of that unit. → It's a pattern! When you have 10 or more in one place, you make 1 of the next biggest unit.

NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

Encourage those students who prefer to solve these problems mentally using the arrow way, or compensation, to do so in order to confirm their answers and to practice this method. Explain that as the number of digits increases, it is more challenging to solve these problems mentally.

Some students benefit from more challenging problems with a greater number of digits. Encourage these students to write problems for each other to solve once they have completed their classwork.

Follow the procedure above to guide students as they model, write, and solve 42 + 96. Have students share how each step in the drawing matches each step in the written addition.

Continue with the following possible sequence: 42 + 67, 53 + 97, 86 + 48, and 99 + 99. Continue to support students who struggle, but as students demonstrate understanding, instruct them to work on the Problem Set independently.

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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.

Student Debrief (10 minutes)

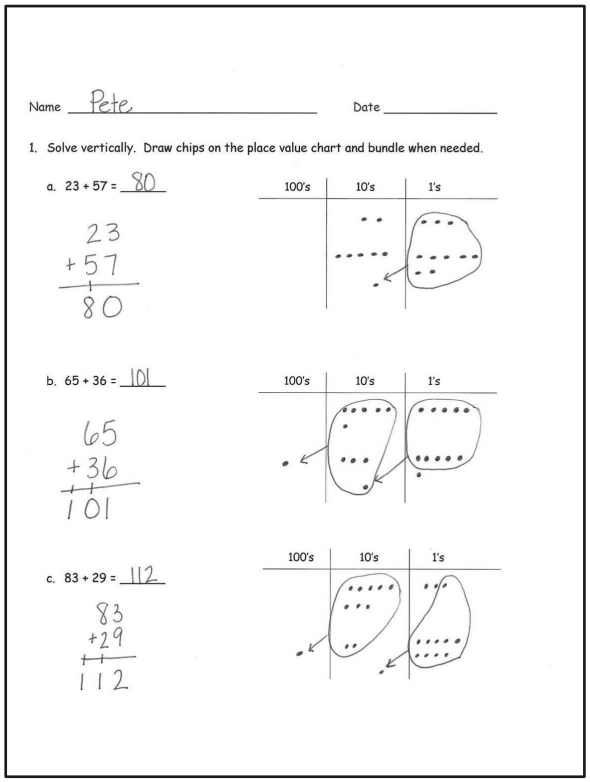
Lesson Objective: Use math drawings to represent additions with up to two compositions and relate drawings to a written method.

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.

- Explain to your partner how you solved Problems 1(a) and (b). What significant differences do you notice about the place value charts for these two parts of the problem? Why?
- For Problem 1(c), use place value language to explain to your partner how your model matches vertical form.
- One student's answer for Problem 1(d), 47 + 75, was 112. Was she correct? What mistake did she make in vertical form?
- Look carefully at Problem 1(e), 68 + 88. Could you have solved this problem mentally? How?
- Think about your math drawings. How did you know when to rename ones? Tens? What did that look like in vertical form?



Name Pete Date

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

a. 23 + 57 = 80

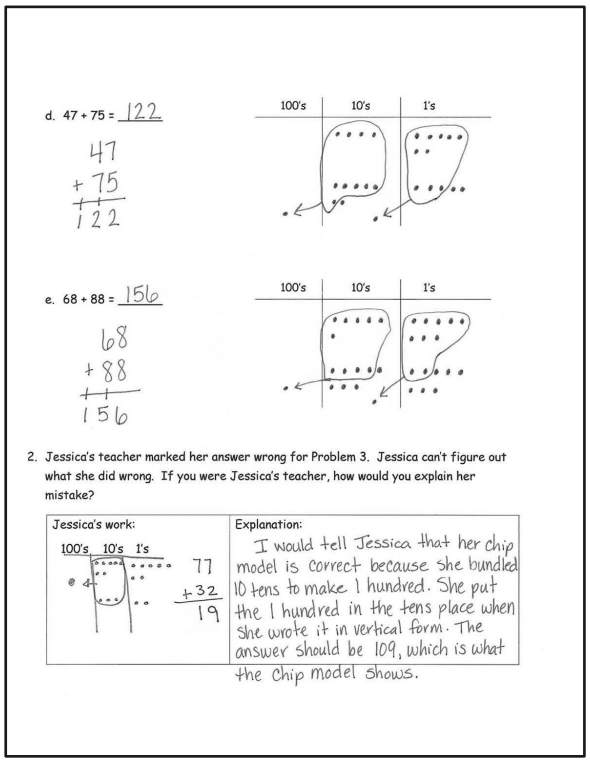
23
+57
80

b. 65 + 36 = 101

65
+36
101

c. 83 + 29 = 112

83
+29
112



d. 47 + 75 = 122

47
+75
122

e. 68 + 88 = 156

68
+88
156

2. Jessica's teacher marked her answer wrong for Problem 3. Jessica can't figure out what she did wrong. If you were Jessica's teacher, how would you explain her mistake?

Jessica's work:	Explanation:
100's 10's 1's 77 +32 19	I would tell Jessica that her chip model is correct because she bundled 10 tens to make 1 hundred. She put the 1 hundred in the tens place when she wrote it in vertical form. The answer should be 109, which is what the chip model shows.

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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.

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A

Number Correct: _____

Addition Crossing a Ten

1.	38 + 1 =	
2.	47 + 2 =	
3.	56 + 3 =	
4.	65 + 4 =	
5.	31 + 8 =	
6.	42 + 7 =	
7.	53 + 6 =	
8.	64 + 5 =	
9.	49 + 1 =	
10.	49 + 2 =	
11.	49 + 3 =	
12.	49 + 5 =	
13.	58 + 2 =	
14.	58 + 3 =	
15.	58 + 4 =	
16.	58 + 6 =	
17.	67 + 3 =	
18.	57 + 4 =	
19.	57 + 5 =	
20.	57 + 7 =	
21.	85 + 5 =	
22.	85 + 6 =	

23.	85 + 7 =	
24.	85 + 9 =	
25.	76 + 4 =	
26.	76 + 5 =	
27.	76 + 6 =	
28.	76 + 9 =	
29.	64 + 6 =	
30.	64 + 7 =	
31.	76 + 8 =	
32.	43 + 7 =	
33.	43 + 8 =	
34.	43 + 9 =	
35.	52 + 8 =	
36.	52 + 9 =	
37.	59 + 1 =	
38.	59 + 3 =	
39.	58 + 2 =	
40.	58 + 4 =	
41.	77 + 3 =	
42.	77 + 5 =	
43.	35 + 5 =	
44.	35 + 8 =	

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B

Number Correct: _____

Improvement: _____

Addition Crossing a Ten

1.	28 + 1 =	
2.	37 + 2 =	
3.	46 + 3 =	
4.	55 + 4 =	
5.	21 + 8 =	
6.	32 + 7 =	
7.	43 + 6 =	
8.	54 + 5 =	
9.	39 + 1 =	
10.	39 + 2 =	
11.	39 + 3 =	
12.	39 + 5 =	
13.	48 + 2 =	
14.	48 + 3 =	
15.	48 + 4 =	
16.	48 + 6 =	
17.	57 + 3 =	
18.	57 + 4 =	
19.	57 + 5 =	
20.	57 + 7 =	
21.	75 + 5 =	
22.	75 + 6 =	
23.	75 + 7 =	
24.	75 + 9 =	
25.	66 + 4 =	
26.	66 + 5 =	
27.	66 + 6 =	
28.	66 + 9 =	
29.	54 + 6 =	
30.	54 + 7 =	
31.	54 + 8 =	
32.	33 + 7 =	
33.	33 + 8 =	
34.	33 + 9 =	
35.	42 + 8 =	
36.	42 + 9 =	
37.	49 + 1 =	
38.	49 + 3 =	
39.	58 + 2 =	
40.	58 + 4 =	
41.	67 + 3 =	
42.	67 + 5 =	
43.	85 + 5 =	
44.	85 + 8 =	

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Name _____ Date _____

1. Solve vertically. Draw chips on the place value chart and bundle, when needed.

a. 23 + 57 = _____

100's	10's	1's

b. 65 + 36 = _____

100's	10's	1's

c. 83 + 29 = _____

100's	10's	1's

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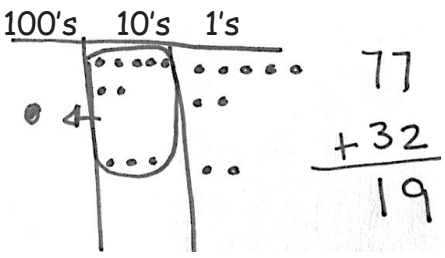
d. 47 + 75 = _____

100's	10's	1's

e. 68 + 88 = _____

100's	10's	1's

2. Jessica's teacher marked her work incorrect for the following problem. Jessica cannot figure out what she did wrong. If you were Jessica's teacher, how would you explain her mistake?

Jessica's work:	Explanation:
	

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Name _____ Date _____

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

1. 46 + 65 = _____

100's	10's	1's

2. 74 + 57 = _____

100's	10's	1's

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Name _____ Date _____

1. Solve vertically. Draw chips on the place value chart and bundle, when needed.

a. 41 + 39 = _____

100's	10's	1's

b. 54 + 26 = _____

100's	10's	1's

c. 96 + 39 = _____

100's	10's	1's

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d. 84 + 79 = _____

100's	10's	1's

e. 65 + 97 = _____

100's	10's	1's

2. For each box, find and circle two numbers that add up to 150.

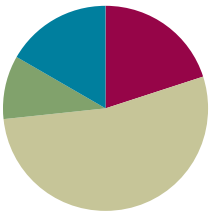
a.	b.	c.
67 63 73 83 57	48 92 68 62 58	75 55 65 45 75

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Lesson 21

Objective: Use math drawings to represent additions with up to two compositions and relate drawings to a written method.

Suggested Lesson Structure

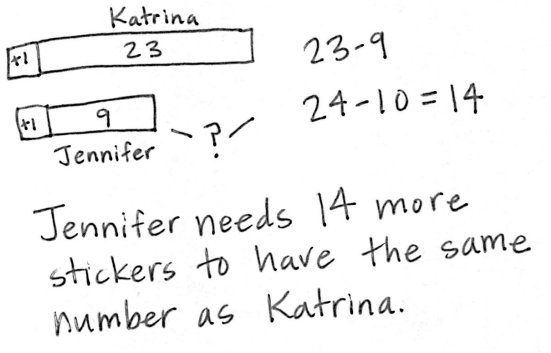


Application Problem	(6 minutes)
Fluency Practice	(12 minutes)
Concept Development	(32 minutes)
Student Debrief	(10 minutes)
Total Time	**(60 minutes)**

Application Problem (6 minutes)

Katrina has 23 stickers, and Jennifer has 9. How many more stickers does Jennifer need to have as many as Katrina?

Note: Guide the students through the use of a comparison tape diagram to represent this *compare with difference unknown* problem type. Remember that, if possible, Application Problems can be completed at a time of day other than the regular math time if they do not directly flow into the lesson, as is the case here.



Fluency Practice (12 minutes)

- Addition Fact Flash Cards **2.OA.2** (2 minutes)
- Place Value **2.NBT.1** (5 minutes)
- Rename the Units: Choral Response **2.NBT.1** (5 minutes)

Addition Fact Flash Cards (2 minutes)

Materials: (T) Addition flash cards (Lesson 19 Fluency Template)

Note: By practicing addition facts, students gain fluency adding within 20.

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Place Value (5 minutes)

Note: Practicing place value skills solidifies understanding the reason for bundling.

T: (Write 103.) Say the number.
S: 103.
T: Which digit is in the tens place?
S: 0.
T: (Underline 0.) What's the value of the 0?
S: 0.
T: State the value of the 1.
S: 1 hundred.
T: State the value of the 3.
S: 3 ones.

Repeat using the following possible sequence: 173, 281, and 428.

Rename the Units: Choral Response (5 minutes)

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

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

Continue with the following possible sequence: 32, 38, 40, 41, 46, 50, 63, and 88.

Concept Development (32 minutes)

Materials: (S) Math journal or paper

This lesson is designed to give students ample time working with bare numbers and chip models to develop conceptual understanding of the algorithm when there are two compositions.

T: Copy the following problem on your paper in vertical form: 48 + 93.

NOTES ON MULTIPLE MEANS OF REPRESENTATION:

Return to the concrete stage (i.e., manipulatives) if a student is unable to grasp concepts at this pictorial stage. Ensure that the student has enough time to practice with manipulatives before moving on to the pictorial stage again.

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T: Next to the written addition, draw a chip model to solve, and record each change in the written addition.

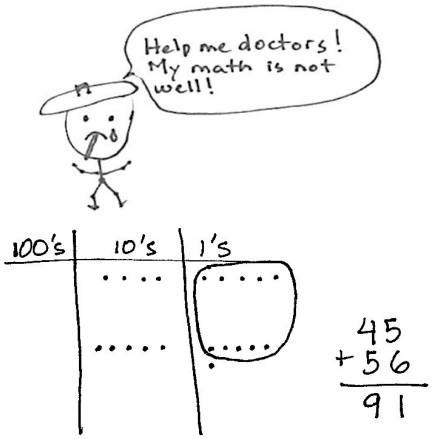
T: When you're finished, check your work with a partner, and explain how your model matches the written addition. Use place value language to explain each step.

Circulate to listen in on conversations and to offer support as needed.

T: Who would like to share his or her work with the class? Use place value language to explain how the model helps you to understand the written addition. (Choose a student.)

Continue with the following possible sequence: 37 + 85, 28 + 82, 139 + 26, and 142 + 58.

When students have finished, write 45 + 56 on the board in vertical form. Draw a model that shows the problem solved incorrectly. (See the image to the right.)



T: This problem is not feeling well. It is wrong.

T: Talk with your partner. Use place value language to explain why it is incorrect. Be a math doctor. Figure out how to make it right.

S: You didn't rename (or bundle) 10 ones as 1 ten. → You circled 10 ones, but you forgot to show the new ten in your drawing or in the problem. → 5 ones + 6 ones is 11 ones. You wrote the number of ones below the line, but you didn't write the new ten on the line below the tens place. → The answer is 101 because 4 tens + 5 tens + another ten is 10 tens, or 100. And you wrote the ones right!

MP.3

T: Who can come up and correct my work? (Choose a student.)

T: How is renaming ones the same as and different from renaming tens?

S: You do the same thing for both; you look for partners to ten to make a new unit. → It's the same because it means you have ten or more in the ones place and the tens place. → It's different because when you rename ones, you make a ten. When you rename tens, you make a hundred.

Continue to support students who need assistance. Once students demonstrate proficiency with the models and the algorithm, allow them to work on the Problem Set independently.

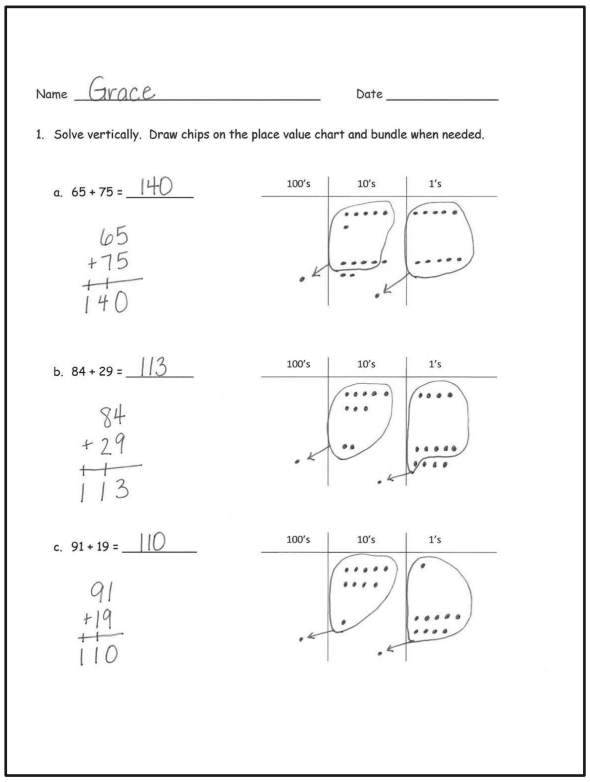
NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

When selecting a "doctor" (a student to correct the mistake), choose someone who has been struggling with the concept. Once the student successfully discovers the mistake (with or without support), praise the student for her hard work and persistence. This models the importance of hard work in achievement and moves the focus of accomplishment away from only those who find the concept easy.

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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.



Name Grace Date

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

a. 65 + 75 = 140

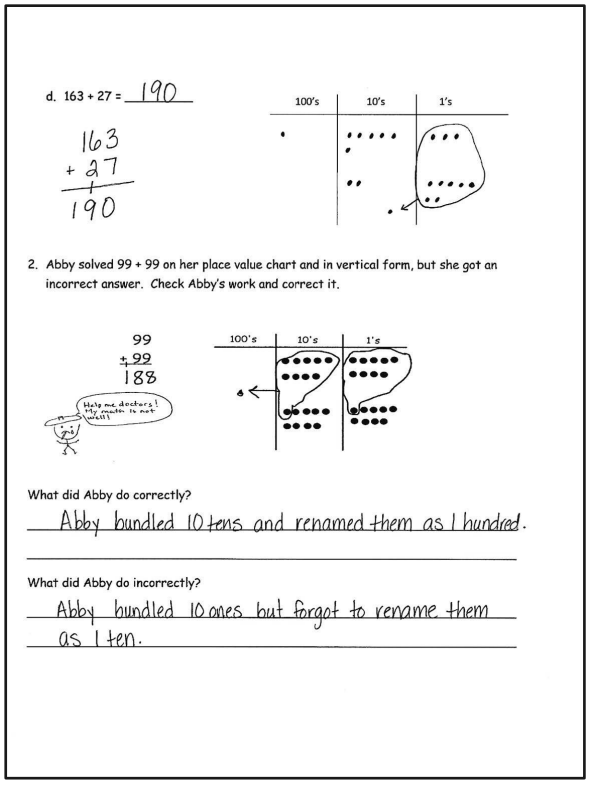
65
+75
140

b. 84 + 29 = 113

84
+29
113

c. 91 + 19 = 110

91
+19
110



d. 163 + 27 = 190

163
+27
190

2. Abby solved 99 + 99 on her place value chart and in vertical form, but she got an incorrect answer. Check Abby's work and correct it.

99
+99
188

What did Abby do correctly?

Abby bundled 10 tens and renamed them as 1 hundred.

What did Abby do incorrectly?

Abby bundled 10 ones but forgot to rename them as 1 ten.

Student Debrief (10 minutes)

Lesson Objective: Use math drawings to represent additions with up to two compositions 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.

- Explain to your partner how you solved Problems 1(a) and (b). How can you tell immediately if you are going to need to bundle ones? Tens?
- Could you have solved Problems 1(a) and (b) mentally? Which strategies would be easiest?
- For Problem 1(c), how does knowing partners to ten help you to solve this problem?
- For Problem 1(d), use place value language to explain to your partner how your model matches the written addition.
- Share your responses to Problem 2 with a partner. What does Abby understand about addition? If you were Abby's teacher, what would you focus on teaching her in the next lesson? Why?

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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.

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Name _____ Date _____

1. Solve vertically. Draw chips on the place value chart and bundle, when needed.

a. 65 + 75 = _____

100's	10's	1's

b. 84 + 29 = _____

100's	10's	1's

c. 91 + 19 = _____

100's	10's	1's

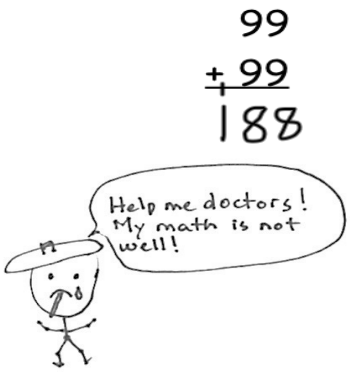
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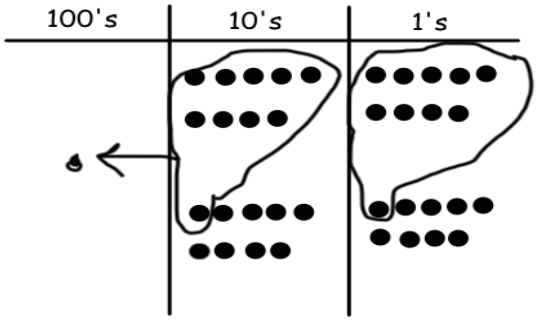
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d. 163 + 27 = _____

100's	10's	1's

2. Abby solved 99 + 99 on her place value chart and in vertical form, but she got an incorrect answer. Check Abby's work, and correct it.





What did Abby do correctly?

_____

_____

What did Abby do incorrectly?

_____

_____

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Name _____ Date _____

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

1. 58 + 67 = _____

100's	10's	1's

2. 43 + 89 = _____

100's	10's	1's

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Name _____ Date _____

1. Solve vertically. Draw chips on the place value chart and bundle, when needed.

a. 45 + 76 = _____

100's	10's	1's

b. 62 + 89 = _____

100's	10's	1's

c. 97 + 79 = _____

100's	10's	1's

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d. 127 + 78 = _____

100's	10's	1's

2. The blue team scored 37 fewer points than the white team. The blue team scored 69 points.

   a. How many points did the white team score?

   b. How many points did the blue and white teams score altogether?

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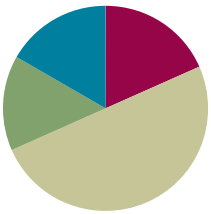
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Lesson 22

Objective: Solve additions with up to four addends with totals within 200 with and without two compositions of larger units.

Suggested Lesson Structure

Fluency Practice	(11 minutes)
Application Problem	(9 minutes)
Concept Development	(30 minutes)
Student Debrief	(10 minutes)
Total Time	**(60 minutes)**



Fluency Practice (11 minutes)

- Addition Facts Flash Cards **2.OA.2** (2 minutes)
- Subtraction from Tens **2.NBT.5** (5 minutes)
- Crossing a Ten **2.NBT.5** (4 minutes)

Addition Facts Flash Cards (2 minutes)

Materials: (T) Addition flash cards (Lesson 19 Fluency Template)

Note: By practicing addition facts, students gain fluency adding within 20.

Subtraction from Tens (5 minutes)

Materials: (S) Personal white board

Note: This allows students to see how their take-from-ten facts help them to solve many, many problems.

T: I say a basic fact. You add 10 to the whole and continue until I say to stop. So, after 10 – 6, you would then solve 20 – 6.
S: 30 – 6, 40 – 6, 50 – 6.
T: Yes, go as high as you can before I give the signal to stop. Let's begin. 10 – 6.
S: (Work.)
T: (Stop everyone when you see that all students have solved at least two problems.)

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

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Crossing a Ten (4 minutes)

Note: Crossing a Ten prepares students for making a multiple of 10 as they solve problems with up to four addends.

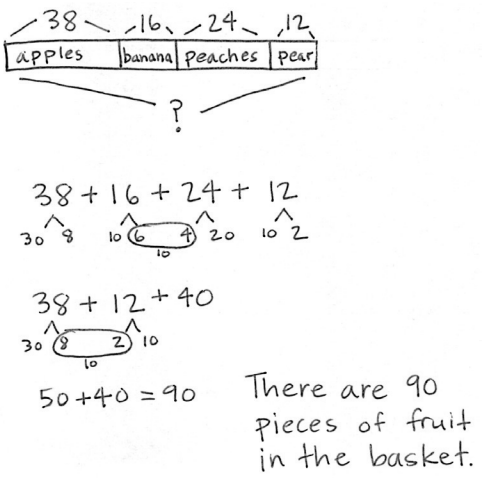
T: (Write on board: 8 + ____ = 10.) How many more does 8 need to make 10?
S: 2 more.
T: Complete the number sentence.
S: 8 + 2 = 10.
T: 10 + 1.
S: 11.
T: 8 + 2 + 1.
S: 11.
T: 8 + 3.
S: 11.

Continue with the following possible sequence: 7 + 3, 7 + 3 + 1, 7 + 4, 7 + 5, 9 + 1, 9 + 1 + 1, 9 + 1 + 4, and 19 + 1 + 4.

Application Problem (9 minutes)

There are 38 apples, 16 bananas, 24 peaches, and 12 pears in the fruit basket. How many pieces of fruit are in the basket?

Note: In this problem, students apply existing skills, but with more addends. Encourage the use of multiple simplifying strategies. When students have finished, invite them to share different strategies and to explain their thinking. Seeing other methods encourages flexibility in problem solving and can provide access for all learners.



Concept Development (30 minutes)

Materials: (S) Personal white board

For each problem within the set, guide students to look for partners to 10 ones or 10 tens to solve, using the associative property to group the numbers. Within each set of problems, encourage students to relate problems to each other.

MP.3

Problems 1–3: 3 + 7 + 6, 23 + 27 + 16, 123 + 27 + 16

T: (Write 3 + 7 + 6 on the board.) Raise your hand when you think you know the answer.
S: 16.

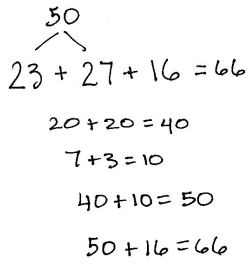
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T: What helped you solve so quickly?

S: 3 + 7 equals 10, and 10 + 6 is 16.

T: (Write 23 + 27 + 16 directly below 3 + 7 + 6 so that the ones are aligned.) Don't use vertical addition to solve; use mental math. Talk to your partner using place value language to explain how you can solve this problem mentally. Then, show your work.

S: I added 23 + 27 first. I added the 2 tens, so 20 + 20 = 40. Then, I added the ones. 7 + 3 equals 10, and 40 + 10 is 50. 50 plus 16 equals 66.
→ I did the same thing, but I said 4 tens + 1 ten is 5 tens, plus another ten is 6 tens. Then, I added 6 ones, which equals 66. → I added all the tens first, and then I added the ones. So, 20 + 20 + 10 = 50. Plus, the 10 from 7 ones and 3 ones makes 60. Then, I added 6 more, which equals 66.
→ It's the same as the first problem, just with tens. So, you add 50 more!



T: Oh, I like the way you used the first problem to solve the second one! (Write 123 + 27 + 16 directly below the prior equation.) Talk with your partner. How is this problem the same as and different from the first two?

S: The ones are the same in all the problems.
→ In the second and third problems, the tens and ones are the same, but now there's a hundred.
→ In the first problem, all the numbers have one digit, and then in the next one they have two digits. And in the last problem, one number has three digits.
→ You can break apart 123 into 100 + 23; then, it's the same as the second problem with an added hundred.

MP.3

NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

Have struggling students circle pairs of addends with ones digits that add up to ten. Review and practice partners to ten with students who need it, using number bonds, ten-frames, or a Rekenrek.

T: On your board, show your favorite strategy; then, share your work with your partner.

If time permits or students need more practice, repeat the procedure above with the following possible sequence: 2 + 8 + 5, 32 + 28 + 45, and 132 + 28 + 45.

Problems 4–6: 1 + 3 + 9 + 7, 31 + 23 + 19 + 47, 61 + 53 + 19 + 27

T: (Write 1 + 3 + 9 + 7 on the board.) Now, we're adding four addends. Talk with your partner about how you can solve this easily.

S: Add the numbers that make ten. → 1 + 9 is 10, and 3 + 7 is 10, so 20.

T: Does this mean we can add numbers in any order?

S: Yes!

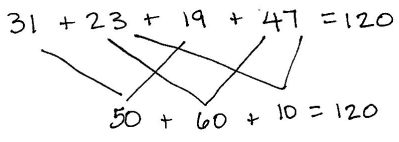
T: (Write 31 + 23 + 19 + 47.) How is this problem the same as the first problem?

S: The ones are the same.

T: How is it different?

S: Now there are tens.

T: Choose a strategy to solve. Then, use place value language to explain your strategy to your partner.



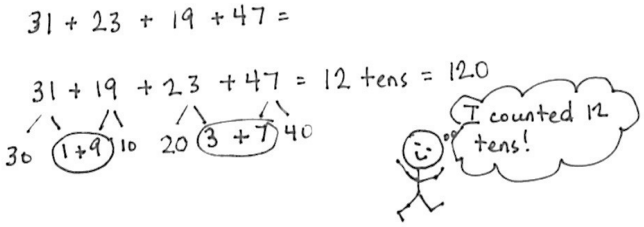
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T: Who would like to show his work and explain his thinking? (Choose volunteers.)

S: I added all the tens, 30 + 20 + 10 + 40. That's 50 + 50, which is 100. Then, I added the ones. 10 + 10 equals 20. 100 + 20 = 120.

MP.3

S: I put 31 and 19 together. 1 + 9 is 10. 30 + 10 is 40. 40 + 10 is 50. Then, I added 23 and 47. 3 + 7 is 10. 20 + 40 is 60. 50 + 60 + 10 is 120.



Repeat the procedure above for 61 + 53 + 19 + 27. As students are able to solve using place value strategies, allow them to work on the Problem Set independently.

Problem Set (10 minutes)

Students should do their personal best to complete the Problem Set within the allotted 10 minutes. For some classes, it may be appropriate to modify the assignment by specifying which problems they work on first. Some problems do not specify a method for solving. Students should solve these problems using the RDW approach used for Application Problems.

Student Debrief (10 minutes)

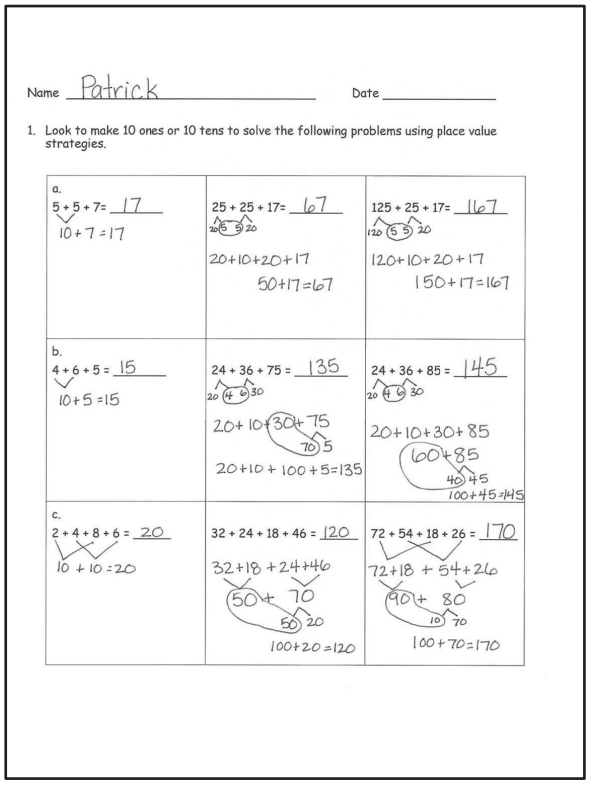
Lesson Objective: Solve additions with up to four addends with totals within 200 with and without two compositions of larger units.

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 Problems 1(a)–(c), how are the three columns related? How do the columns build upon each other?
- In Problem 1(a), how many tens are in 125 + 25 + 17? How do you know?
- In Problem 1(b), how did you group the tens and ones to solve an easy problem? What did you do with 15 ones?


Name Patrick Date

1. Look to make 10 ones or 10 tens to solve the following problems using place value strategies.

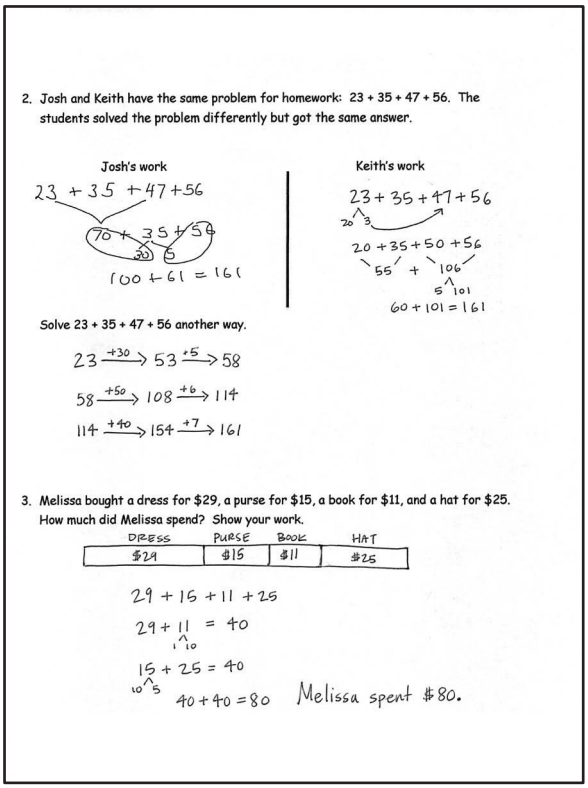
a. 5 + 5 + 7 = 17 10 + 7 = 17	25 + 25 + 17 = 67 20 + 10 + 20 + 17 50 + 17 = 67	125 + 25 + 17 = 167 120 + 10 + 20 + 17 150 + 17 = 167
b. 4 + 6 + 5 = 15 10 + 5 = 15	24 + 36 + 75 = 135 20 + 10 + 30 + 75 20 + 10 + 100 + 5 = 135	24 + 36 + 85 = 145 20 + 10 + 30 + 85 60 + 85 100 + 45 = 145
c. 2 + 4 + 8 + 6 = 20 10 + 10 = 20	32 + 24 + 18 + 46 = 120 32 + 18 + 24 + 46 50 + 70 100 + 20 = 120	72 + 54 + 18 + 26 = 170 72 + 18 + 54 + 26 90 + 80 100 + 70 = 170

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- In Problem 1(c), how did you change the order of the addends to make a simpler problem to solve?
- How did you solve Problem 2 differently from Josh and Keith? Did you change the order of the addends? Did you make 10 ones? How about 10 tens?
- Could we use the vertical method 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 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.



2. Josh and Keith have the same problem for homework: 23 + 35 + 47 + 56. The students solved the problem differently but got the same answer.

Josh's work

23 + 35 + 47 + 56

70 + 35 + 56

30 5

100 + 61 = 161

Keith's work

23 + 35 + 47 + 56

20 3

20 + 35 + 50 + 56

55 + 106

5 101

60 + 101 = 161

Solve 23 + 35 + 47 + 56 another way.

23 +30→ 53 +5→ 58

58 +50→ 108 +6→ 114

114 +40→ 154 +7→ 161

3. Melissa bought a dress for $29, a purse for $15, a book for $11, and a hat for $25. How much did Melissa spend? Show your work.

DRESS	PURSE	BOOK	HAT
$29	$15	$11	$25

29 + 15 + 11 + 25

29 + 11 = 40

1 10

15 + 25 = 40

10 5

40 + 40 = 80 Melissa spent $80.

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Name _____ Date _____

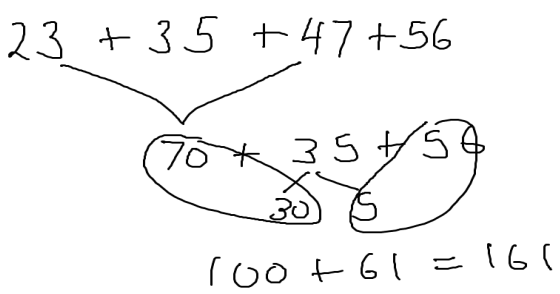
1. Look to make 10 ones or 10 tens to solve the following problems using place value strategies.

a. 5 + 5 + 7= _____	25 + 25 + 17= _____	125 + 25 + 17= _____
b. 4 + 6 + 5 = _____	24 + 36 + 75 = _____	24 + 36 + 85 = _____
c. 2 + 4 + 8 + 6 = _____	32 + 24 + 18 + 46 = _____	72 + 54 + 18 + 26 = _____

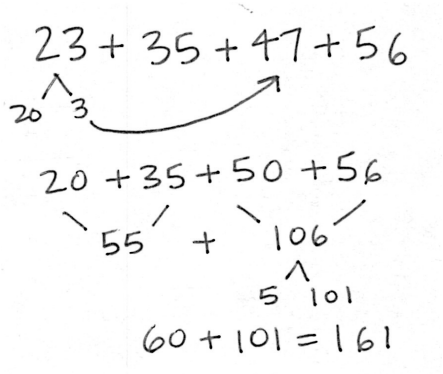
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2. Josh and Keith have the same problem for homework: 23 + 35 + 47 + 56. The students solved the problem differently but got the same answer.

Josh's work



Keith's work



Solve 23 + 35 + 47 + 56 another way.

3. Melissa bought a dress for $29, a purse for $15, a book for $11, and a hat for $25. How much did Melissa spend? Show your work.

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Name _____ Date _____

Look to make 10 ones or 10 tens to solve the following problems using place value strategies.

1. 17 + 33 + 48

2. 35 + 56 + 89 + 18

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Name _____ Date _____

1. Look to make 10 ones or 10 tens to solve the following problems using place value strategies.

a. 6 + 3 + 7= _____	36 + 23 + 17= _____	126 + 23 + 17= _____
b. 8 + 2 + 5 = _____	38 + 22 + 75 = _____	18 + 62 + 85 = _____
c. 9 + 4 + 1 + 6 = _____	29 + 34 + 41 + 16 = _____	81 + 34 + 19 + 56 = _____

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2. The table shows the top six soccer teams and their total points scored this season.

Teams	Points
Red	29
Yellow	38
Green	41
Blue	76
Orange	52
Black	24

a. How many points did the yellow and orange teams score together?

b. How many points did the yellow, orange, and blue teams score together?

c. How many points did the red, green, and black teams score together?

d. Which two teams scored a total of 70 points?

e. Which two teams scored a total of 100 points?

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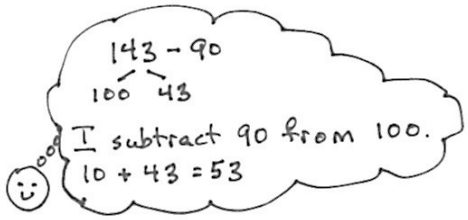
Topic E

Strategies for Decomposing Tens and Hundreds

2.NBT.7, 2.NBT.9

Focus Standard:		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.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:		6	
Coherence	**-Links from:**	G1–M4	Place Value, Comparison, Addition and Subtraction to 40
	-Links to:	G3–M2	Place Value and Problem Solving with Units of Measure
		G4–M1	Place Value, Rounding, and Algorithms for Addition and Subtraction

Topic E begins with an extension of mental math strategies learned in first grade, when students learned to subtract from the ten by using number bonds. In Lesson 23, they return to this strategy to break apart three-digit minuends and subtract from the hundred. For example, in Grade 1, students solved 14 – 9 by restating the problem as 10 – 9 + 4. In Grade 2, students use the same strategy to restate 143 – 90 as 100 – 90 + 43.

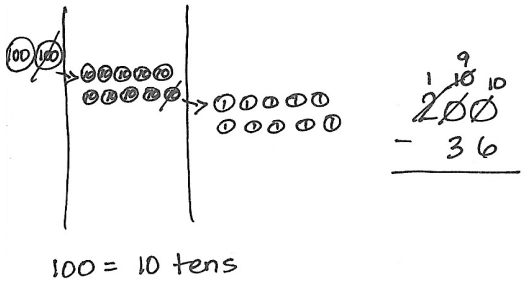


In Lesson 24, students use place value disks on a place value chart to represent subtraction and develop an understanding of decomposition of tens and hundreds. This concrete model helps students see the answer to the question, "Do I have enough ones?" or "Do I have enough tens?" When they do not, they exchange one of the larger units for ten of the smaller units. Repeated practice with this exchange solidifies their understanding that within a unit of ten there are 10 ones, and within a unit of a hundred there are 10 tens. This practice is connected to the strategies they learned with tens and ones; they learn that the only real difference is in place value. The strategies are also connected to addition through part–whole understanding, which is reinforced throughout.

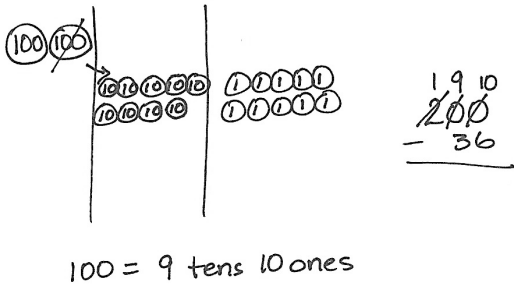
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In Lesson 25, students move toward the abstract when they model decompositions on their place value charts while simultaneously recording the changes in the vertical form. Students draw a magnifying glass around the minuend, as they did in Topic C. They then ask the question, "Do I have enough ones?" They refer to the place value disks to answer and exchange a ten disk for 10 ones when necessary. They record the change in the vertical form. Students repeat these steps when subtracting the tens.

Students use math drawings in Lesson 26 as they move away from concrete representations and into the pictorial stage. They follow the same procedure for decomposing numbers as they did in Lesson 25 with the place value disks, but now they may use a chip model or place value disk drawing. They continue to record changes in the vertical form as they work with their models.



Topic E closes with the special case of subtracting from 200. Using place value disk drawings on a place value chart, students review the concept that a unit of 100 is comprised of 10 tens. They then model 1 hundred as 9 tens and 10 ones and practice counting to 100 both ways (i.e., 10, 20, 30, …, 100 and 10, 20, …, 90, 91, 92, 93, …, 100). Next, they model the decomposition of a hundred either in two steps (as 10 tens then decomposing 1 ten as 10 ones) or one step (as 9 tens and 10 ones) as they represent subtractions from 200 (see image to the right). Students use this same reasoning to subtract from numbers that have zero tens. For example, to subtract 48 from 106, students model the decomposition of 106 as 10 tens 6 ones and as 9 tens 16 ones. Throughout the lesson, students relate their models to the vertical form step by step.



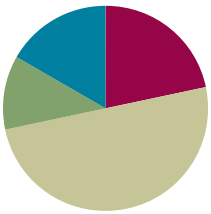
A Teaching Sequence Toward Mastery of Strategies for Decomposing Tens and Hundreds	
Objective 1:	**Use number bonds to break apart three-digit minuends and subtract from the hundred. (Lesson 23)**
Objective 2:	**Use manipulatives to represent subtraction with decompositions of 1 hundred as 10 tens and 1 ten as 10 ones. (Lesson 24)**
Objective 3:	**Relate manipulative representations to a written method. (Lesson 25)**
Objective 4:	**Use math drawings to represent subtraction with up to two decompositions and relate drawings to a written method. (Lesson 26)**
Objective 5:	**Subtract from 200 and from numbers with zeros in the tens place. (Lessons 27–28)**

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Lesson 23

Objective: Use number bonds to break apart three-digit minuends and subtract from the hundred.

Suggested Lesson Structure



Fluency Practice	(13 minutes)
Application Problem	(7 minutes)
Concept Development	(30 minutes)
Student Debrief	(10 minutes)
Total Time	**(60 minutes)**

Fluency Practice (13 minutes)

- Take from the Ten **2.OA.2** (2 minutes)
- Adding to 1 Hundred **2.NBT.7** (2 minutes)
- Sprint: Subtraction Patterns **2.NBT.5** (9 minutes)

Take from the Ten (2 minutes)

Note: Students practice subtracting from the ten as the foundation for subtracting from the hundred in the lesson.

T: 16 – 9. Take 9 from the ten or the ones?
S: Ten.
T: Say the number sentence.
S: 10 – 9 = 1.
T: Now add back the ones.
S: 1 + 6 = 7.
T: Say the complete number sentence for 16 – 9.
S: 16 – 9 = 7.

Continue with the following possible sequence: 15 – 7, 14 – 8, 13 – 6, 18 – 9, 12 – 7, and 16 – 7.

Adding to 1 Hundred (2 minutes)

Note: Students practice adding to 1 hundred in preparation for the lesson.

T: What is the number sentence for 10 more than 100?
S: 100 + 10 = 110.

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T: 25 more than 100.
S: 100 + 25 = 125.
T: 34 more than 100.
S: 100 + 34 = 134.

Continue with the following possible sequence: 42 more, 50 more, 67 more, 69 more, 70 more, 78 more, and 88 more.

Sprint: Subtraction Patterns (9 minutes)

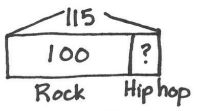
Materials: (S) Subtraction Patterns Sprint

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

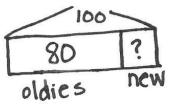
Application Problem (7 minutes)

Yossef downloaded 115 songs. 100 of them were rock songs. The rest were hip-hop songs.

a. How many of Yossef's songs were hip-hop?
b. 80 of his rock songs were oldies rock. How many rock songs were new?



115 −100→ 15
15 songs were hip-hop.



100 −80→ 20
20 rock songs were new.

This Application Problem serves to anticipate the day's Concept Development.

Concept Development (30 minutes)

Materials: (S) Personal white board

Problem 1: 107 – 90

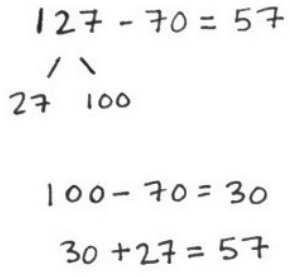
107 − 90 = 17
7 ⟋ ⟍ 100
100 − 90 = 10
10 + 7 = 17

T: (Write 107 – 90 on the board with number bond arms under 107. Pull out the hundred as shown to the right.) Can we break apart 107 by making 100 and some ones? Give me the number sentence.
S: 100 + 7 = 107.
T: Great! Now we can make an easier problem and subtract from the hundred.
T: What is 100 – 90? Turn and talk. MP.2
S: 90 plus 10 is 100, so the answer is 10. → 100 – 90 = 10. → 10 tens – 9 tens is 1 ten.
T: Yes, ten! Am I finished? Does 107 – 90 equal 10?
S: No. What about the 7?
T: You're right; I need to add back the 7 ones! What is 10 + 7?
S: 17.
T: Yes! 107 – 90 = 17.

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Problem 2: 127 – 70

T: Let's try another one together.
T: (Write 127 – 70 on the board.) Can you take out the 100?
S: Yes!
T: Show me how to break apart 127 into 100 and some more. (Wait as students complete the number bond.)
T: If you take out the 100, how many are left in 127?
S: 27.
T: Now we can subtract easily! What's 100 – 70?
S: 30.
T: Great! Now, look at your number bond and add back the rest. Show me your work. (Call on students to share.)
S: I know that 100 – 70 is 30. I added the 27 back on and I got 57. → 30 + 27 = 57.

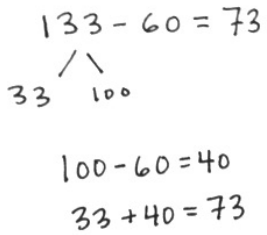


NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

Post a hundreds chart on the wall. Count down from 100 by tens at the start of the lesson. Ask, "What do you notice about the pattern of counting back?" Guide students to realize that the pattern of counting back from 100 by tens is the same as counting back from 10 by ones, with the only difference being place value.

Problem 3: 133 – 60

T: Let's try a harder one. (Write 133 – 60 on the board.) What should we do first?
MP.2 S: Break apart 133. → Take out the 100.
T: Show me.
S: (Decompose 133 on personal white board.)
T: (Call on students to share their number bonds.)
S: 133 is 100 + 33. → 133 – 33 = 100.
T: What next?
S: Subtract 60 from 100.
T: Yes! Subtract and show me.
S: (Subtract 100 – 60, and show their work as pictured to the right.)
T: How much is 100 – 60?
S: 40.
T: What next?
S: Put the parts together. → Add 40 + 33.
T: Yes! Put the parts together and show me.
S: (Add on their personal white boards and hold up their work.)
T: What is 133 – 60?
S: 73.



Repeat the above process for the following possible sequence: 128 – 70, 138 – 70, and 139 – 60. As you move through the problems, allow students more independence. For the first problem, ask them to set up the problem by decomposing 128 before they show you their boards. For the second problem, ask them to decompose 138 and subtract 70. For the last problem, allow students to complete the whole problem independently as you circulate to offer support. If needed, provide more practice before moving on to the Problem Set.

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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.

Student Debrief (10 minutes)

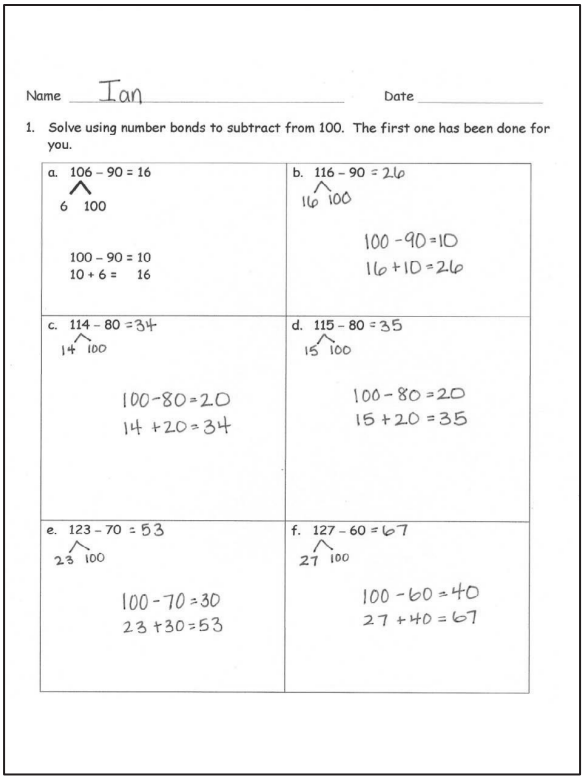
Lesson Objective: Use number bonds to break apart three-digit minuends and subtract from the hundred.

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, explain how you used a number bond to make the problem easier to solve. How did you show subtracting from the hundred?
- How did the number bond in Problem 1, Part (a) help you to solve Part (b)? What was different about your number bond for Part (b)? How did this affect the answer in comparison to Part (a)?
- What was the same and different about solving Problem 1, Parts (c) and (d)? How did you know that the answer to Part (d) would be one more than the answer to Part (c)?
- Explain to your partner how to solve Problem 1, Part (e) in three simple steps. Why does the third step involve addition when this is a subtraction problem?
- How are Problem 1, Parts (g) and (h) related? Why are their answers the same even though their number bonds are different?
- When is subtracting from the hundred a good mental strategy?



Name Ian Date

1. Solve using number bonds to subtract from 100. The first one has been done for you.

a. 106 − 90 = 16
6 100
100 − 90 = 10
10 + 6 = 16

b. 116 − 90 = 26
16 100
100 − 90 = 10
16 + 10 = 26

c. 114 − 80 = 34
14 100
100 − 80 = 20
14 + 20 = 34

d. 115 − 80 = 35
15 100
100 − 80 = 20
15 + 20 = 35

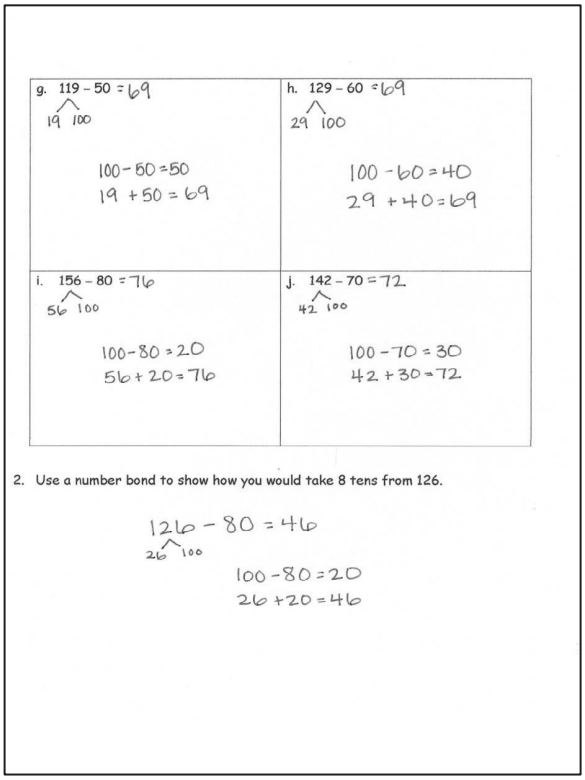
e. 123 − 70 = 53
23 100
100 − 70 = 30
23 + 30 = 53

f. 127 − 60 = 67
27 100
100 − 60 = 40
27 + 40 = 67

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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.



g. 119 − 50 = 69
19 100
100 − 50 = 50
19 + 50 = 69

h. 129 − 60 = 69
29 100
100 − 60 = 40
29 + 40 = 69

i. 156 − 80 = 76
56 100
100 − 80 = 20
56 + 20 = 76

j. 142 − 70 = 72
42 100
100 − 70 = 30
42 + 30 = 72

2. Use a number bond to show how you would take 8 tens from 126.

126 − 80 = 46
26 100
100 − 80 = 20
26 + 20 = 46

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A

Number Correct: _____

Subtraction Patterns

1.	10 – 1 =	
2.	10 – 2 =	
3.	20 – 2 =	
4.	40 – 2 =	
5.	10 – 2 =	
6.	11 – 2 =	
7.	21 – 2 =	
8.	51 – 2 =	
9.	10 – 3 =	
10.	11 – 3 =	
11.	21 – 3 =	
12.	61 – 3 =	
13.	10 – 4 =	
14.	11 – 4 =	
15.	21 – 4 =	
16.	71 – 4 =	
17.	10 – 5 =	
18.	11 – 5 =	
19.	21 – 5 =	
20.	81 – 5 =	
21.	10 – 6 =	
22.	11 – 6 =	
23.	21 – 6 =	
24.	91 – 6 =	
25.	10 – 7 =	
26.	11 – 7 =	
27.	31 – 7 =	
28.	10 – 8 =	
29.	11 – 8 =	
30.	41 – 8 =	
31.	10 – 9 =	
32.	11 – 9 =	
33.	51 – 9 =	
34.	12 – 3 =	
35.	82 – 3 =	
36.	13 – 5 =	
37.	73 – 5 =	
38.	14 – 6 =	
39.	84 – 6 =	
40.	15 – 8 =	
41.	95 – 8 =	
42.	16 – 7 =	
43.	46 – 7 =	
44.	68 – 9 =	

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B

Number Correct: _____

Improvement: _____

Subtraction Patterns

1.	10 – 2 =	
2.	20 – 2 =	
3.	30 – 2 =	
4.	50 – 2 =	
5.	10 – 2 =	
6.	11 – 2 =	
7.	21 – 2 =	
8.	61 – 2 =	
9.	10 – 3 =	
10.	11 – 3 =	
11.	21 – 3 =	
12.	71 – 3 =	
13.	10 – 4 =	
14.	11 – 4 =	
15.	21 – 4 =	
16.	81 – 4 =	
17.	10 – 5 =	
18.	11 – 5 =	
19.	21 – 5 =	
20.	91 – 5 =	
21.	10 – 6 =	
22.	11 – 6 =	

23.	21 – 6 =	
24.	41 – 6 =	
25.	10 – 7 =	
26.	11 – 7 =	
27.	51 – 7 =	
28.	10 – 8 =	
29.	11 – 8 =	
30.	61 – 8 =	
31.	10 – 9 =	
32.	11 – 9 =	
33.	31 – 9 =	
34.	12 – 3 =	
35.	92 – 3 =	
36.	13 – 5 =	
37.	43 – 5 =	
38.	14 – 6 =	
39.	64 – 6 =	
40.	15 – 8 =	
41.	85 – 8 =	
42.	16 – 7 =	
43.	76 – 7 =	
44.	58 – 9 =	

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Name _____ Date _____

1. Solve using number bonds to subtract from 100. The first one has been done for you.

a. 106 – 90 = 16 6 100 100 – 90 = 10 10 + 6 = 16	b. 116 – 90
c. 114 – 80	d. 115 – 80
e. 123 – 70	f. 127 – 60

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g. 119 – 50	h. 129 – 60
i. 156 – 80	j. 142 – 70

2. Use a number bond to show how you would take 8 tens from 126.

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Name _____ Date _____

Solve using number bonds to subtract from 100.

1. 114 – 50

2. 176 – 90

3. 134 – 40

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Name _____ Date _____

1. Solve using number bonds to subtract from 100. The first one has been done for you.

a. 105 – 90 = 15  100 5 100 – 90 = 10 10 + 5 = 15	b. 121 – 90
c. 112 – 80	d. 135 – 70
e. 136 – 60	f. 129 – 50

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g. 156 – 80	h. 138 – 40

2. Monica incorrectly solved 132 – 70 to get 102. Show her how to solve it correctly.

Monica's work:	Correct way to solve 132 – 70:
132 - 70 = _____ 100 32 100 - 30 = 70 70 + 32 = 102	

3. Billy sold 50 fewer magazines than Alex. Alex sold 128 magazines. How many magazines did Billy sell? Solve using a number bond.

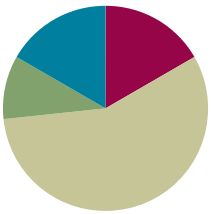
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Lesson 24

Objective: Use manipulatives to represent subtraction with decompositions of 1 hundred as 10 tens and 1 ten as 10 ones.

Suggested Lesson Structure

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



Fluency Practice (10 minutes)

- Subtraction Fact Flash Cards **2.OA.2** (3 minutes)
- Adding to 1 Hundred **2.NBT.5** (3 minutes)
- Take from a Ten or from the Ones **2.NBT.5** (4 minutes)

Subtraction Fact Flash Cards (3 minutes)

Materials: (T) Subtraction fact flash cards set 1 (Fluency Template)

Note: By practicing subtraction facts, students gain fluency subtracting within 20.

Adding to 1 Hundred (3 minutes)

Note: Students practice adding to 1 hundred in preparation for the lesson.

T: What is the number sentence for 15 more than 100?
S: 100 + 15 = 115.
T: 30 more than 100…?
S: 100 + 30 = 130.
T: 41 more than 100…?
S: 100 + 41 = 141.

Continue with the following possible sequence: 45 more, 60 more, 62 more, 68 more, 80 more, 84 more, and 89 more.

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Take from a Ten or from the Ones (4 minutes)

Note: This fluency activity helps students know when to unbundle a ten to subtract. This is a foundational skill for the lesson.

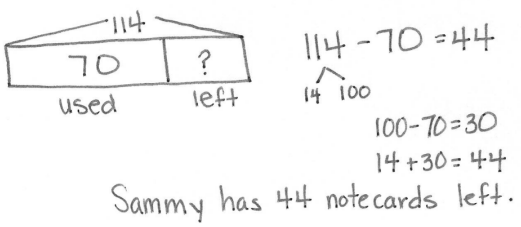
T: For every number sentence I say, you tell me if I take from a ten or the ones. When I say 46 – 5, you say take from the ones, but if I say 46 – 7, you say take from a ten. Ready?
T: 46 – 6.
S: Take from the ones.
T: 46 – 9.
S: Take from a ten.

Continue with the following possible sequence: 56 – 5, 52 – 4, 63 – 6, 67 – 5, 65 – 4, 68 – 8, and 70 – 3.

Application Problem (6 minutes)

Sammy bought 114 notecards. He used 70 of them. How many unused notecards did he have left?

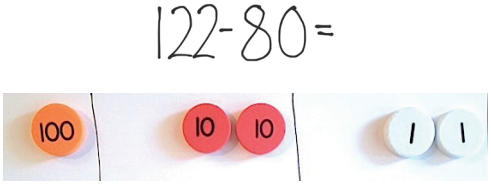
Note: This Application Problem provides practice in taking from the hundred, as taught in Lesson 23. To encourage flexible thinking, you might invite some students to count up using the arrow way and invite others to solve by subtracting from the hundred. This serves as a bridge to today's Concept Development in which students use place value disks to decompose a hundred and a ten to subtract.



Concept Development (34 minutes)

Materials (T) Place value disks (1 hundreds, 18 tens, 18 ones) (S) Place value disks (1 hundreds, 18 tens, 18 ones), unlabeled hundreds place value chart (Lesson 18 Template), personal white board, place value disks (Lesson 6 Template)

Problem 1: 122 – 80



T: (Write 122 – 80 on the board.) Let's read the problem together.
T: Yesterday, we used number bonds to subtract from the hundred. Today, we are going to use place value disks to unbundle the hundred before subtracting. What should I do first? MP.4
S: Count out your place value disks.
T: What number should I model?
S: 122.
T: Turn and talk. Why do I only need to model 122 and not 80?

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S: Because when we subtract, we only show the whole. → 122 is the whole and 80 is a part. We take away the part.

T: (Count to 122 using place value disks, and arrange them on the place value chart as shown on the previous page.) Can I subtract 0 ones from 2 ones?

S: Yes!

T: We are ready to subtract in the ones place.

T: Let's move on to the tens. Can I subtract 8 tens from 2 tens?

S: No!

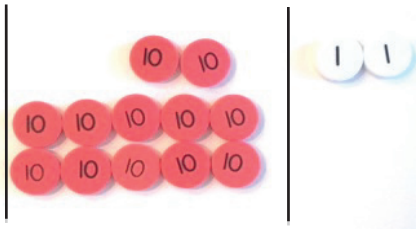
T: I need more tens. What should I do? Turn and talk.

S: A hundred has 10 tens in it. → Decompose 100. → Take 100 apart and break it into 10 tens.

T: That's right! Just as we can unbundle a ten for 10 ones, we can also unbundle a hundred for 10 tens.

MP.4

T: Watch what I do with my place value disks to unbundle a hundred. (Remove a hundreds disk from the place value chart, counting 10 tens, and arrange them in 5-groups in the tens place.)



T: Say the number in tens and ones.

S: 12 tens 2 ones.

T: Can I subtract 8 tens from 12 tens?

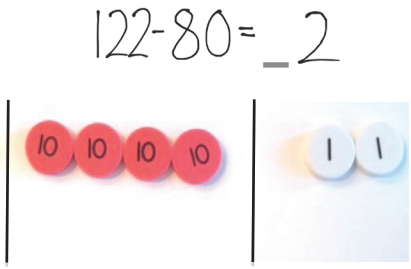
S: Yes!

T: Great! Now we are ready to subtract in both the ones and the tens places.

T: 2 ones minus 0 ones is how many?

S: 2 ones.

T: (Write 2 on the board as shown to the right.) 12 tens minus 8 tens is how many? (Remove 8 tens disks from the place value chart.)



S: 4 tens.

T: What is 122 – 80 the Say Ten way?

S: 4 tens 2.

T: The regular way?

S: 42.



NOTES ON MULTIPLE MEANS OF REPRESENTATION:

For students unclear about the part–whole relationship in subtraction, draw a number bond for the problem. Instruct them to draw a number bond for the problem when they are unable to determine how to solve.

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Problem 2: 174 – 56

T: This time, work with me. What I do, you do. (Write 174 – 56 on the board.) What number should I show on my place value chart now?

S: 174.

T: Show me 174 with your disks. (Give students time to do so.) What number is in the ones place?



S: 4.

T: How many ones do we need to subtract?

S: 6.

T: Can we subtract 6 from 4?

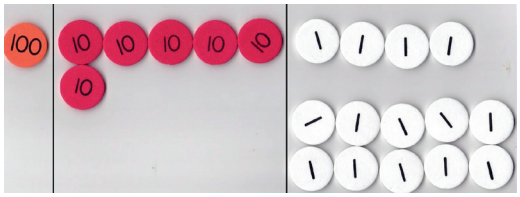
S: No!

T: So what do we do?

S: Decompose a ten. → Change a ten for 10 ones.

T: Let's do it together.

T: (Show taking a tens disk off the chart, counting out 10 ones, and arranging them on the place value chart as shown to the right. Students do the same.) How many ones do we have now?



S: 14 ones.

MP.4

T: Can we subtract 6 ones from 14 ones?

S: Yes!

T: What about the tens place? How many tens do we have left?

S: 6 tens.

T: Do we have enough tens to take 5 tens away?

S: Yes!

T: I think we are ready to subtract.

T: (Remove 6 ones and record the answer. Then, remove 5 tens and record the answer.)

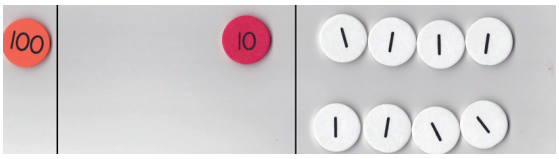
T: I see we have 1 hundred. How many hundreds are we taking away?

S: None.

T: So, how many hundreds do we have left?

S: 1 hundred.

T: (Record this on the board.) What is 174 – 56?



S: 118.

T: How many hundreds in 118?

S: 1 hundred.

T: How many tens are in a hundred?

S: 10 tens.

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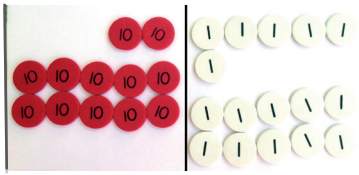
T: How many is 10 tens plus 1 ten?
S: 11 tens.
T: So, how many tens in 118?
S: 11 tens.
T: How many ones in the ones place in 118?
S: 8 ones.
T: What is 174 – 56 the Say Ten way?
S: 11 ten 8.
T: The regular way?
S: 118.

Problem 3: 136 – 57

T: Let's try another problem. Again, what I do, you do. (Write 136 – 57 on the board.) What should we do first?
S: Set up the problem with place value disks by counting out 1 hundred, 3 tens, and 6 ones.
T: (Allow time to do so.) Can we subtract 7 ones from 6 ones?
S: No!
MP.4
T: What should we do?
S: Unbundle a ten.
T: Do this with me. (Model taking a tens disk off the chart, counting out 10 ones, and arranging them on the place value chart as shown to the right.) How many ones do we have now?







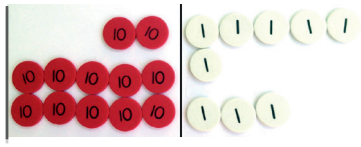
S: 16 ones.
T: Can we subtract 7 ones from 16 ones?
S: Yes!
T: We are ready to subtract in the ones place. Let's move on to the tens. Can we subtract 5 tens from 2 tens?
S: No!
T: What should we do?
S: Unbundle the hundred. → Take a hundred and rename it as 10 tens. → Change 1 hundred for 10 tens.
T: (Remove the hundred from the place value chart, counting out 10 tens, and arranging them in 5-groups on the place value chart as students do the same.) How many tens do we have?
S: 12 tens.

NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

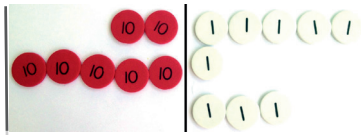
Provide straws or similar manipulatives for students to practice literally unbundling if they are unable to grasp the concept with the place value disks.

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T: How many hundreds?
S: Zero. → None.
T: Can I subtract 5 tens from 12 tens?
S: Yes, we are ready to subtract.
T: (Remove 7 ones and record the answer. Then, remove 5 tens and record the answer.) What is 136 – 57 the Say Ten way?



S: 7 ten 9.
T: The regular way?
S: 79.
T: Now, it's your turn.



MP.4

Depending on students' proficiency levels, you may choose to walk them through another two or three problems. Otherwise, instruct them to complete the following suggested problems, 146 – 67, 137 – 58, and 112 – 34. Allow them to move on to the Problem Set as they show proficiency.

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.

Student Debrief (10 minutes)

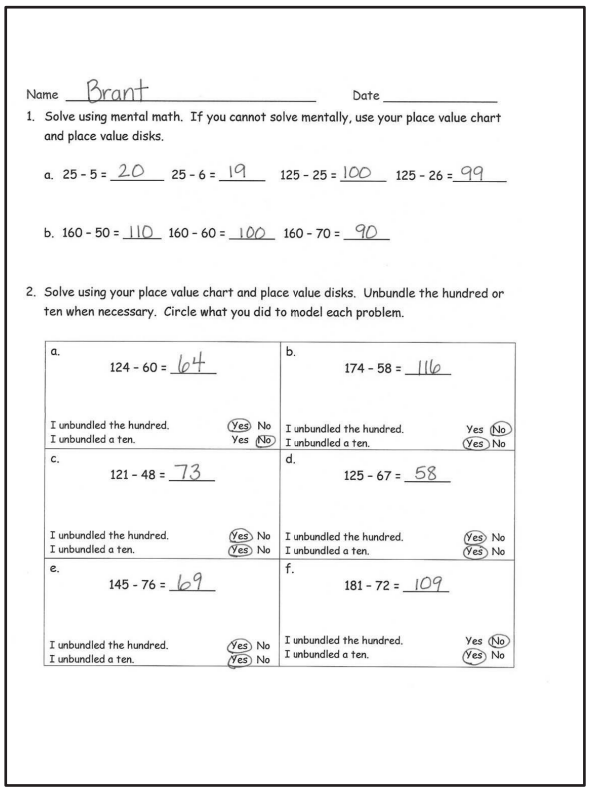
Lesson Objective: Use manipulatives to represent subtraction with decompositions of 1 hundred as 10 tens and 1 ten and 10 ones.

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.

- Tell your partner how you solved the problems in Problem 1 mentally.
- How did the sequence in Problem 1, Part (a) help you to solve 125 – 26 mentally?



Name Brant Date

1. Solve using mental math. If you cannot solve mentally, use your place value chart and place value disks.

a. 25 - 5 = 20 25 - 6 = 19 125 - 25 = 100 125 - 26 = 99

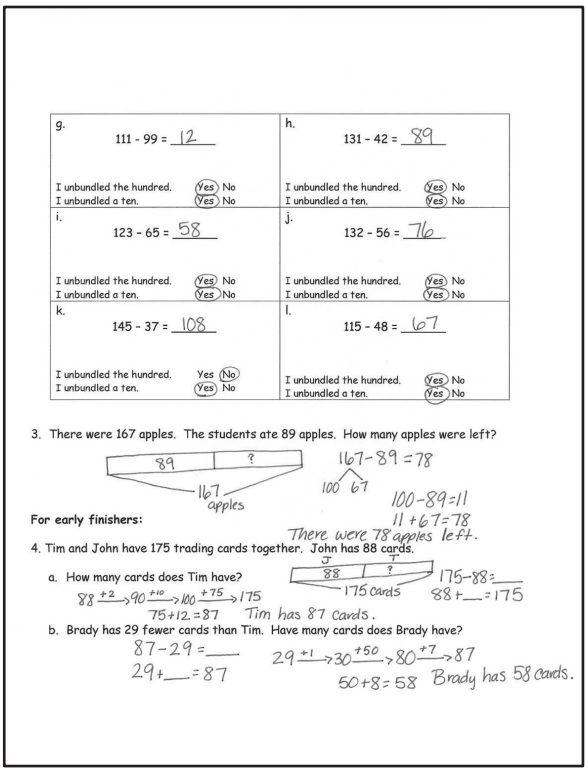
b. 160 - 50 = 110 160 - 60 = 100 160 - 70 = 90

2. Solve using your place value chart and place value disks. Unbundle the hundred or ten when necessary. Circle what you did to model each problem.

a. 124 - 60 = 64 I unbundled the hundred. (Yes) No I unbundled a ten. Yes (No)	b. 174 - 58 = 116 I unbundled the hundred. Yes (No) I unbundled a ten. (Yes) No
c. 121 - 48 = 73 I unbundled the hundred. (Yes) No I unbundled a ten. (Yes) No	d. 125 - 67 = 58 I unbundled the hundred. (Yes) No I unbundled a ten. (Yes) No
e. 145 - 76 = 69 I unbundled the hundred. (Yes) No I unbundled a ten. (Yes) No	f. 181 - 72 = 109 I unbundled the hundred. Yes (No) I unbundled a ten. (Yes) No

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- Charlie showed how he solved Problem 2, Part (b), 174 – 58. (Represent problem with place value disks.) Since there were not enough ones to subtract, he decomposed a hundred. He explained that since you can remove 5 tens disks, you decompose the hundred. Charlie's answer was 26. How was Charlie's reasoning incorrect? What does he need to learn?
- For Problem 2, Part (g), did you decompose a hundred or a ten? Why or why not? Could anyone solve this in a different way? What simplifying strategy could you use to solve?
- Explain how you know when to unbundle a hundred or a ten. What is the same about changing these larger units for smaller units? What is different?



g. 111 - 99 = 12
I unbundled the hundred. (Yes) No
I unbundled a ten. (Yes) No

h. 131 - 42 = 89
I unbundled the hundred. (Yes) No
I unbundled a ten. (Yes) No

i. 123 - 65 = 58
I unbundled the hundred. (Yes) No
I unbundled a ten. (Yes) No

j. 132 - 56 = 76
I unbundled the hundred. (Yes) No
I unbundled a ten. (Yes) No

k. 145 - 37 = 108
I unbundled the hundred. Yes (No)
I unbundled a ten. (Yes) No

l. 115 - 48 = 67
I unbundled the hundred. (Yes) No
I unbundled a ten. (Yes) No

3. There were 167 apples. The students ate 89 apples. How many apples were left?

89 ? 167 apples

167 - 89 = 78
100 67
100 - 89 = 11
11 + 67 = 78
There were 78 apples left.

For early finishers:

4. Tim and John have 175 trading cards together. John has 88 cards.

a. How many cards does Tim have?

J 88 T ? 175 cards

175 - 88 = ___
88 + ___ = 175
88 +2→ 90 +10→ 100 +75→ 175
75 + 12 = 87
Tim has 87 cards.

b. Brady has 29 fewer cards than Tim. Have many cards does Brady have?

87 - 29 = ___
29 + ___ = 87
29 +1→ 30 +50→ 80 +7→ 87
50 + 8 = 58
Brady has 58 cards.

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.

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Name _____ Date _____

1. Solve using mental math. If you cannot solve mentally, use your place value chart and place value disks.

   a. 25 – 5 = _____ 25 – 6 = _____ 125 – 25 = _____ 125 – 26 = _____

   b. 160 – 50 = _____ 160 – 60 = _____ 160 – 70 = _____

2. Solve using your place value chart and place value disks. Unbundle the hundred or ten when necessary. Circle what you did to model each problem.

a. 124 – 60 = _____ I unbundled the hundred. Yes No I unbundled a ten. Yes No	b. 174 – 58 = _____ I unbundled the hundred. Yes No I unbundled a ten. Yes No
c. 121 – 48 = _____ I unbundled the hundred. Yes No I unbundled a ten. Yes No	d. 125 – 67 = _____ I unbundled the hundred. Yes No I unbundled a ten. Yes No
e. 145 – 76 = _____ I unbundled the hundred. Yes No I unbundled a ten. Yes No	f. 181 – 72 = _____ I unbundled the hundred. Yes No I unbundled a ten. Yes No

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g. 111 – 99 = _____ I unbundled the hundred. Yes No I unbundled a ten. Yes No	h. 131 – 42 = _____ I unbundled the hundred. Yes No I unbundled a ten. Yes No
i. 123 – 65 = _____ I unbundled the hundred. Yes No I unbundled a ten. Yes No	j. 132 – 56 = _____ I unbundled the hundred. Yes No I unbundled a ten. Yes No
k. 145 – 37 = _____ I unbundled the hundred. Yes No I unbundled a ten. Yes No	l. 115 – 48 = _____ I unbundled the hundred. Yes No I unbundled a ten. Yes No

3. There were 167 apples. The students ate 89 apples. How many apples were left?

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For early finishers:

4. Tim and John have 175 trading cards together. John has 88 cards.

   a. How many cards does Tim have?

   b. Brady has 29 fewer cards than Tim. Have many cards does Brady have?

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Name _____ Date _____

Solve using your place value chart and place value disks. Change 1 hundred for 10 tens and change 1 ten for 10 ones when necessary. Circle what you need to do to model each problem.

1. 157 – 74 = _____	2. 124 – 46 = _____
I unbundled the hundred. Yes No	I unbundled the hundred. Yes No
I unbundled a ten. Yes No	I unbundled a ten. Yes No

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Name _____ Date _____

1. Solve using mental math. If you cannot solve mentally, use your place value chart and place value disks.

   a. 38 – 8 = _____ 38 – 9 = _____ 138 – 38 = _____ 138 – 39 = _____

   b. 130 – 20 = _____ 130 – 30 = _____ 130 – 40 = _____

2. Solve using your place value chart and place value disks. Unbundle the hundred or ten when necessary. Circle what you did to model each problem.

a. 115 – 50 = _____ I unbundled the hundred. Yes No I unbundled a ten. Yes No	b. 125 – 57 = _____ I unbundled the hundred. Yes No I unbundled a ten. Yes No
c. 88 – 39 = _____ I unbundled the hundred. Yes No I unbundled a ten. Yes No	d. 186 – 39 = _____ I unbundled the hundred. Yes No I unbundled a ten. Yes No
e. 162 – 85 = _____ I unbundled the hundred. Yes No I unbundled a ten. Yes No	f. 172 – 76 = _____ I unbundled the hundred. Yes No I unbundled a ten. Yes No

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g. 121 – 89 = _____ I unbundled the hundred. Yes No I unbundled a ten. Yes No	h. 131 – 98 = _____ I unbundled the hundred. Yes No I unbundled a ten. Yes No
i. 140 – 65 = _____ I unbundled the hundred. Yes No I unbundled a ten. Yes No	j. 150 – 56 = _____ I unbundled the hundred. Yes No I unbundled a ten. Yes No
k. 163 – 78 = _____ I unbundled the hundred. Yes No I unbundled a ten. Yes No	l. 136 – 87 = _____ I unbundled the hundred. Yes No I unbundled a ten. Yes No

3. 96 crayons in the basket are broken. The basket has 182 crayons. How many crayons are not broken?

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9 - 2	10 - 2
11 - 2	12 - 2
13 - 2	14 - 2
15 - 2	16 - 2

subtraction fact flash cards set 1

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17 - 2	18 - 2
19 - 2	20 - 2
9 - 3	10 - 3
11 - 3	12 - 3

subtraction fact flash cards set 1

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13 - 3	14 - 3
15 - 3	16 - 3
17 - 3	18 - 3
19 - 3	20 - 3

subtraction fact flash cards set 1

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9 - 4	10 - 4
11 - 4	12 - 4
13 - 4	14 - 4
15 - 4	16 - 4

subtraction fact flash cards set 1

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17 - 4	18 - 4
19 - 4	20 - 4
9 - 5	10 - 5
11 - 5	12 - 5

subtraction fact flash cards set 1

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13 - 5	14 - 5
15 - 5	16 - 5
17 - 5	18 - 5
19 - 5	20 - 5

subtraction fact flash cards set 1

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9 - 6	10 - 6
11 - 6	12 - 6
13 - 6	14 - 6
15 - 6	16 - 6

subtraction fact flash cards set 1

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17 - 6	18 - 6
19 - 6	20 - 6
9 - 7	10 - 7
11 - 7	12 - 7

subtraction fact flash cards set 1

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13 - 7	14 - 7
15 - 7	16 - 7
17 - 7	18 - 7
19 - 7	20 - 7

subtraction fact flash cards set 1

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9 - 8	10 - 8
11 - 8	12 - 8
13 - 8	14 - 8
15 - 8	16 - 8

subtraction fact flash cards set 1

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17 - 8	18 - 8
19 - 8	20 - 8
9 - 9	10 - 9
11 - 9	12 - 9

subtraction fact flash cards set 1

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13 - 9	14 - 9
15 - 9	16 - 9
17 - 9	18 - 9
19 - 9	20 - 9

subtraction fact flash cards set 1

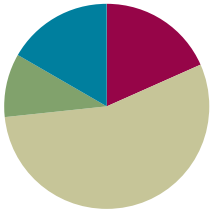
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Lesson 25

Objective: Relate manipulative representations to a written method.

Suggested Lesson Structure

Fluency Practice	(11 minutes)
Application Problem	(6 minutes)
Concept Development	(33 minutes)
Student Debrief	(10 minutes)
Total Time	**(60 minutes)**



Fluency Practice (11 minutes)

- Subtraction Fact Flash Cards **2.OA.2** (3 minutes)
- Zap to Zero **2.NBT.5** (3 minutes)
- Rename the Units: Choral Response **2.NBT.1** (5 minutes)

Subtraction Fact Flash Cards (3 minutes)

Materials: (T) Subtraction fact flash cards set 1 (Lesson 24 Fluency Template)

Note: By practicing subtraction facts, students gain fluency subtracting within 20.

Zap to Zero (3 minutes)

Note: Practice using place value concepts to mentally subtract helps lay a foundation for this lesson's content.

T: (Write 184.) If I say zap the digit 8 to zero, you say subtract 80. Ready?
T: Zap the digit 8 to zero.
S: Subtract 80.
T: What is the number sentence?
S: 184 – 80 = 104.
T: Start again with 184. Zap the digit 1 to zero.
S: Subtract 100.
T: What is the number sentence?
S: 184 – 100 = 84.

Continue with the following possible sequence: 173 and 256.

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Rename the Units: Choral Response (5 minutes)

Note: This fluency activity reviews foundations that lead into today's lesson.

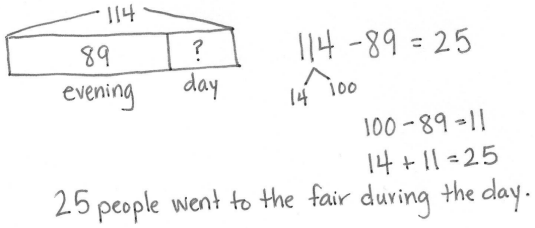
T: (Write 30 ones = _____ tens.) Say the number sentence.
S: 30 ones = 3 tens.
T: (Write 20 ones = 1 ten _____ ones.) Say the number sentence.
S: 20 ones = 1 ten 10 ones.
T: (Write 24 ones = 1 ten _____ ones.) Say the number sentence.
S: 24 ones = 1 ten 14 ones.

Continue with the following possible sequence: 27, 30, 32, 38, 40, 41, 46, 50, 63, and 88.

Application Problem (6 minutes)

114 people went to the fair. 89 of them went in the evening. How many went during the day?

Note: Allow students to choose the strategy to solve the Application Problem. Students may decompose 100, use the arrow way, or use place value disks.



Concept Development (33 minutes)

Materials: (T) Place value disks, unlabeled hundreds place value chart (Lesson 18 Template) (S) Personal white boards, place value disks, unlabeled hundreds place value chart (Lesson 18 Template), place value disks (Lesson 6 Template)

Note: It may be better to have one student use the place value disks and one student use the written method, and then switch.

Problem 1: 175 – 56

T: Today, let's use place value disks to help us solve problems in vertical form when the numbers are larger. (Write 175 – 56 in vertical form on the board.) What should I do first?
S: Get ready to subtract!
T: (Draw the magnifying glass as shown on the next page.) What next?
S: Count out your place value disks.

NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

Some students may need scaffolding with three-digit minuend problems that only require one unbundling step in the tens. Once they have demonstrated proficiency with these problems, introduce unbundling only the hundreds. Finally, introduce problems with unbundling in both the hundreds and the tens.

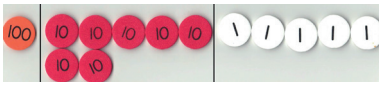
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T: (Model counting 1 hundred, 7 tens, and 5 ones as you place them on your place value chart.) Why do we only show 1 hundred, 7 tens, and 5 ones? Turn and talk.

S: Because when you subtract, you only show the whole. → We will subtract from 175.
→ We are subtracting one part, and the amount that is left is the other part.

T: Okay, what next?

S: Look at the ones column.
→ See if you have enough ones to subtract.





T: Can we subtract 6 ones from 5 ones?

S: No!

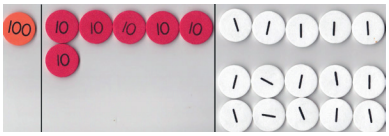
T: Turn and talk. What can we do to find some more ones?

S: We have to unbundle a ten. → We have to change a ten for 10 ones.

T: Why don't we get more ones from the hundred? Turn and talk.

S: Because 100 would give us 10 tens, not 10 ones. → A hundred changes into 100 ones. That's too many. → We go one place to the left, not two places.

T: (Remove a tens disk from the place value chart, counting out 10 ones and arranging them in 5-groups as shown to the right.) How do we represent our model in the vertical form?





S: Cross out the 7 and make it a 6. Change the 5 to 15.
→ Change the 7 tens to 6 tens and the 5 ones to 15 ones.

T: (Change the tens to 6 tens and change the ones to 15 ones.) Now, can we subtract 5 tens from 6 tens?

S: Yes!

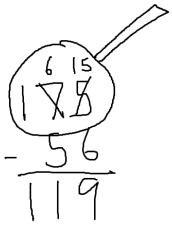
T: Are we ready to subtract using the vertical form?



S: Yes!

T: What is 15 ones minus 6 ones?

S: 9 ones.



T: (Remove 6 ones disks from the place value chart, and record the work on the problem.) Whatever we do to our place value disks, we must also do to the numbers. What next?

S: Subtract the tens.

T: What is 6 tens minus 5 tens?

S: 1 ten.

T: (Remove 5 tens disk from the place value chart, and record the work in the vertical form.)

T: What is 1 hundred minus zero hundreds?

S: 1 hundred.

T: 175 – 56 is…?

S: 119.

T: The Say Ten way?

S: 11 tens 9.

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Problem 2: 115 – 56

T: This time, solve with me. What I do, you do. (Write 115 – 56 on the board.) Count out your place value disks with me.

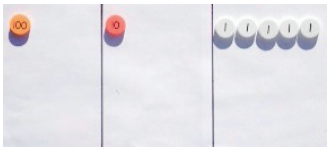
S: 1 hundred, 1 ten, 5 ones.

T: (Arrange the place value disks on the place value chart and instruct students to do the same.) What should we always do first?

S: Get ready to subtract!

T: Turn and talk. How should we set up the problem for subtraction?

S: You can't take 6 ones from 5 ones, so you have to unbundle a ten. → Check to make sure we can subtract in each place. → Change the whole to 10 tens, 15 ones. → Ask yourself if you have enough ones and tens to subtract.

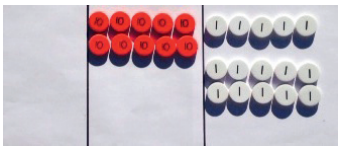




T: Can we subtract in the ones place?

S: No! We need to unbundle a ten.

T: Show me on your place value charts. (Remove a tens disk from the place value chart, and add 10 ones disks as students do the same.) What we do with the disks we must also do in the vertical form. Show me on the problem. (Cross out the 1, and write a 0 above it. Cross out the 5, and write a 15 above it. Students do the same.)





MP.2

T: Can we subtract 5 tens from 0 tens?

S: No way! We must unbundle a hundred. → We have to change 1 hundred for 10 tens.

T: Show me on your place value charts and using the algorithm. (Remove a hundreds disk from the place value chart and add 10 tens. Record the change in the vertical form as students do the same.)

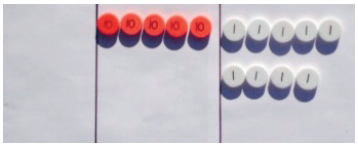
T: Are we ready to subtract?

S: Yes!

T: What is 15 ones minus 6 ones?

S: 9 ones.

T: (Record the answer on the problem as students do the same.) What is 10 tens minus 5 tens?





S: 5 tens.

T: (Record the answer on the problem as students do the same.) What is 0 hundreds minus 0?

S: 0.

T: Read the problem and answer using the Say Ten way.

S: 10 tens 15 ones minus 5 tens 6 ones equals 5 tens 9 ones.

NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

Challenge students performing above grade level to find three different ways to solve 111 – 99. Have them illustrate their work, journal their thinking, and then present the results to the class.

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T: Now the regular way.

S: 115 minus 56 equals 59.

MP.2

Continue with the following possible sequence: 165 – 74, 156 – 78, and 112 – 89. Guide the students towards proficiency by encouraging them to work more independently on each problem. 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.

Student Debrief (10 minutes)

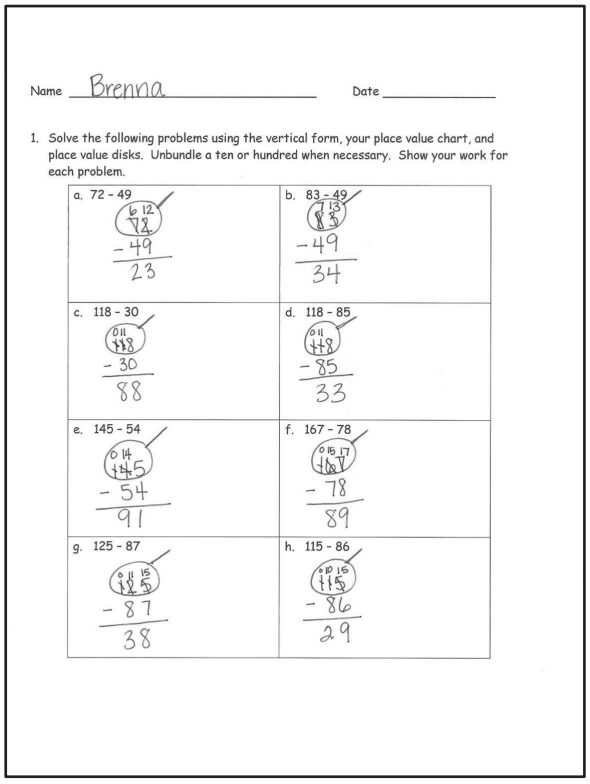
Lesson Objective: Relate manipulative representations to a written method.

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.

- In Problem 1, which problems could you have solved mentally?
- How did you solve Problem 1, Part (e), 145 – 54? How did you show this on your place value chart? How did you show this with your numbers?
- Explain to your partner how you used place value disks to solve Problem 1, Part (f), 167 – 78. How did your place value chart match the vertical form?
- In Problem 2, what part did Mrs. Tosh have left? Did anyone write an equation to find the missing addend (or part) and solve by using a simplifying strategy? How does subtraction connect to our understanding that two parts make a whole?



Name Brenna Date

1. Solve the following problems using the vertical form, your place value chart, and place value disks. Unbundle a ten or hundred when necessary. Show your work for each problem.

a. 72 - 49 = 23

b. 83 - 49 = 34

c. 118 - 30 = 88

d. 118 - 85 = 33

e. 145 - 54 = 91

f. 167 - 78 = 89

g. 125 - 87 = 38

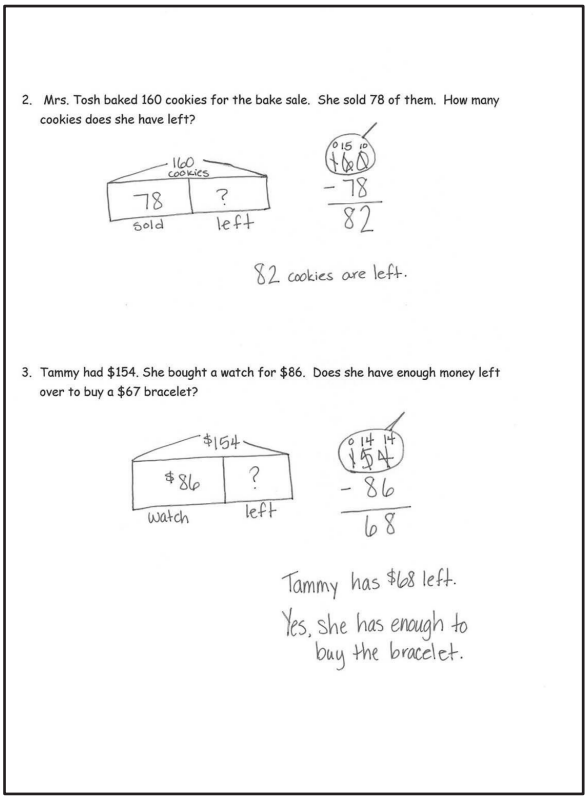
h. 115 - 86 = 29

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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.



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Name _____ Date _____

1. Solve the following problems using the vertical form, your place value chart, and place value disks. Unbundle a ten or hundred when necessary. Show your work for each problem.

a. 72 – 49	b. 83 – 49
c. 118 – 30	d. 118 – 85
e. 145 – 54	f. 167 – 78
g. 125 – 87	h. 115 – 86

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2. Mrs. Tosh baked 160 cookies for the bake sale. She sold 78 of them. How many cookies does she have left?

3. Tammy had $154. She bought a watch for $86. Does she have enough money left over to buy a $67 bracelet?

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Name _____ Date _____

Solve the following problems using the vertical form, your place value chart, and place value disks. Unbundle a ten or hundred when necessary. Show your work for each problem.

1. 97 – 69

2. 121 – 65

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Name _____ Date _____

1. Solve the following problems using the vertical form, your place value chart, and place value disks. Unbundle a ten or hundred when necessary. Show your work for each problem.

a. 65 – 38	b. 66 – 49
c. 111 – 60	d. 120 – 67
e. 163 – 66	f. 184 – 95
g. 114 – 98	h. 154 – 85

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2. Dominic has $167. He has $88 more than Mario. How much money does Mario have?

3. Which problem will have the same answer as 133 – 77? Show your work.

   a. 155 – 66

   b. 144 – 88

   c. 177 – 33

   d. 139 – 97

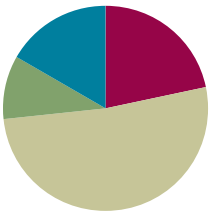
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Lesson 26

Objective: Use math drawings to represent subtraction with up to two decompositions and relate drawings to a written method.

Suggested Lesson Structure

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



Fluency Practice (13 minutes)

- Subtraction Fact Flash Cards **2.OA.2** (2 minutes)
- Subtraction from Tens **2.NBT.5** (3 minutes)
- Sprint: Subtraction Patterns **2.NBT.5** (8 minutes)

Subtraction Fact Flash Cards (2 minutes)

Materials: (T) Subtraction fact flash cards set 1 (Lesson 24 Fluency Template)

Note: By practicing subtraction facts, students gain fluency subtracting within 20.

Subtraction from Tens (3 minutes)

Materials: (S) Personal white board

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

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

S: 30 – 5 = 25, 40 – 5 = 35, 50 – 5 = 45.

T: Yes, as high as you can before I give the signal to stop. Let's begin. 10 – 5.

S: (Work.)

T: (Stop everyone when you see that all students have solved at least two problems.)

Continue with the following possible sequence: 10 – 8 and 11 – 2.

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Sprint: Subtraction Patterns (8 minutes)

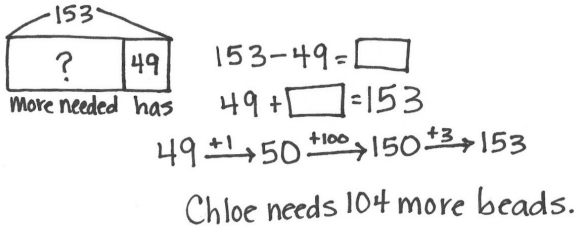
Materials: (S) Subtraction Patterns Sprint

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

Application Problem (6 minutes)

Chloe needs 153 beads to make a bag. She only has 49. How many more beads does she need?

Note: This Application Problem serves as practice of Lesson 25's Concept Development.



Concept Development (31 minutes)

Materials: (S) Personal white board

Problem 1: 172 – 56

T: (Write 172 – 56 in vertical form on the board.) Turn and talk. Use place value language to tell your partner how you could show this problem with a chip model.

S: Draw 1 chip in the hundreds, 7 chips in the tens, and 2 chips in the ones. → I know that you only show the whole, so I would show 1 hundred, 7 tens, and 2 ones by drawing chips in the correct columns on my chart.

T: (Create a chip model to solve 172 – 56. Remind students that when subtracting, we only draw the whole.) Let's record our work in writing as we solve. When we are subtracting, what should we always do first?

MP.6

S: Set up the problem for subtraction. → Make sure we have enough ones and tens to solve. → Get ready to subtract.

T: Yes. Let's draw our magnifying glass to help us do that.

T: Can we subtract 6 ones from 2 ones?

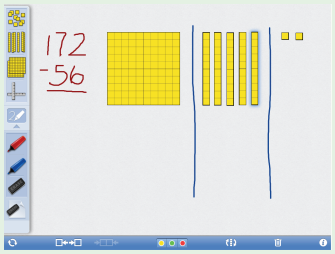
S: No! We need to unbundle a ten.

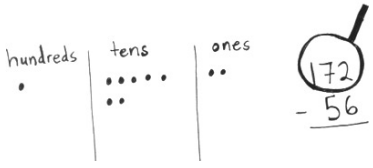
T: Could I get the ones I need from the hundred?

S: No, just tens. → Yes, you can. Hey, can we unbundle the hundred instead? → Do you want 100 chips? That's not easy. Let's just change 1 ten for 10 ones.

NOTES ON MULTIPLE MEANS OF REPRESENTATION:

Engage struggling students with technology. If you have access to iPads or other tablets, use an app such as Number Pieces™, owned and provided by The Math Learning Center, to represent the problem with manipulatives that can be unbundled.





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T: Yes, changing 1 ten for 10 ones is a lot simpler; though, I like that you realize there are ones inside the hundred, too.

T: (Cross out a chip in the tens place, adding 10 chips to the ones place. Record the change on the problem.)

T: Can we subtract 5 tens from 6 tens?

S: Yes!

T: Are we ready to subtract?

S: Yes!

T: What is 12 ones minus 6 ones? (Cross out 6 chips in the ones column on the chip model.)

S: 6 ones.

T: (Record the ones on the problem.) What is 6 tens minus 5 tens? (Cross out 5 chips in the tens place on the chip model.)

S: 1 ten.

T: (Record the tens on the problem.) What is 1 hundred minus 0 hundreds?

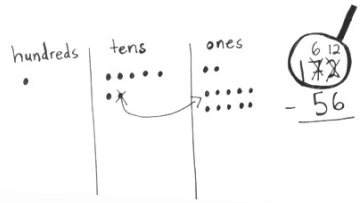
S: 1 hundred.

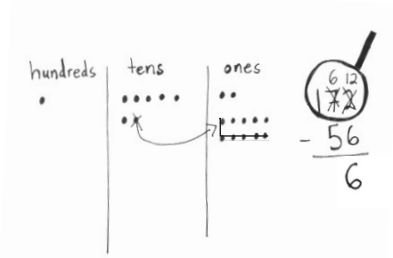
T: Read the answer the Say Ten way.

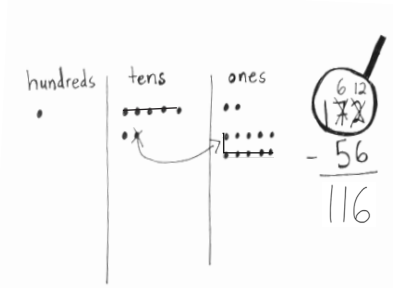
S: 11 tens 6.

MP.6 T: The regular way?

S: One hundred sixteen.







Problem 2: 137 – 45

T: This time, you do what I do. (Write 137 – 45 on the board in vertical form as students do the same on their personal white boards. Ask students to leave space on the left for a place value chart. Draw a chip model to represent 137 – 45 as students do the same.) What should we do first with our written numbers?

S: Set up the problem for subtraction. → Make sure we have enough ones and tens to subtract.

T: Can we subtract 5 ones from 7 ones?

S: Yes!

T: Are we ready to subtract in the ones?

S: Yes!

T: Can we subtract 4 tens from 3 tens?

S: No! Unbundle the hundred.

T: (Cross out the chip in the hundreds place, adding 10 chips to the tens place. Record the change on the problem. Instruct students to do the same.) Are we ready to subtract in the tens?

S: Yes!

NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

Some students may be able to go directly from the previous lesson with concrete models to the vertical written method. Allow those students to demonstrate proficiency with the chip model in the first few problems of the Problem Set and then continue without drawing. Have them write challenging problems for each other to solve, after solving them first, if they finish early.

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T: Let's begin. What is 7 ones minus 5 ones? (Cross out 5 chips in the ones place on the chip model as students do the same.)

S: 2 ones.

T: Let's record that using the algorithm. (Write 2 in the ones place as students do the same.) What is 13 tens minus 4 tens? (Cross out 4 chips in the tens place on the chip model as students do the same.)

MP.6

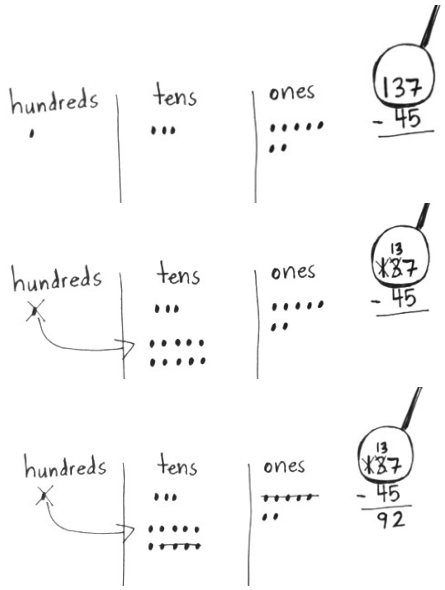
S: 9 tens.

T: Let's record that on the problem. (Write 9 in the tens place as students do the same.) What is 137 – 45?

S: 92.

T: The Say Ten way?

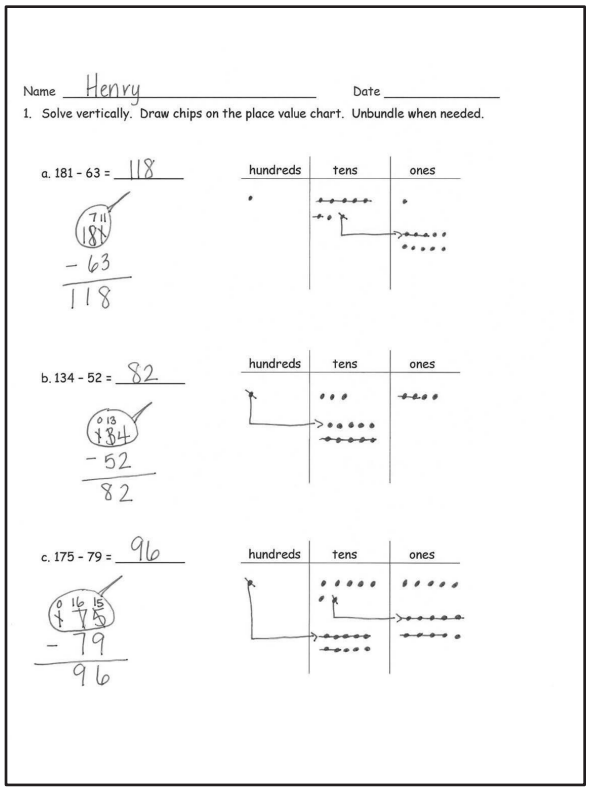
S: 9 tens 2.



Repeat the above process with 112 – 75. If students show proficiency, allow them to move on to the Problem Set. Those who need more support might be guided through the following sequence: 127 – 19, 116 – 36, and 123 – 86.

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.



Student Debrief (10 minutes)

Lesson Objective: Use math drawings to represent subtraction with up to two decompositions and relate drawings to a written method.

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

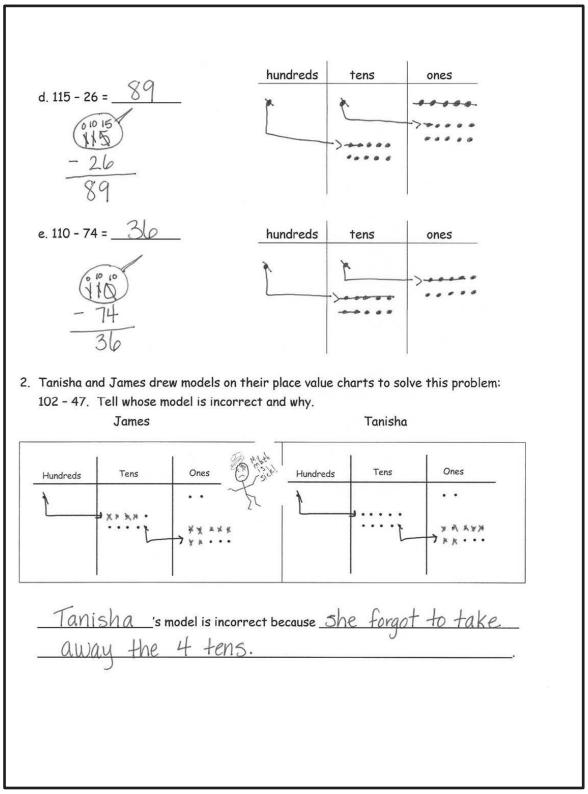
Invite students to review their solutions for the Problem Set. They should check work by comparing answers with a partner before going over answers as a class. Look for misconceptions or misunderstandings that can be addressed in the Debrief. Guide students in a conversation to debrief the Problem Set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

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

- Explain to your partner how you solved Problem 1, Parts (a) and (b). Compare the unbundling you had to do for each of these problems. How was it different and how was it the same?
- For Problem 1, Part (c), use place value language to explain to your partner how your chip model matches the algorithm. Could you have used a mental strategy to solve, too?
- How does Problem 1, Part (e) help you understand that 110 is the same as 10 tens and 10 ones?
- For Problem 2, explain to your partner whose drawing was incorrect and why. Use place value language to defend your reasoning.



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.

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A

Number Correct: _____

Subtraction Patterns

1.	30 – 1 =	
2.	40 – 2 =	
3.	50 – 3 =	
4.	50 – 4 =	
5.	50 – 5 =	
6.	50 – 9 =	
7.	51 – 9 =	
8.	61 – 9 =	
9.	81 – 9 =	
10.	82 – 9 =	
11.	92 – 9 =	
12.	93 – 9 =	
13.	93 – 8 =	
14.	83 – 8 =	
15.	33 – 8 =	
16.	33 – 7 =	
17.	43 – 7 =	
18.	53 – 6 =	
19.	63 – 6 =	
20.	63 – 5 =	
21.	73 – 5 =	
22.	93 – 5 =	

23.	31 – 2 =	
24.	31 – 3 =	
25.	31 – 4 =	
26.	41 – 4 =	
27.	51 – 5 =	
28.	61 – 6 =	
29.	71 – 7 =	
30.	81 – 8 =	
31.	82 – 8=	
32.	82 – 7 =	
33.	82 – 6 =	
34.	82 – 3 =	
35.	34 – 5 =	
36.	45 – 6 =	
37.	56 – 7 =	
38.	67 – 8 =	
39.	78 – 9 =	
40.	77 – 9 =	
41.	64 – 6 =	
42.	24 – 8 =	
43.	35 – 8 =	
44.	36 – 8 =	

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B

Number Correct: _____

Improvement: _____

Subtraction Patterns

1.	20 – 1 =	
2.	30 – 2 =	
3.	40 – 3 =	
4.	40 – 4 =	
5.	40 – 5 =	
6.	40 – 9 =	
7.	41 – 9 =	
8.	51 – 9 =	
9.	71 – 9=	
10.	72 – 9=	
11.	82 – 9=	
12.	83 – 9=	
13.	83 – 8 =	
14.	93 – 8 =	
15.	23 – 8 =	
16.	23 – 7 =	
17.	33 – 7 =	
18.	43 – 6 =	
19.	53 – 6 =	
20.	53 – 5 =	
21.	63 – 5 =	
22.	83 – 5 =	

23.	21 – 2 =	
24.	21 – 3 =	
25.	21 – 4 =	
26.	31 – 4 =	
27.	41 – 5 =	
28.	51 – 6 =	
29.	61 – 7 =	
30.	71 – 8 =	
31.	72 – 8 =	
32.	72 – 7 =	
33.	72 – 6 =	
34.	72 – 3 =	
35.	24 – 5 =	
36.	35 – 6 =	
37.	46 – 7 =	
38.	57 – 8 =	
39.	68 – 9 =	
40.	67 – 9 =	
41.	54 – 6 =	
42.	24 – 9 =	
43.	35 – 9 =	
44.	46 – 9 =	

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Name _____ Date _____

1. Solve vertically. Draw chips on the place value chart. Unbundle when needed.

a. 181 – 63 = _____

hundreds	tens	ones

b. 134 – 52 = _____

hundreds	tens	ones

c. 175 – 79 = _____

hundreds	tens	ones

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d. 115 – 26 = _____

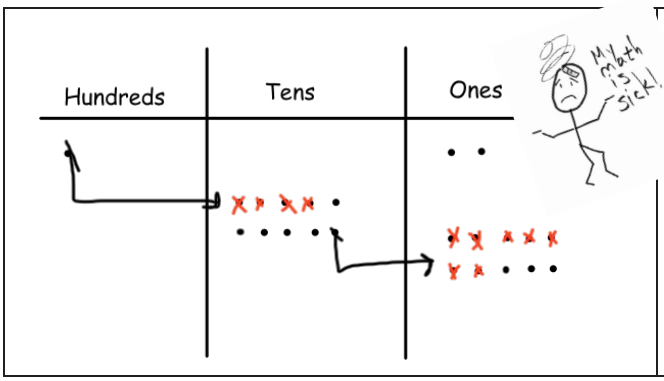
hundreds	tens	ones

e. 110 – 74 = _____

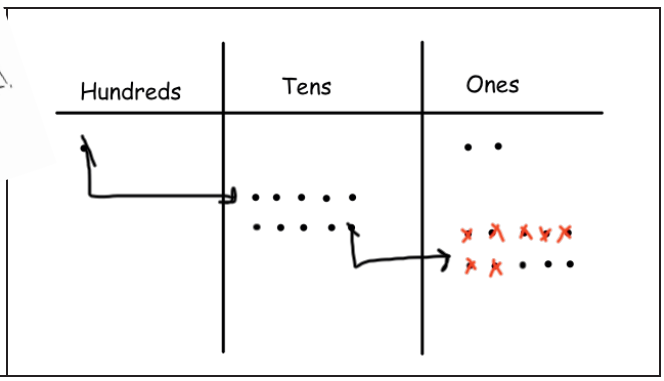
hundreds	tens	ones

2. Tanisha and James drew models on their place value charts to solve this problem: 102 – 47. Tell whose model is incorrect and why.

James



Tanisha



_____'s model is incorrect because _____

_____.

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Name _____ Date _____

Solve vertically. Draw chips on the place value chart. Unbundle when needed.

1. 153 – 46 = _____

hundreds	tens	ones

2. 118 – 79 = _____

hundreds	tens	ones

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Name _____ Date _____

1. Solve vertically. Draw chips on the place value chart. Unbundle when needed.

a. 114 – 65 = _____

hundreds	tens	ones

b. 120 – 37 = _____

hundreds	tens	ones

c. 141 – 89 = _____

hundreds	tens	ones

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d. 136 – 77 = _____

hundreds	tens	ones

e. 154 – 96 = _____

hundreds	tens	ones

2. **Extension**: Fill in the missing number to complete the problem. Draw a place value chart and chips to solve.

1 2 3 – 5 ☐ 6 9	

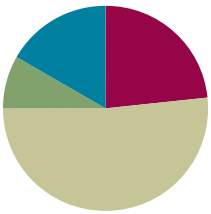
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Lesson 27

Objective: Subtract from 200 and from numbers with zeros in the tens place.

Suggested Lesson Structure



Fluency Practice	(14 minutes)
Application Problem	(5 minutes)
Concept Development	(31 minutes)
Student Debrief	(10 minutes)
Total Time	**(60 minutes)**

Fluency Practice (14 minutes)

- Subtraction Fact Flash Cards **2.OA.2** (2 minutes)
- Subtraction from Tens **2.NBT.5** (3 minutes)
- Sprint: Subtraction from a Ten or a Hundred **2.NBT.5** (9 minutes)

Subtraction Facts Flash Cards (2 minutes)

Materials: (T) Subtraction fact flash cards set 1 (Lesson 24 Fluency Template)

Note: By practicing subtraction facts, students gain fluency subtracting within 20.

Subtraction from Tens (3 minutes)

Materials: (S) Personal white board

Note: This allows students to see how their take-from-ten facts help them to solve many, many problems. It also prepares them for today's Sprint.

T: When I say a basic fact, you add ten to the whole and continue until I say to stop. So, after 10 – 8, you would solve 20 – 8, and then…?

S: 30 – 8, 40 – 8, 50 – 8.

T: Yes. Solve as many as you can on your personal white board before I give the signal to stop. Let's begin. 10 – 8.

S: (Work.)

When every student has completed at least 2 problems, stop the class and give the next expression.

Continue with the following possible sequence: 100 – 80, 10 – 6, 100 – 60, and 100 – 59.

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Sprint: Subtraction from a Ten or a Hundred (9 minutes)

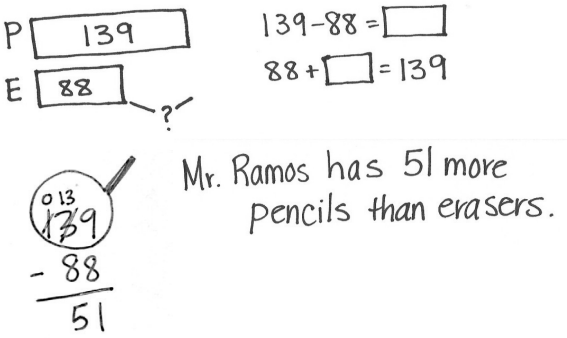
Materials: (S) Subtraction from a Ten or a Hundred Sprint

Note: Students are given the opportunity to use mental math strategies when subtracting from 10 or 100.

Application Problem (5 minutes)

Mr. Ramos has 139 pencils and 88 erasers. How many more pencils than erasers does he have?

Note: Allow students to use varied strategies. Invite pairs of students committed to different strategies to solve at the board while others work at their seats. Have those who worked at the board quickly present their solutions to their peers.

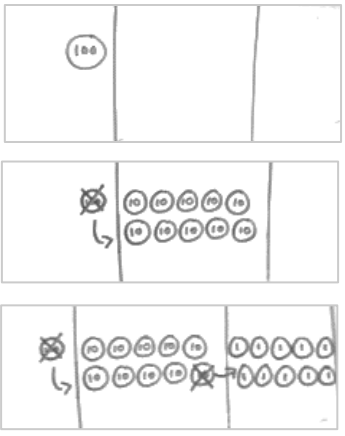


Concept Development (31 minutes)

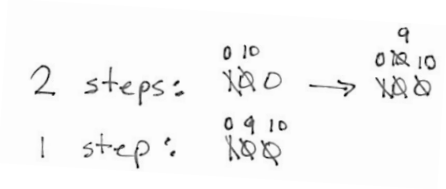
Materials: (S) Personal white board

Note: In the previous lesson, students used the chip model to subtract with up to two decompositions. We will be modeling today's lesson with place value disk drawings; students can work with the representation that best suits their level of development. Simple to complex representation include bills, place value disks (concrete and then drawn), bundles of straws, and the chip model.

Problem 1: Model 100 as 9 tens and 10 ones and relate to a number written with changed units.



T: Show me 100 with the fewest disks possible.
T: What is the value of your disk?
S: 100.
T: Change 1 hundred for 10 tens.
S: (Draw 10 tens arranged in 5-groups.)
MP.4
T: Say the number in hundreds.
S: 1 hundred.
T: Now, say the number in tens and then count.
S: 10 tens. 10, 20, 30, …, 100.
T: Did the value change?
S: No!
T: Show me 100 by changing 1 ten for 10 ones.
T: Say the number in hundreds.



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S: 1 hundred.
T: Say the number in tens and ones.
S: 9 tens and 10 ones.
T: Let's count.
S: 10, 20, 30, …, 90, 91, 92, 93, …, 100.
T: Did the value change?
S: No! It's still a hundred!
T: Let's write the number 100 and show how we renamed it. (See the image on the previous page.)
T: How does the way the change is recorded relate to what we just did with the disks.
S: In the first way, you change 1 hundred to 0 hundreds and 10 tens. Then you change 10 tens to 9 tens and 10 ones. → Or, you can do it all at once, and just change 1 hundred to 0 hundreds, 9 tens, and 10 ones. It makes it easier for me. 90 + 10 = 100.

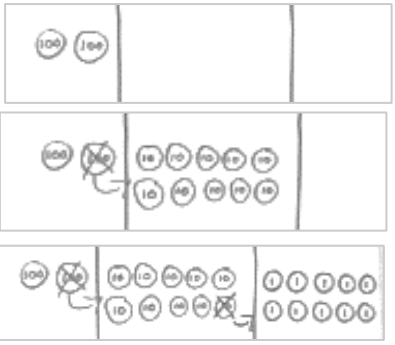
NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

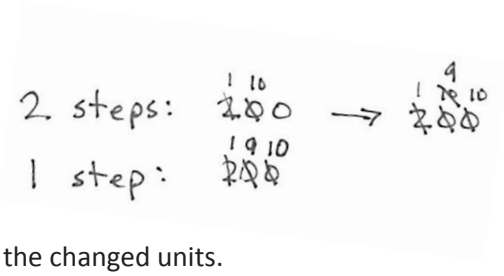
Give students enough time to come up with the answers. While they may be obvious to adults, these questions are new to the children and necessitate some processing time.

Problem 2: Model 200 as 1 hundred, 9 tens, and 10 ones, and relate to a number written with changed units.

MP.4

T: Show me 200 with the fewest disks possible.
S: (Draw 2 hundreds disks.)
T: Change 1 hundred for 10 tens.
T: Say the number in hundreds.
S: 2 hundreds.
T: Say the number in hundreds and tens.
S: 1 hundred 10 tens.
T: Did the value change?
S: No!
T: Now show me 200 by unbundling a ten.
S: (Draw 1 hundred 9 tens 10 ones.)
T: Say the number in hundreds, tens, and ones.
S: 1 hundred 9 tens 10 ones.
T: Did the value change?
S: No!
T: Relate your work with the disks to these numbers showing the changed units.
S: In the first way, you change 2 hundreds to 1 hundred and 10 tens. Then, you change 10 tens to 9 tens and 10 ones. → In the faster way, you just change 2 hundreds to 1 hundred, 9 tens, and 10 ones. 190 + 10 = 200.





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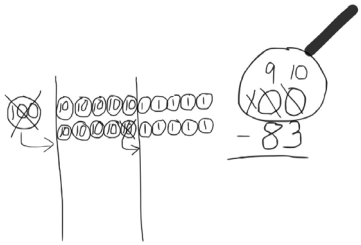
Problem 3: 100 – 83



T: Why would we want to show 100 as 9 tens and 10 ones?

S: Sometimes when you subtract, both the tens and the ones need more. → You need ones if you want to subtract ones. → 9 tens 10 ones is the same as 100.

T: Let's see how knowing this will help us to solve some subtraction problems today.
(Write 100 – 83 on the board in the vertical form.)



T: What do we do first?

T: When I set up to subtract, I am going to draw my place value disks to show the whole. (Draw 100 in place value disks.) How many do you see on my place value chart?

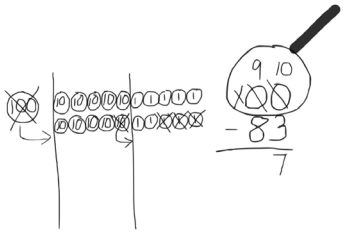
S: 1 hundred 0 tens 0 ones.

T: Can we subtract 3 ones from 0 ones?

S: No! We need to change 1 ten for 10 ones.

T: But there are no tens. Does that mean we are stuck?

S: No, because a hundred has tens in it. → Yeah, from the tens we can get some ones. → It's what we just did. Let's change 1 hundred for 9 tens and ten ones.



MP.4

T: Okay. Let's do that. Tell me what to do.

S: Just what she said. Change 1 hundred for 9 tens and 10 ones, and show that on your numbers, too, by crossing out.

T: (Work with disks and numbers.) Now, am I ready to subtract in the ones place?



S: Yes!

T: Am I ready to subtract in the tens place?

S: Yes!

T: 10 ones – 3 ones is…?

S: 7 ones.

T: 9 tens – 8 tens is…?

S: 1 ten.

T: Read me the full number sentence.

S: 100 – 83 = 17.

T: So, the missing part was 17. How can I check to see if my subtraction is correct?

S: Add the two parts to see if you get the whole.

T: What are the two parts?

S: 17 and 83.

NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

If you see some students demonstrating proficiency during the lesson, have one or more lead the class in modeling these problems.

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T: The whole?

S: 100.

T: When we add the two parts, do we get the whole?

S: Yes. 80 + 10 = 90, 90 + 3 + 7 = 90 + 10 = 100. → 8 tens, 1 ten, and 10 ones is 100.

Problem 4: 200 – 8

T: (Draw 2 hundreds on the place value chart, and write 200 – 8 on the board. Draw the magnifying glass.) Let's start at the ones place. Can I subtract 8 ones from 0 ones?



MP.4

S: No!

T: Where am I going to find some ones? Talk to your partner.

S: It's like the last problem we did. → After you decompose 1 hundred, you have 1 hundred, 9 tens, and 10 ones. → Unbundle a hundred; then unbundle a ten. → You can make 200 into 1 hundred, 10 tens, and then change 1 of the tens for 10 ones. → You can change 1 hundred for 10 tens, and then change a ten for 10 ones.

T: (Unbundle 200 to make 1 hundred 9 tens 10 ones.) Are we ready to subtract?



S: Yes!

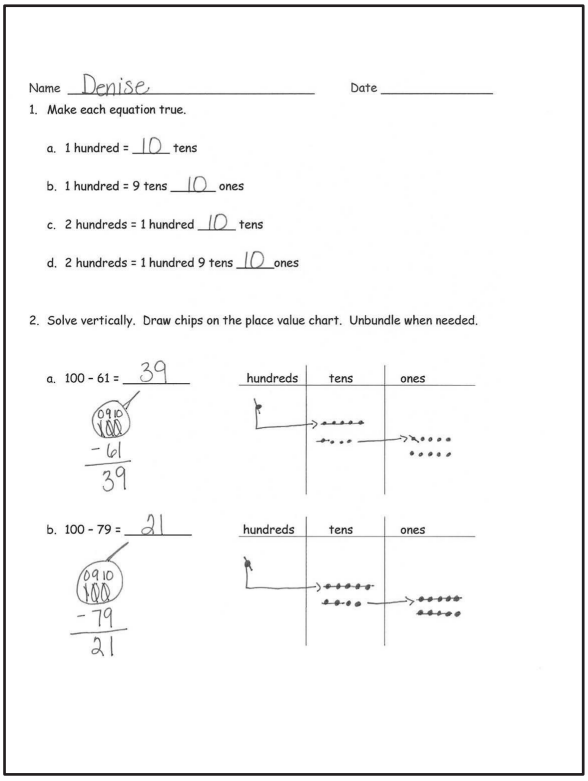
T: Solve the problem by crossing out place value disks, starting with the ones, and recording each step in the written form.

Have the students analyze the problem for parts and wholes as in Problem 1 and check to see the total of the parts is 200.

Guide students through solving two or three more problems that require renaming 200 as 1 hundred, 9 tens, and 10 ones. You might use the following suggested sequence: 200 – 78, 200 – 143, and 200 – 111. As students show proficiency, allow them to work independently 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 should solve these problems using the RDW approach used for Application Problems.



Name Denise Date

1. Make each equation true.

a. 1 hundred = 10 tens

b. 1 hundred = 9 tens 10 ones

c. 2 hundreds = 1 hundred 10 tens

d. 2 hundreds = 1 hundred 9 tens 10 ones

2. Solve vertically. Draw chips on the place value chart. Unbundle when needed.

a. 100 - 61 = 39

- 61
39

hundreds tens ones

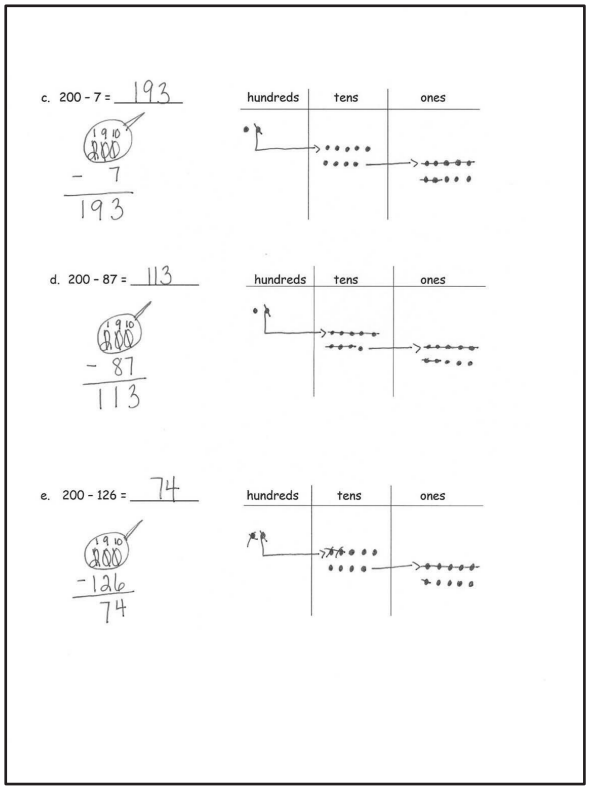
b. 100 - 79 = 21

- 79
21

hundreds tens ones

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Student Debrief (10 minutes)



Lesson Objective: Subtract from 200 and from numbers with zeros in the tens place.

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.

- Look at Problem 1. What possible combinations of tens and ones do you notice within a unit of 100?
- How can I unbundle 100 on a place value chart? How can I do it in two steps? How can I do it in one step?
- What are two different ways that I can unbundle 200 using hundreds, tens, and ones? Now, look at Problem 2, Part (c). Which way did you choose to decompose? Why?
- How is Problem 2, Part (d) significantly different from Problem 2, Part (b)?
- Explain to your partner how you unbundled Problem 2, Part (d), 200 – 87. Did you do it in one or two steps? Which way is easier for you?
- When you are subtracting, what clues tell you that you will have to unbundle a hundred?

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.

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A

Number Correct: _____

Subtraction from a Ten or a Hundred

1.	10 – 1 =	
2.	100 – 10 =	
3.	90 – 1 =	
4.	100 – 11 =	
5.	10 – 2 =	
6.	100 – 20 =	
7.	80 – 1 =	
8.	100 – 21 =	
9.	10 – 5 =	
10.	100 – 50 =	
11.	50 – 2 =	
12.	100 – 52 =	
13.	10 – 4 =	
14.	100 – 40 =	
15.	60 – 1 =	
16.	100 – 41 =	
17.	10 – 3 =	
18.	100 – 30 =	
19.	70 – 5 =	
20.	100 – 35 =	
21.	100 – 80 =	
22.	100 – 81 =	
23.	100 – 82 =	
24.	100 – 85 =	
25.	100 – 15 =	
26.	100 – 70 =	
27.	100 – 71 =	
28.	100 – 72 =	
29.	100 – 75 =	
30.	100 – 25 =	
31.	100 – 10 =	
32.	100 – 11 =	
33.	100 – 12 =	
34.	100 – 18 =	
35.	100 – 82 =	
36.	100 – 60 =	
37.	100 – 6 =	
38.	100 – 70 =	
39.	100 – 7 =	
40.	100 – 43 =	
41.	100 – 8 =	
42.	100 – 59 =	
43.	100 – 4 =	
44.	100 – 68 =	

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B

Number Correct: _____

Improvement: _____

Subtraction from a Ten or a Hundred

1.	10 – 5 =	
2.	100 – 50 =	
3.	50 – 1 =	
4.	100 – 51 =	
5.	10 – 2 =	
6.	100 – 20 =	
7.	80 – 1 =	
8.	100 – 21 =	
9.	10 – 1 =	
10.	100 – 10 =	
11.	90 – 2 =	
12.	100 – 12 =	
13.	10 – 3 =	
14.	100 – 30 =	
15.	70 – 1 =	
16.	100 – 31 =	
17.	10 – 4 =	
18.	100 – 40 =	
19.	60 – 5 =	
20.	100 – 45 =	
21.	100 – 70 =	
22.	100 – 71 =	

23.	100 – 72 =	
24.	100 – 75 =	
25.	100 – 25 =	
26.	100 – 80 =	
27.	100 – 81 =	
28.	100 – 82 =	
29.	100 – 85 =	
30.	100 – 15 =	
31.	100 – 10 =	
32.	100 – 11 =	
33.	100 – 12 =	
34.	100 – 17 =	
35.	100 – 83 =	
36.	100 – 70 =	
37.	100 – 7 =	
38.	100 – 60 =	
39.	100 – 6 =	
40.	100 – 42 =	
41.	100 – 4 =	
42.	100 – 58 =	
43.	100 – 8 =	
44.	100 – 67 =	

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Name _____ Date _____

1. Make each equation true.
   a. 1 hundred = _____ tens
   b. 1 hundred = 9 tens _____ ones
   c. 2 hundreds = 1 hundred _____ tens
   d. 2 hundreds = 1 hundred 9 tens _____ones

2. Solve vertically. Draw chips on the place value chart. Unbundle when needed.
   a. 100 – 61 = _____

hundreds	tens	ones

   b. 100 – 79 = _____

hundreds	tens	ones

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c. 200 – 7 = _____

hundreds	tens	ones

d. 200 – 87 = _____

hundreds	tens	ones

e. 200 – 126 = _____

hundreds	tens	ones

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Name _____ Date _____

Solve vertically. Draw chips on the place value chart. Unbundle when needed.

1. 100 – 44 = _____

hundreds	tens	ones

2. 200 – 76 = _____

hundreds	tens	ones

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Name _____ Date _____

1. Solve vertically. Draw chips on the place value chart. Unbundle when needed.

a. 100 – 37 = _____

hundreds	tens	ones

b. 100 – 49 = _____

hundreds	tens	ones

c. 200 – 49 = _____

hundreds	tens	ones

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d. 200 – 57 = _____

hundreds	tens	ones

e. 200 – 83 = _____

hundreds	tens	ones

2. Susan solved 200 – 91 and decided to add her answer to 91 to check her work. Explain why this strategy works.

Susan's work:	Explanation:
1 9 10 2 0 0 – 9 1 1 0 9 109 + 91 200	_____ _____ _____ _____

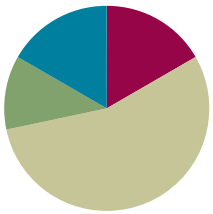
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Lesson 28

Objective: Subtract from 200 and from numbers with zeros in the tens place.

Suggested Lesson Structure

Fluency Practice	(10 minutes)
Application Problem	(7 minutes)
Concept Development	(33 minutes)
Student Debrief	(10 minutes)
Total Time	**(60 minutes)**



Fluency Practice (10 minutes)

- Subtraction Fact Flash Cards **2.OA.2** (2 minutes)
- Rename the Units: Choral Response **2.NBT.1** (6 minutes)
- Take from the Tens or Ones **2.NBT.5** (2 minutes)

Subtraction Fact Flash Cards (2 minutes)

Materials: (T) Subtraction fact flash cards set 1 (Lesson 24 Fluency Template)

Note: By practicing subtraction facts, students gain fluency subtracting within 20.

Rename the Units: Choral Response (6 minutes)

Note: This fluency activity reviews foundations that will lead into today's lesson.

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

Continue with the following possible sequence: 27, 30, 32, 38, 40, 41, 46, 50, 63, and 88.

T: (Write 100 = 9 tens ____ ones.) Say the number sentence.
S: 100 = 9 tens 10 ones.
T: (Write 101 = 9 tens ____ ones.) Say the number sentence.

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S: 101 = 9 tens 11 ones.

T: 9 tens 11 ones is…?

S: 101.

T: 9 tens 12 ones is…?

S: 102.

Continue with the following possible sequence: 103, 104, 105, 106, 107, 108, 109, and 110.

Take from the Tens or Ones (2 minutes)

Note: This fluency activity helps students know when to unbundle a ten to subtract. This is a foundational skill for the lesson.

T: For every number sentence I say, you tell me if I take from the tens or the ones. When I say 46 – 5, you say take from the ones, but if I say 46 – 7, you say take from the tens. Ready?

T: 46 – 6.

S: Take from the ones.

T: 46 – 9.

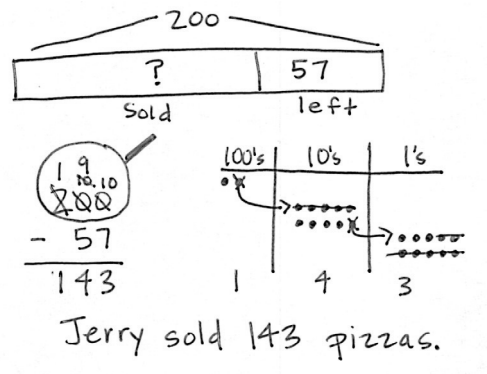
S: Take from the tens.

Continue with the following possible sequence: 52 – 1, 52 – 4, 63 – 6, 64 – 5, 65 – 4, 68 – 8, and 70 – 3.

Application Problem (7 minutes)

Jerry made 200 pizzas. He sold some of them and had 57 pizzas left. How many did he sell?

Note: Instruct students to set up a place value chart to solve this Application Problem. Some students may relate this problem to Lesson 27 by drawing place value disks on their place value charts. Others may choose to represent the problem using a tape diagram or the arrow way.



Concept Development (33 minutes)

Materials: (S) Personal white board

Note: This Concept Development is intentionally designed for students to practice concepts taught in Lesson 27. Encourage students to choose any accurate math drawing to represent the subtraction. While some students may be comfortable drawing chip models, others may choose to represent the problem using place value disk drawings. In either case, all students should relate their drawings to the vertical form.

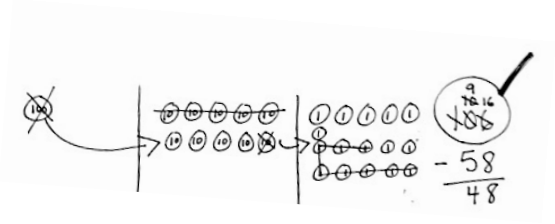
NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

Have manipulatives available for students who have not yet mastered the ability to solve these problems without a concrete representation.

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Problem 1: 106 – 58

T: (Write 106 – 58 on the board.)
T: Let's solve 106 – 58 using a math drawing. Choose whether you want to use a disk drawing or a chip model. What number are we going to draw?
S: 106.
T: And, what should I draw on my model to show that number?
S: 1 hundred and 6 ones.
T: Great. Which place do we look at first to see if we need to do any renaming?
S: The ones!
T: Are we ready to subtract in the ones place?
S: No.
T: What should we do? Turn and talk to your partner.
S: There are no tens either, so let's rename a hundred as 9 tens and 10 ones. → That makes it 9 tens and 16 ones because we already had 6 ones. → We can change 1 hundred into 10 tens and then change 10 tens into 9 tens 10 ones.
T: Okay, let's do it. Record each change.
MP.4
T: Are we ready to subtract in the ones?
S: Yes.
T: In the tens?
S: Yes.
T: Show your answer in the written subtraction. What is our first step? Tell the units.
S: 16 ones – 8 ones.
T: (Model on your drawing and algorithm.) How many ones are left?
S: 8.



T: Great. Let's try the tens. What is our problem?
S: 9 tens – 5 tens.
T: How many tens do we have left?
S: 4 tens. (Show this on the drawing and using the algorithm.)
T: Do we subtract any hundreds?
S: No!

Invite students to share their work. Analyze the parts and join them to see if they total 106.

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Problem 2: 200 – 67

T: (Write 200 – 67 on the board.)

T: We are now going to do the same thing with another problem. Make a math drawing that represents the number from which we will be subtracting. (Give students time to make their drawings.)

T: What did you draw?

S: 200. → 2 hundreds.

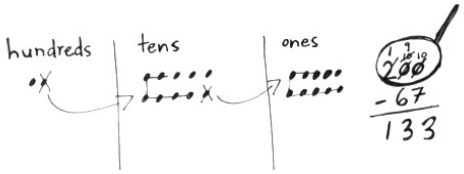
MP.4 T: How can we rename 200 to solve 200 – 67? Turn and talk.

S: We can rename it as 1 hundred, 9 tens, and 10 ones. → Since you can't subtract from the ones or tens, we can unbundle a hundred and then unbundle a ten.

T: In which place will you start subtracting?

S: The ones.

T: On your own, solve 200 – 67 using a math drawing. Again, record each change and show your answer in the written subtraction.



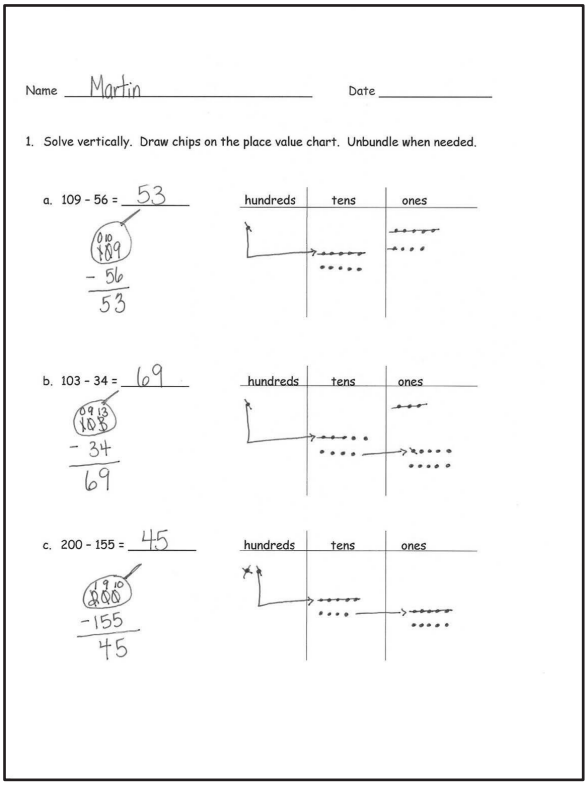
Continue with the following possible sequence: 200 – 33, 103 – 59, and 200 – 49. Before students begin each problem, instruct them to rename the whole. Emphasize the renaming of 200 as 1 hundred, 9 tens, 10 ones. As you circulate, remind students to draw the magnifying glass, to represent the problem using a math drawing, and to record each step in the written subtraction.

NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

Allow students who prefer to work in groups to work with a partner on the Problem Set. Likewise, allow students who concentrate better alone to work independently.

Problem Set (10 minutes)

Students should do their personal best to complete the Problem Set within the allotted 10 minutes. For some classes, it may be appropriate to modify the assignment by specifying which problems they work on first. Some problems do not specify a method for solving. Students should solve these problems using the RDW approach used for Application Problems.


Name Martin Date

1. Solve vertically. Draw chips on the place value chart. Unbundle when needed.

a. 109 - 56 = 53

- 56
53

hundreds tens ones

b. 103 - 34 = 69

- 34
69

hundreds tens ones

c. 200 - 155 = 45

-155
45

hundreds tens ones

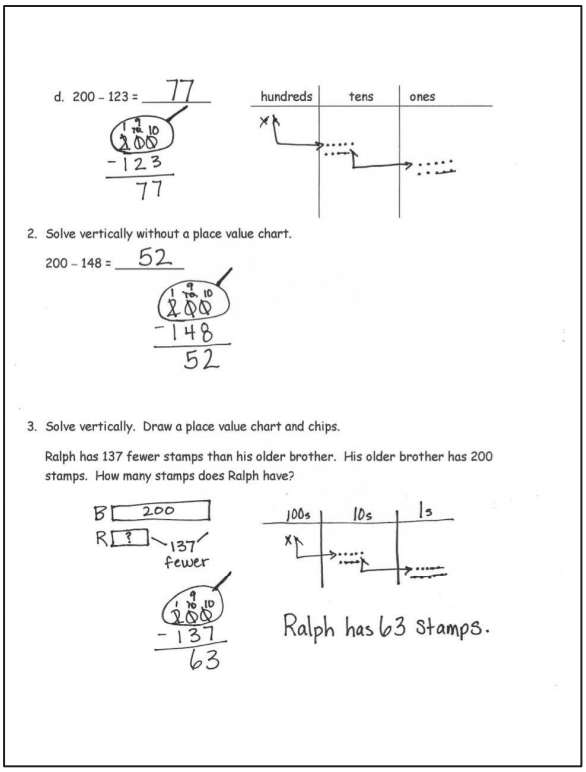
Student Debrief (10 minutes)

Lesson Objective: Subtract from 200 and from numbers with zeros in the tens place.

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

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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.

- Look at Problem 1, Parts (a) and (b). When you are subtracting and the whole (i.e., larger number) has a zero in the tens place, what do you know for sure? How do you know if that zero will become a 10 or a 9?
- For Problem 1, Part (c), how did you unbundle 200 on your place value chart? Did you do it in one or two steps?
- For Problem 1, Part (d), how did you unbundle 200 on your place value chart? Why did you show 200 that way? How did it match your written subtraction?
- Problem 2, 200 – 148, asked you to solve vertically. Could you also have solved mentally? How? Which way is quicker and easier?
- In your work today, how was unbundling 200 similar to and different from unbundling 100?

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.

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Name _____ Date _____

1. Solve vertically. Draw chips on the place value chart. Unbundle when needed.

a. 109 – 56 = _____

hundreds	tens	ones

b. 103 – 34 = _____

hundreds	tens	ones

c. 200 – 155 = _____

hundreds	tens	ones

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d. 200 – 123 = _____

hundreds	tens	ones

2. Solve vertically without a place value chart.

   200 – 148 = _____

3. Solve vertically. Draw a place value chart and chips.

   Ralph has 137 fewer stamps than his older brother. His older brother has 200 stamps. How many stamps does Ralph have?

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Name _____ Date _____

Solve vertically. Draw chips on the place value chart. Unbundle when needed.

1. 108 – 79 = _____

hundreds	tens	ones

2. 200 – 126 = _____

hundreds	tens	ones

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Name _____ Date _____

1. Solve vertically. Draw chips on the place value chart. Unbundle when needed.

a. 136 – 94 = _____

hundreds	tens	ones

b. 105 – 57 = _____

hundreds	tens	ones

c. 200 – 61 = _____

hundreds	tens	ones

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d. 200 – 107 = _____

hundreds	tens	ones

e. 200 – 143 = _____

hundreds	tens	ones

2. Herman collected 200 shells on the beach. Of those, he kept 136 shells and left the rest on the beach. How many shells did he leave on the beach?

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Topic F

Student Explanations of Written Methods

2.OA.1, 2.NBT.7, 2.NBT.9

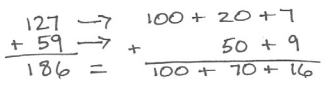
Focus Standards:	2.OA.1	Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
	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.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:	3	
Coherence -Links from:	G1–M2	Introduction to Place Value Through Addition and Subtraction Within 20
-Links to:	G3–M2	Place Value and Problem Solving with Units of Measure
	G4–M1	Place Value, Rounding, and Algorithms for Addition and Subtraction

Module 4 culminates with Topic F, in which students think about and discuss the multiple strategies they have learned to represent and solve addition and subtraction problems. They share their reasoning as they link their drawings to two written methods and discuss the similarities, differences, and efficacy of each approach.

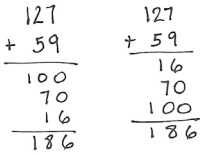
In Lesson 29, students learn the totals below method. Throughout Grades 1 and 2, students decompose numbers into expanded form to recognize place value and to understand that they must add like units. These problems are written horizontally. Here, students use this prior learning to solve addition problems in a similar way. They decompose two- and three-digit numbers, add like units, and record the totals horizontally (see image on the next page). They then transition into the vertical form of the method when they decompose the numbers mentally, add like units, and record the totals below. The totals below method gives students the option of adding from left to right or from right to left. Students explain how each step of their math drawings relates to this written method.

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Horizontal Notation



Totals Below



Left to Right Right to Left

In Lesson 30, students represent and solve problems using both the totals below and the new groups below methods (students used the latter method throughout the module). They relate both methods to their math drawings and discuss the differences and similarities between the two.

In Lesson 31, students apply knowledge of addition and subtraction strategies to solve two-step word problems. Students are challenged to make sense of more complex relationships as they are guided through more difficult problem types, such as comparison problems. These problems involve smaller numbers and are scaffolded to address the heightened level of difficulty.

A Teaching Sequence Toward Mastery of Student Explanations of Written Methods	
Objective 1:	**Use and explain the totals below method using words, math drawings, and numbers. (Lesson 29)**
Objective 2:	**Compare totals below to new groups below as written methods. (Lesson 30)**
Objective 3:	**Solve two-step word problems within 100. (Lesson 31)**

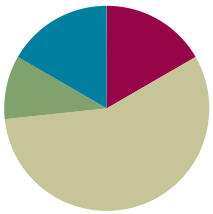
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Lesson 29

Objective: Use and explain the totals below method using words, math drawings, and numbers.

Suggested Lesson Structure

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



Fluency Practice (10 minutes)

- Crossing a Ten **2.NBT.5** (5 minutes)
- Rename the Units: Choral Response **2.NBT.1** (5 minutes)

Crossing a Ten (5 minutes)

Note: Crossing a Ten reviews making a multiple of 10 to solve problems with up to four addends.

T: (Write on the board: 8 + ____ = 10.) How many more does 8 need to make ten?
S: 2 more.
T: Give the complete number sentence.
S: 8 + 2 = 10.
T: 10 + 1.
S: 11.
T: 8 + 2 + 1.
S: 11.
T: 8 + 3.
S: 11.

Continue with the following possible sequence: 7 + 3, 7 + 3 + 1, 7 + 4, 7 + 5, 9 + 1, 9 + 1 + 1, 9 + 1 + 4, and 19 + 1 + 4.

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Rename the Units: Choral Response (5 minutes)

Note: This fluency activity reviews foundations that lead into today's lesson.

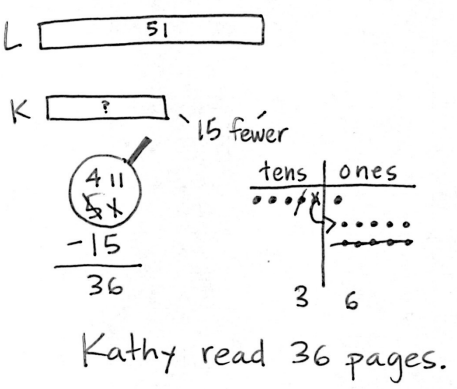
T: (Write 10 tens = _____ hundred.) Say the number sentence.
S: 10 tens = 1 hundred.
T: (Write 11 tens = 1 hundred _____ ten.) Say the number sentence.
S: 11 tens = 1 hundred 1 ten.
T: (Write 14 tens = 1 hundred _____ tens.) Say the number sentence.
S: 14 tens = 1 hundred 4 tens.

Repeat the process for teen numbers of tens up to 20 tens.

Application Problem (6 minutes)

Kathy read 15 fewer pages than Lucy. Lucy read 51 pages. How many pages did Kathy read?

Note: Encourage students to use the RDW process to reason through the relationships in this problem. Can they draw a number bond or tape diagram to represent the part–whole relationship? What place value strategies can they use to solve? Invite students to share their strategies using place value language.

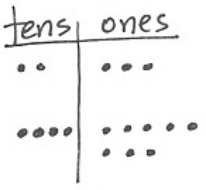


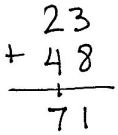
Concept Development (34 minutes)

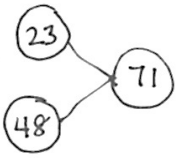
Materials: (S) Math journal or paper

Method 1: New Groups Below

T: (Draw a chip model of 23 + 48.) What expression am I modeling?
S: 23 + 48.
T: (Write vertically.) We know how to do this. (Record while talking through the algorithm to solve.)
T: Let's look at this as a number bond. (Draw the bond as they answer.) What are the parts?
S: 23 and 48.
T: What is the total?
S: 71.







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Method 2: Totals Below

T: Let's look at this same place value model another way. (See the image below and to the right.) How do we write 23 in expanded form?

S: 20 + 3.

T: (Record as shown.) How do we write 48 in expanded form?

S: 40 + 8.

T: (Record as shown.) 20 + 40 …?

S: 60.

T: (Record 60 as shown.) 3 + 8 …?

S: 11.

T: (Record 11 as shown.) Let's record these **totals below** the line while we add our numbers vertically.

T: 3 ones + 8 ones …?

S: 11 ones.

T: The Say Ten way? (Point to each digit in 11.)

S: Ten 1.

T: Can I write it like this? (Point to each digit in 11.) 1 ten 1 one? (Write it as a full total as pictured.)

S: Yes!

T: Now, let's add the tens. 2 tens and 4 tens …?

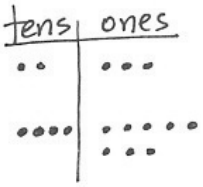
S: 6 tens.

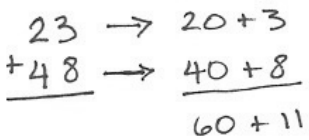
T: (Record 60.) Let's add to see what these two totals equal. Talk to your partner about the sum of 60 and 11.

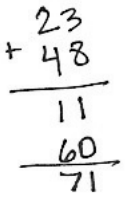
S: 60 + 10 + 1 is 71. → It's one more than 70. → Just add ten and add one more, 71.

T: We added the ones first and then the tens. Talk with your partner. Would we get the same answer if we added the tens first and then added the ones?

MP.1 S: Yes, because the number of tens and ones would still be the same. → Yes, we would still get 11 and 60 because we're adding the same parts. → Yes, we can add in either direction!





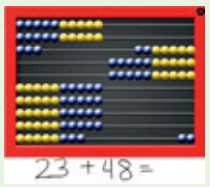


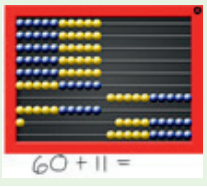
NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

While the totals below strategy is conceptually useful for all students, some will be able to solve the problems without it. After demonstrating proficiency with this method, allow students to solve problems using either totals below or new groups below.

NOTES ON MULTIPLE MEANS OF REPRESENTATION:

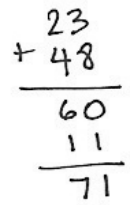
Use a ten-row Rekenrek to model 23 + 48 for students who need a concrete representation. Show the number bond by having the addends in separate groups; then, combine them to show the steps to 71.





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T: Let's see if that's true. (Write the totals below method again. Add the tens first, then the ones as pictured.)



T: What do you notice?

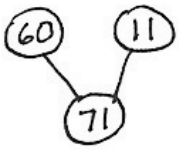
S: The total is the same!

T: Yes! So, we can add in either direction! When we add this way, no matter where we start, we can see the different parts, 11 ones and 6 tens.

T: Let's make a number bond of the parts when we add in this totals below method. What are the parts? (Draw the bond as they answer. Point to 11 ones and 6 tens on the chip model.)

MP.1

S: 60 and 11.



T: So, 71 isn't just 23 + 48. It's also 60 and 11.

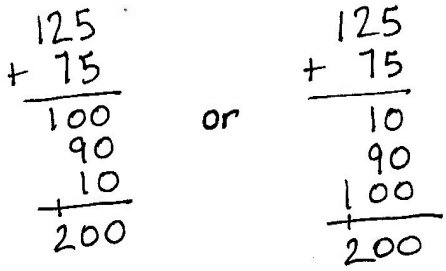
T: Talk with your partner. How are these written methods the same and different? How do they relate to the math drawings?

Invite students to the board to point to the parts of the drawings or written methods as they explain their thinking.

S: They all equal 71. → Both models show adding like units to find the total. → When I look at the chip model, I can see 23 and 48, but I also see 60 and 11.

T: Let's practice doing some problems the totals below way.

Continue with the following possible sequence: 45 + 37, 179 + 18, 56 + 82, 65 + 47, and 125 + 75. See the images below for 125 + 75.



As students demonstrate proficiency with the totals below method, allow them to work on the Problem Set independently.

Problem Set (10 minutes)

Students should do their personal best to complete the Problem Set within the allotted 10 minutes. For some classes, it may be appropriate to modify the assignment by specifying which problems they work on first. Some problems do not specify a method for solving. Students should solve these problems using the RDW approach used for Application Problems.

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Student Debrief (10 minutes)

Lesson Objective: Use and explain the totals below written method using words, math drawings, and numbers.

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

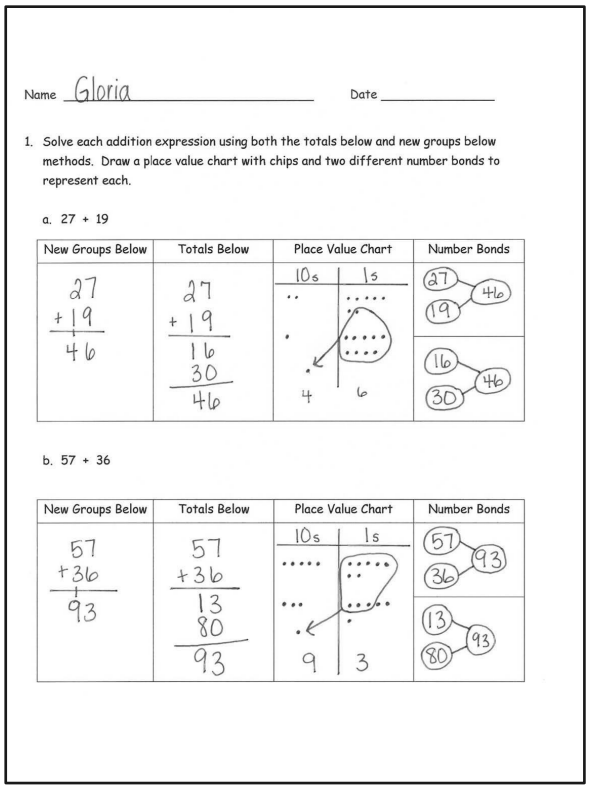
Invite students to review their solutions for the Problem Set. They should check work by comparing answers with a partner before going over answers as a class. Look for misconceptions or misunderstandings that can be addressed in the Debrief. Guide students in a conversation to debrief the Problem Set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

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

- For Problem 1, what connections can you make between the **totals below** method and number bonds? Place value chart?
- For Problem 1(b), how were the two written methods the same and different? How did you show your understanding of place value?
- In Problem 2(a), how did you record the totals below? Why does the answer include a hundred when you are only adding tens and ones?
- For Problem 2(b), let's make a chip model to show the addition (draw on board). How does our model relate to the totals below method?
- Pretend you are explaining the totals below method to a first grader: Why are we decomposing numbers first and then adding?

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.



Name Gloria Date

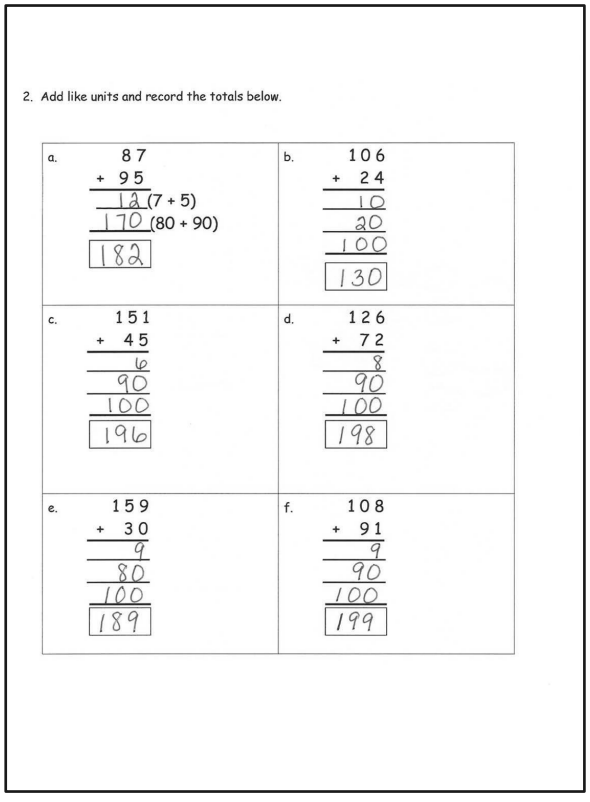
1. Solve each addition expression using both the totals below and new groups below methods. Draw a place value chart with chips and two different number bonds to represent each.

a. 27 + 19

New Groups Below	Totals Below	Place Value Chart	Number Bonds
27 + 19 = 46	27 + 19; 16, 30, 46	10s 1s; 4, 6	27, 19, 46; 16, 30, 46

b. 57 + 36

New Groups Below	Totals Below	Place Value Chart	Number Bonds
57 + 36 = 93	57 + 36; 13, 80, 93	10s 1s; 9, 3	57, 36, 93; 13, 80, 93



2. Add like units and record the totals below.

a. 87 + 95; 12 (7 + 5); 170 (80 + 90); 182

b. 106 + 24; 10; 20; 100; 130

c. 151 + 45; 6; 90; 100; 196

d. 126 + 72; 8; 90; 100; 198

e. 159 + 30; 9; 80; 100; 189

f. 108 + 91; 9; 90; 100; 199

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Name _____ Date _____

1. Solve each addition expression using both the totals below and new groups below methods. Draw a place value chart with chips and two different number bonds to represent each.

a. 27 + 19

New Groups Below	Totals Below	Place Value Chart	Number Bonds

b. 57 + 36

New Groups Below	Totals Below	Place Value Chart	Number Bonds

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2. Add like units and record the totals below.

a. 87 + 95 _____ (7 + 5) _____(80 + 90) ☐	b. 106 + 24 _____ _____ _____ ☐
c. 151 + 45 _____ _____ _____ ☐	d. 126 + 72 _____ _____ _____ ☐
e. 159 + 30 _____ _____ _____ ☐	f. 108 + 91 _____ _____ _____ ☐

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Add like units and record the totals below.

1. 45 + 64	2. 109 + 72
3. 144 + 58	4. 167 + 52

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Name _____ Date _____

1. Add like units and record the totals below.

a. 48 + 27 _____ _____ ☐	b. 118 + 73 _____ _____ _____ ☐
c. 156 + 62 _____ _____ _____ ☐	d. 137 + 82 _____ _____ _____ ☐

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e. 147 + 35 ____ ____ ____ ☐	f. 149 + 51 ____ ____ ____ ☐
g. 188 + 22 ____ ____ ____ ☐	h. 126 + 65 ____ ____ ____ ☐

2. Daniel counted 67 apples on one tree and 79 apples on another tree. How many apples were on both trees? Add like units and record the totals below to solve.

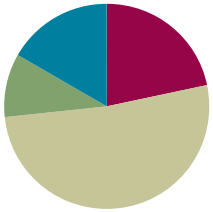
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Lesson 30

Objective: Compare totals below to new groups below as written methods.

Suggested Lesson Structure

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



Fluency Practice (13 minutes)

- Find the Difference **2.NBT.5** (4 minutes)
- Sprint: Subtraction Crossing a Ten **2.NBT.5** (9 minutes)

Find the Difference (4 minutes)

Materials: (S) Personal white board

Note: Reviewing subtraction problems in sets prepares students for understanding the importance of the subtraction algorithm.

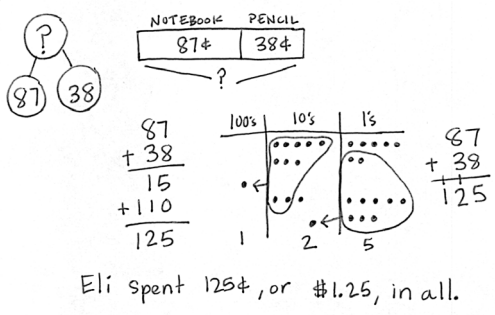
T: (Write 44 – 3 =____.) Write a subtraction sentence horizontally or vertically.

Continue with the following possible sequence: 40 – 5, 41 – 5; 57 –6, 50 – 6, 51 – 6; 68 – 7, 60 – 7, and 61 – 7.

Sprint: Subtraction Crossing a Ten (9 minutes)

Materials: (S) Subtraction Crossing a Ten Sprint

Note: Students use mental math strategies to mentally unbundle when subtracting.



Application Problem (6 minutes)

Eli spent 87 cents for a notebook and 38 cents for a pencil. How much money did he spend in all?

Note: Direct students to draw both a tape diagram and chip model. Then, have students use both the totals below and new groups below methods to solve this problem. When students have finished, have them share their work with a partner, using place value language to relate their work to their drawings. This leads directly into today's Concept Development, in which students compare the two written methods.

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Concept Development (31 minutes)

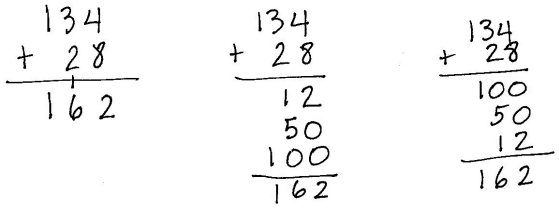
Materials: (S) Math journal or paper

As students compare the two written methods, circulate, observe student work, and listen for place value language to share with the class.

Problem 1: 134 + 28

T: Let's look at different ways I can solve this problem. (Solve 134 + 28 on the board as shown.)

T: Talk with your partner. Compare these different methods and explain why they all work. You can make a math drawing or use numbers, but you must use place value language to explain.

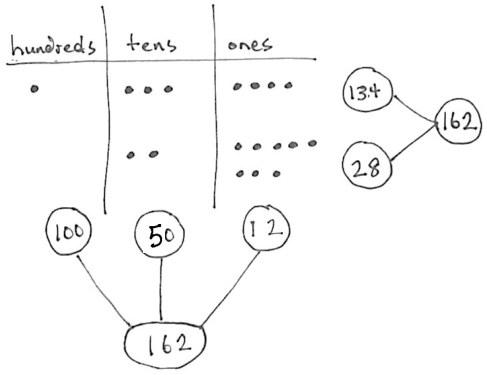


Project selected student work on the board. Invite students to stand next to their work so they can point to the parts and clarify their explanations. Invite remaining students to ask questions and to provide feedback; give presenters time to defend their answers.

MP.3

S1: I drew a number bond to show why the algorithm works. The total is 162, and the parts are 134 and 28.

S2: I drew a number bond to show why the totals below method works. 162 is the whole, and, since we added 134 and 28, the parts are 12, 50, and 100. We added the hundreds, tens, and ones by themselves to get each of the numbers we see below the problem. Then, we added those parts up!



S3: I drew a chip model that shows why they all work. It shows the parts that are 134 and 28 by themselves, but when you circle the dots to rename, you can see how 1 hundred 5 tens 12 ones becomes 1 hundred 6 tens 2 ones.

Problem 2: 176 + 59

T: Now, it's your turn. (Write 176 + 59 on the board horizontally.)

T: Solve this problem using totals below and new groups below.

T: While you're solving, think about which method is easiest for you. Why? Which is most efficient, or fastest?

NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

If a student says, "I solved it using mental math," praise her, and then ask her to use place value language to explain how she solved it mentally.

Project student work on the board, and encourage students to share their thinking.

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S: I like writing all the totals because I like starting in the hundreds place. → I like writing all the totals because you can add the value of the digits in each place. → I like to write the addition problem vertically and put the new tens and hundreds on the line below. New groups below is fastest!

MP.3

Problem 3: 105 + 89, 149 + 39, 118 + 82

T: This time, solve using either method. You decide!

Circulate to check for understanding. As students demonstrate proficiency with both methods, allow them to work on the Problem Set independently.

NOTES ON MULTIPLE MEANS OF REPRESENTATION:

Continue to support struggling students with Hide Zero cards, horizontal notation, and chip models to help them see the value of the digits in each number.

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.

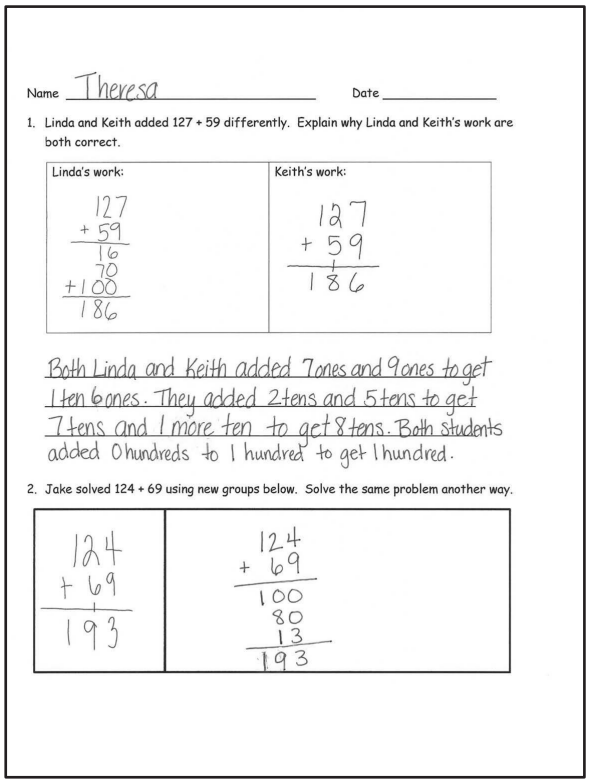
Student Debrief (10 minutes)

Lesson Objective: Compare totals below with new groups below as written methods.

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.


Name Theresa Date

1. Linda and Keith added 127 + 59 differently. Explain why Linda and Keith's work are both correct.

Linda's work:

127
+ 59
16
70
+100
186

Keith's work:

127
+ 59
186

Both Linda and Keith added 7 ones and 9 ones to get 1 ten 6 ones. They added 2 tens and 5 tens to get 7 tens and 1 more ten to get 8 tens. Both students added 0 hundreds to 1 hundred to get 1 hundred.

2. Jake solved 124 + 69 using new groups below. Solve the same problem another way.

124
+ 69
193

124
+ 69
100
80
13
193

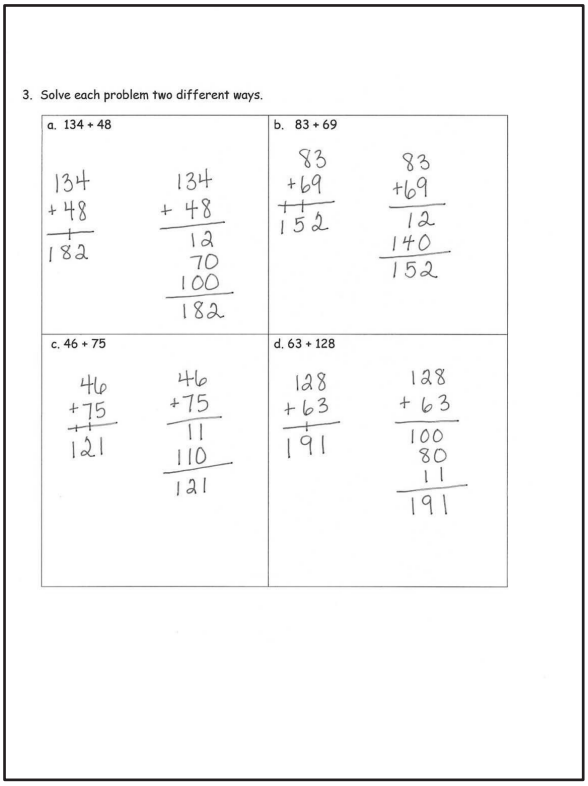
- For Problem 1, explain to your partner why Linda and Keith are both correct. How did each method show the addition of the ones, 7 + 9?
- Explain the other strategy you used to solve Problem 2.
- For Problem 3, explain to your partner how you solved one of the problems two different ways (i.e., new groups below and totals below)? How were they the same and different?

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- What do you need to know before you can record totals below correctly? How is this method similar to writing numbers in expanded form?
- Which method, new groups below or totals below, is fastest and/or easiest for you? Why?

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.



3. Solve each problem two different ways.

a. 134 + 48

134 + 48 = 182

134 + 48 = 12 + 70 + 100 + 182

b. 83 + 69

83 + 69 = 152

83 + 69 = 12 + 140 + 152

c. 46 + 75

46 + 75 = 121

46 + 75 = 11 + 110 + 121

d. 63 + 128

128 + 63 = 191

128 + 63 = 100 + 80 + 11 + 191

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A

Number Correct: _____

Subtraction Crossing a Ten

1.	30 – 1 =	
2.	40 – 2 =	
3.	50 – 3 =	
4.	50 – 4 =	
5.	50 – 5 =	
6.	50 – 9 =	
7.	51 – 9 =	
8.	61 – 9 =	
9.	81 – 9 =	
10.	82 – 9 =	
11.	92 – 9 =	
12.	93 – 9 =	
13.	93 – 8 =	
14.	83 – 8 =	
15.	33 – 8 =	
16.	33 – 7 =	
17.	43 – 7 =	
18.	53 – 6 =	
19.	63 – 6 =	
20.	63 – 5 =	
21.	73 – 5 =	
22.	93 – 5 =	

23.	31 – 2 =	
24.	31 – 3 =	
25.	31 – 4 =	
26.	41 – 4 =	
27.	51 – 5 =	
28.	61 – 6 =	
29.	71 – 7 =	
30.	81 – 8 =	
31.	82 – 8 =	
32.	82 – 7 =	
33.	82 – 6 =	
34.	82 – 3 =	
35.	34 – 5 =	
36.	45 – 6 =	
37.	56 – 7 =	
38.	67 – 8 =	
39.	78 – 9 =	
40.	77 – 9 =	
41.	64 – 6 =	
42.	24 – 8 =	
43.	35 – 8 =	
44.	36 – 8 =	

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B

Number Correct: _____

Improvement: _____

Subtraction Crossing a Ten

1.	20 – 1 =	
2.	30 – 2 =	
3.	40 – 3 =	
4.	40 – 4 =	
5.	40 – 5 =	
6.	40 – 9 =	
7.	41 – 9 =	
8.	51 – 9 =	
9.	71 – 9 =	
10.	72 – 9 =	
11.	82 – 9 =	
12.	83 – 9 =	
13.	83 – 8 =	
14.	93 – 8 =	
15.	23 – 8 =	
16.	23 – 7 =	
17.	33 – 7 =	
18.	43 – 6 =	
19.	53 – 6 =	
20.	53 – 5 =	
21.	63 – 5 =	
22.	83 – 5 =	

23.	21 – 2 =	
24.	21 – 3 =	
25.	21 – 4 =	
26.	31 – 4 =	
27.	41 – 5 =	
28.	51 – 6 =	
29.	61 – 7 =	
30.	71 – 8 =	
31.	72 – 8 =	
32.	72 – 7 =	
33.	72 – 6 =	
34.	72 – 3 =	
35.	24 – 5 =	
36.	35 – 6 =	
37.	46 – 7 =	
38.	57 – 8 =	
39.	68 – 9 =	
40.	67 – 9 =	
41.	54 – 6 =	
42.	24 – 9 =	
43.	35 – 9 =	
44.	46 – 9 =	

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Name _____ Date _____

1. Linda and Keith added 127 + 59 differently. Explain why Linda's work and Keith's work are both correct.

Linda's work:	Keith's work:
127 + 59 16 70 +100 186	127 + 59 186

_____

_____

_____

2. Jake solved 124 + 69 using new groups below. Solve the same problem another way.

124 + 69 193	

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3. Solve each problem two different ways.

a. 134 + 48	b. 83 + 69
c. 46 + 75	d. 63 + 128

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Name _____ Date _____

1. Kevin solved 166 + 25 using totals below. Solve the same problem another way.

166 + 25 11 80 100 191	

2. Explain how Kevin's work and your work are similar.

_____

_____

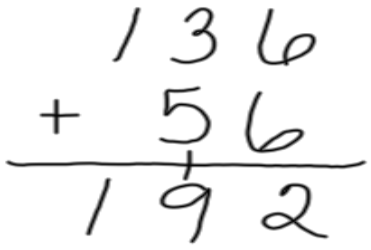
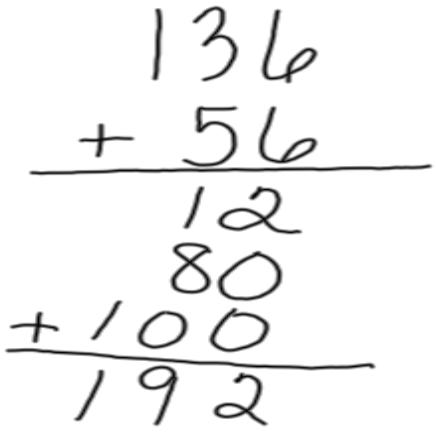
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Name _____ Date _____

1. Kari and Marty solved 136 + 56.

Kari's work:	Marty's work:
	

Explain what is different about how Kari and Marty solved the problem.

_____

_____

_____

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2. Here is one way to solve 145 + 67. For (a), solve 145 + 67 another way.

145 + 67 11 212	a.

b. Explain how the two ways to solve 145 + 67 are similar.

3. Show another way to solve 142 + 39.

142 + 39 11 70 100 181	

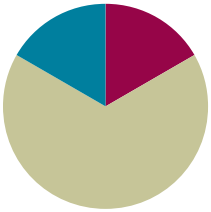
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Lesson 31

Objective: Solve two-step word problems within 100.

Suggested Lesson Structure

Fluency Practice	(10 minutes)
Concept Development	(40 minutes)
Student Debrief	(10 minutes)
Total Time	**(60 minutes)**



Fluency Practice (10 minutes)

- Find the Total **2.NBT.5** (5 minutes)
- Find the Difference **2.NBT.5** (5 minutes)

Find the Total (5 minutes)

Materials: (S) Personal white board

Note: Reviewing this mental math fluency prepares students to solve word problems in today's lesson.

T: (Write 32 + 64 =____.) Solve using any method.
T: Write 1 hundred to change 32 to 132. What is the total now?
S: 196.

Continue with the following possible sequence: 25 + 74, 125 + 74; 58 + 32, 158 + 32; and 32 + 48, 132 + 48.

Find the Difference (5 minutes)

Materials: (S) Personal white board

Note: Reviewing subtraction problems in sets prepares students to solve word problems in today's lesson.

T: (Write 48 – 24 =____.) Write a subtraction sentence horizontally or vertically.

Continue with the following possible sequence: 48 – 24, 40 – 24; 56 – 15, 50 – 15, 52 – 15; 64 – 38, 60 – 38, and 61 – 38.

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Concept Development (40 minutes)

Materials: (S) Math journal or personal white board

Note: Prepare Problems 1 through 4 in advance for either display or distribution to students.

Suggested Delivery of Instruction for Solving Lesson 31's Word Problems

1. Model the problem.

Invite two pairs of students, who can successfully model the problem, to work at the board while the others work independently or in pairs at their seats. Review the following questions before solving the first problem.

- Can you draw something?
- What can you draw?
- What conclusions can you make from your drawing?

As students work, circulate. Reiterate the questions above and guide them in drawing their tape diagrams.

After two minutes, have the two pairs of students share *only* their labeled diagrams.

NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

Students who are struggling benefit from an opportunity to model the problems on the board. Encourage them to try. Guide them if they are stuck, or encourage them to seek help from a friend. Praise their hard work when they successfully achieve the desired results.

For about one minute, encourage the demonstrating students to respond to feedback and questions from their peers.

2. Solve and write a statement.

Discuss strategies for solving problems, drawing attention to the strategy chart created during the Debrief in Lesson 5. Give students two minutes to solve and complete the question, sharing their work and thought processes with a peer.

Then instruct students to write their equations and statements of the answer.

3. Assess the solution for reasonableness.

Give students one to two minutes to assess and explain the reasonableness of their solution.

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Problem 1

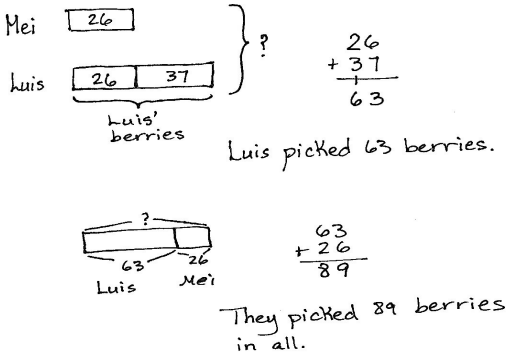
Solve a two-step *add to with result unknown* word problem using a tape diagram.

Mei picked 26 berries. Luis picked 37 more berries than Mei.

a. How many berries did Luis pick?

b. How many berries did they pick in all?

Circulate and ask guiding questions as needed to help students identify the steps in the problem and to determine if they are looking for the whole or a missing part. Once they draw their tape diagram, they may solve using any written method that they can explain and relate to their drawings.



Problem 2

Solve a two-step *take from/add to with result unknown* word problem by drawing a tape diagram. Then, students may use any strategy they have learned to solve.

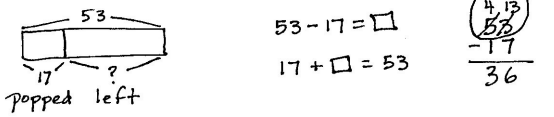
Kevin had 53 balloons. His cat popped 17 of them. His father gives him 18 more balloons. How many balloons does Kevin have now?

MP.1

Drawing tape diagrams is essential to understanding the relationships within the problem. Equally important is that teachers encourage students to be flexible in their thinking while solving. A student might recognize, for example, that 17 balloons were popped and 18 given, so Kevin has 1 more than he started with.

NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

Encourage students who have not mastered the computation methods to focus on understanding the word problem and using manipulatives to compute the answers.

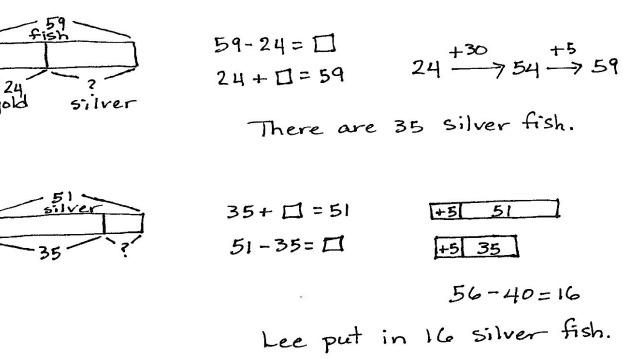


Problem 3

Solve a two-step *change unknown* problem by drawing a tape diagram.

Lee's fish tank has 24 goldfish and some silver fish. In all, there are 59 fish in the aquarium. Lee puts in some more silver fish. Now, there are 51 silver fish. How many silver fish did Lee put in the tank?

Solve this as a guided practice. Have students talk through each piece of information in the problem, drawing and labeling as they go. Prompt them with the question, "What do we know?" Then, write an equation that matches that situation. Allow students to solve using methods they are comfortable with; problem solving is about sense-making. Mental math is acceptable.



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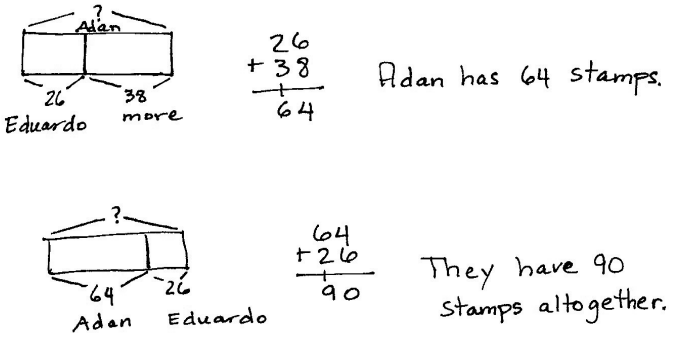
Problem 4

Solve a two-step comparison problem by drawing a tape diagram and using a preferred method to solve.

MP.1

Eduardo collects 26 stamps. Adan collects 38 more than Eduardo. How many stamps do they have altogether?

Circulate and encourage students to use their favorite method to solve. Remind them to be prepared to explain their strategy using place value language.



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.

Student Debrief (10 minutes)

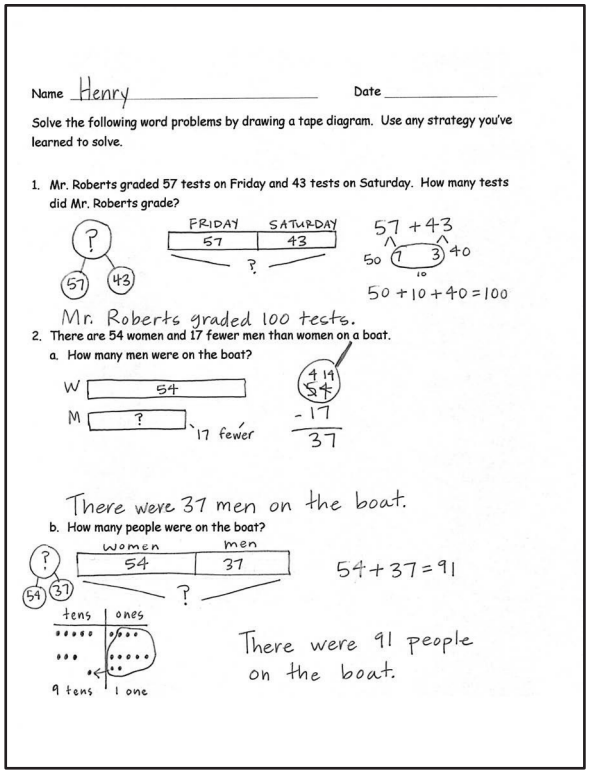
Lesson Objective: Solve two-step word problems within 100.

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.

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

- Explain the strategy you used to solve Problem 1. Use place value language to defend the reasonableness of your solution.
- How did you draw a tape diagram for Problem 3(a)? Explain to your partner the conclusions you can make from your drawing. How did your drawing help you to choose a strategy to solve?


Name Henry Date

Solve the following word problems by drawing a tape diagram. Use any strategy you've learned to solve.

1. Mr. Roberts graded 57 tests on Friday and 43 tests on Saturday. How many tests did Mr. Roberts grade?

FRIDAY 57 SATURDAY 43 ?

57 + 43 = 50 + 10 + 40 = 100

Mr. Roberts graded 100 tests.

2. There are 54 women and 17 fewer men than women on a boat.
   a. How many men were on the boat?

W 54
M ? 17 fewer

54 − 17 = 37

There were 37 men on the boat.

   b. How many people were on the boat?

women 54 men 37 ?

54 + 37 = 91

tens ones
9 tens 1 one

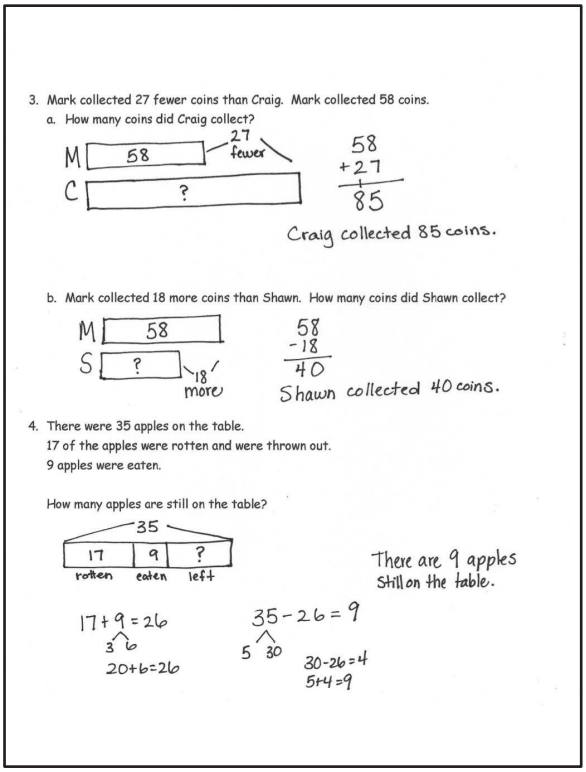
There were 91 people on the boat.

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- In Problem 3(b), what is tricky about the word *more*? How did you represent this situation in your tape diagram? Explain the strategy you used to solve.
- In Problem 4, how did you match each piece of information in the problem with your labeled tape diagram? Which strategy did you use to solve? Why?
- What steps do you recommend for solving word problems? What questions do you ask yourself before, during, and after solving?

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.


3. Mark collected 27 fewer coins than Craig. Mark collected 58 coins.
a. How many coins did Craig collect?
M 58 — 27 fewer
C ?
58 + 27 = 85
Craig collected 85 coins.
b. Mark collected 18 more coins than Shawn. How many coins did Shawn collect?
M 58
S ? — 18 more
58 - 18 = 40
Shawn collected 40 coins.
4. There were 35 apples on the table.
17 of the apples were rotten and were thrown out.
9 apples were eaten.
How many apples are still on the table?
35
17 rotten | 9 eaten | ? left
There are 9 apples still on the table.
17 + 9 = 26
3 6
20+6=26
35 - 26 = 9
5 30
30-26=4
5+4=9

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Name _____ Date _____

Solve the following word problems by drawing a tape diagram. Use any strategy you have learned to solve.

1. Mr. Roberts graded 57 tests on Friday and 43 tests on Saturday. How many tests did Mr. Roberts grade?

2. There are 54 women and 17 fewer men than women on a boat.

   a. How many men are on the boat?

   b. How many people are on the boat?

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3. Mark collected 27 fewer coins than Craig. Mark collected 58 coins.
   a. How many coins did Craig collect?

   b. Mark collected 18 more coins than Shawn. How many coins did Shawn collect?

4. There were 35 apples on the table. 17 of the apples were rotten and were thrown out. 9 apples were eaten. How many apples are still on the table?

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Name _____ Date _____

Solve the following word problems by drawing a tape diagram. Then, use any strategy that you've learned to solve.

1. Sandra has 46 fewer coins than Martha. Sandra has 57 coins.

   a. How many coins does Martha have?

   b. How many coins do Sandra and Martha have together?

2. There are 32 brown dogs and 19 white dogs at the park. 16 more brown dogs come to the park. How many dogs are there now at the park?

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Name _____ Date _____

1. Melissa had 56 pens and 37 more pencils than pens.
   a. How many pencils did Melissa have?

   b. How many pens and pencils did Melissa have?

2. Antonio gave 27 tomatoes to his neighbor and 15 to his brother. He had 72 tomatoes before giving some away. How many tomatoes does Antonio have left?

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3. The bakery made 92 muffins. Seventeen were blueberry, 23 were cranberry, and the rest were chocolate chip. How many chocolate chip muffins did the bakery make?

4. After spending $43 on groceries and $19 on a book, Mrs. Groom had $16 left. How much money did Mrs. Groom have to begin with?

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Name _____ Date _____

1. Solve mentally:

a. 72 + 10 = _____	b. _____ = 73 – 10	c. _____ + 10 = 174
d. 83 + 100 = _____	e. _____ = 182 – 100	f. _____ – 100 = 81
g. 65 + 40 = _____	h. _____ = 166 – 40	i. 127 + _____ = 167
j. 85 + 42 = _____	k. _____ = 186 – 41	l. 189 – 47 = _____

2. Solve:
   a. Find the solution and model how you found your answer.

87 + 56 =	Model:
38 + 68 + 71 + 12 =	Model:

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b. Solve and explain your answer using place value.

91 – 24 =	154 + 27 =
105 – 42 =	86 + 45 =

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c. Susan and James solved 125 + 32 in different ways. Explain why both ways are correct.

Susan's Way:	James's Way:
125 + 32 125 +10→ 135 +10→ 145 +10→ 155 +2→ 157	125 + 32 125 + 30 + 2 = 157
Explanation:	Explanation:

3. Find the missing numbers to make each statement true. Show your mental math strategy.

a. 98 $\xrightarrow{+10}$ _____ $\xrightarrow{+__}$ 109

b. 6 tens + 4 ones = 70 – _____

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c. 25 + 75 = _____ + 30

d. 39 + _____ = 82

e. 100 – _____ = 45 + 15 + 32

4. Sally went shopping. She spent $86 on groceries and $39 on clothing.

   a. How much more did Sally spend on groceries than on clothing? Show your work.

   b. After Sally's shopping trip, she had $12 left. How much money did she have to begin with? Show your work.

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c. If Sally hadn't purchased the clothing, would she have been able to afford a $55 necklace? Explain your answer.

d. How much money would Sally need to buy the groceries, the clothing, and the necklace? Show your work with a model.

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End-of-Module Assessment Task Standards Addressed	Topics A–F

Represent and solve problems involving addition and subtraction.

2.OA.1 Use addition and subtraction within 100 to solve one- and two-step problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

Use place value understanding and properties of operations to add and subtract.

2.NBT.5 Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

2.NBT.6 Add up to four two-digit numbers using strategies based on place value and properties of operations.

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.)

Evaluating Student Learning Outcomes

A Progression Toward Mastery is provided to describe steps that illuminate the gradually increasing understandings that students develop on their way to proficiency. In this chart, this progress is presented from left (Step 1) to right (Step 4). The learning goal for students is to achieve Step 4 mastery. These steps are meant to help teachers and students identify and celebrate what the students CAN do now and what they need to work on next.

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A Progression Toward Mastery				
Assessment Task Item and Standards Assessed	**STEP 1 Little evidence of reasoning without a correct answer. (1 Point)**	**STEP 2 Evidence of some reasoning without a correct answer. (2 Points)**	**STEP 3 Evidence of some reasoning with a correct answer or evidence of solid reasoning with an incorrect answer. (3 Points)**	**STEP 4 Evidence of solid reasoning with a correct answer. (4 Points)**
1 **2.NBT.8** **2.NBT.7**	The student correctly solves one to three of twelve parts.	The student correctly solves four to seven of twelve parts.	The student correctly solves eight to eleven of twelve parts.	The student correctly solves to find: a. 82 b. 63 c. 164 d. 183 e. 82 f. 181 g. 105 h. 126 i. 40 j. 127 k. 145 l. 142

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A Progression Toward Mastery				
2 **2.NBT.6** **2.NBT.7** **2.NBT.9**	The student correctly solves one to four of fourteen parts.	The student correctly solves five to nine of fourteen parts.	The student correctly solves ten to thirteen of fourteen parts.	For Part (a), the student correctly: ▪ Solves to find 143. ▪ Shows an accurate model for 87 + 56. ▪ Solves to find 189. ▪ Shows an accurate model for 38 + 68 + 71 + 12. ▪ Uses and models place value strategies such as arrow notation, adding the same amount to the subtrahend as to the minuend to make a multiple of ten, adding or subtracting a multiple of 10 and adjusting the solution as necessary, or other strategies as noted in the Module Overview. For Part (b), the student correctly: ▪ Solves to find 67, 181, 63, and 131. ▪ Shows an accurate explanation for each problem. For Part (c), the student correctly: ▪ Explains why both Susan and James's strategies are correct.

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A Progression Toward Mastery				
3 **2.NBT.5** **2.NBT.6** **2.NBT.8**	The student correctly solves one of five problems and models fewer than two mental math strategies.	The student correctly solves two of five problems and models at least two mental math strategies.	The student correctly solves three to four of five problems and models at least four mental math strategies.	The student correctly: ▪ Solves to find a. 108, + 1 b. 6 c. 70 d. 43 e. 8 ▪ Uses and models place value strategies such as arrow notation, adding the same amount to the subtrahend as to the minuend to make a multiple of ten, adding or subtracting a multiple of 10 and adjusting the solution as necessary, or other strategies as noted in the Module Overview.
4 **2.OA.1** **2.NBT.5** **2.NBT.6** **2.NBT.7**	The student correctly solves one of six parts.	The student correctly solves two or three of six parts.	The student correctly solves four or five of six parts.	The student correctly answers: a. $47 b. $137 c. "No," and provides an accurate explanation. d. $180.00 with an accurate model.

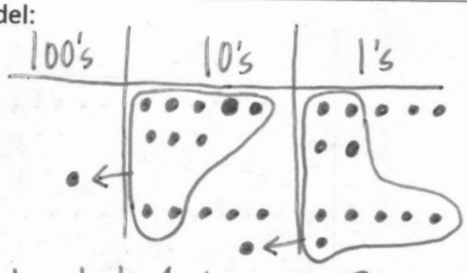
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Name Henry Date

1. Solve mentally:

a. 72 + 10 = 82	b. 63 = 73 – 10	c. 164 + 10 = 174
d. 83 + 100 = 183	e. 82 = 182 – 100	f. 181 – 100 = 81
g. 65 + 40 = 105	h. 126 = 166 – 40	i. 127 + 40 = 167
j. 85 + 42 = 127	k. 145 = 186 – 41	l. 189 – 47 = 142

2. Solve:
   a. Find the solution and model how you found your answer.

87 + 56 = 143	Model:  87 + 56 143 1 hundred 4 tens 3 ones
38 + 68 + 71 + 12 = 189	Model: 38 + 68 + 71 + 12 40 + 68 = 108 – 2 = 106 71 +10→ 81 +2→ 83 106 +80→ 186 +3→ 189

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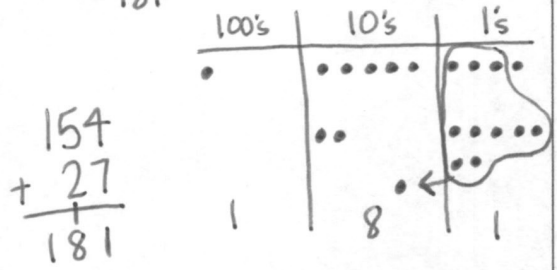
b. Solve and explain your answer using place value.

91 – 24 = 67

91 –20→ 71 –1→ 70 –3→ 67

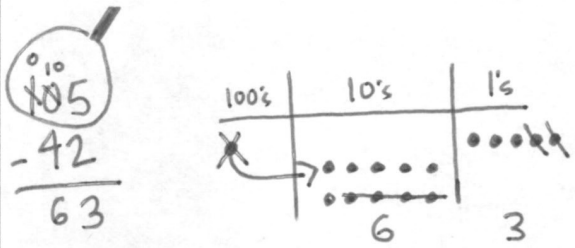
I started by subtracting 2 tens from 91. Then I subtracted the ones.

154 + 27 = 181



First I added the ones. There were 11 ones so I bundled a ten to make 1 ten 1 one. Then I added the tens place. In the hundreds place I didn't have to add (there was 1).

105 – 42 = 63



I drew my magnifying glass and saw I had enough ones but not enough tens to subtract so I unbundled the hundred to give me 10 tens. Then I subtracted.

86 + 45 = 131

86+45

86 +40→ 126 +5→ 131

I know that 8+4=12 so 8 tens + 4 tens = 120. I used the arrow way to add on the tens first and then the ones.

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c. Susan and James solved 125 + 32 in different ways. Explain why both ways are correct.

Susan's Way:	James' Way:
125 + 32 125 $\xrightarrow{+10}$ 135 $\xrightarrow{+10}$ 145 $\xrightarrow{+10}$ 155 $\xrightarrow{+2}$ 157	125 + 32 125 + 30 + 2 = 157
Explanation: Susan is correct because she added 32 by first adding 3 tens (1 ten at a time) and then 2 ones.	Explanation: James is correct because he broke 32 into tens and ones. He added 30 and then he added 2.

3. Find the missing numbers to make each statement true. Show your mental math strategy.

a. 98 $\xrightarrow{+10}$ 108 $\xrightarrow{+1}$ 109

b. 6 tens + 4 ones = 70 − 6

64 $\xrightarrow{+6}$ 70

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c. 25 + 75 = 70 + 30

25 + 75
5 ^ 70

30 + 70 = 70 + 30

d. 39 + 43 = 82

39 +1→ 40 +40→ 80 +2→ 82

e. 100 – 8 = 45 + 15 + 32

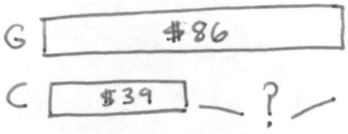
45 + 15 + 32
5 ^ 10

50 + 42 = 92
40 ^ 2

92 + 8 = 100

4. Sally went shopping. She spent $86 on groceries and $39 on clothing.

a. How much more did Sally spend on groceries than on clothing? Show your work.

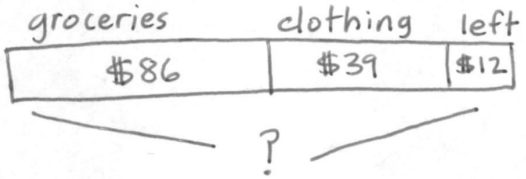


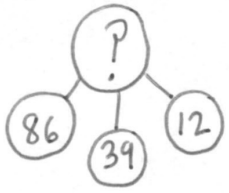
86 − 39

86 −30→ 56 −10→ 46 +1→ 47

Sally spent $47 more on groceries than clothing.

b. After Sally's shopping trip she had $12 left. How much money did she have to begin with? Show your work.





86 + 39 + 12
1 ^ 11

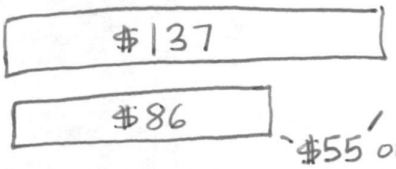
86 + 40 + 11

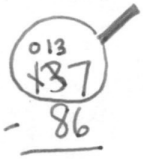
86 +40→ 126 +10→ 136 +1→ 137

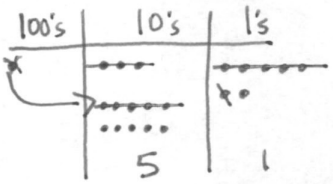
Sally had $137 to start.

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c. If Sally hadn't purchased the clothing would she have been able to afford a $55 necklace? Explain your answer.

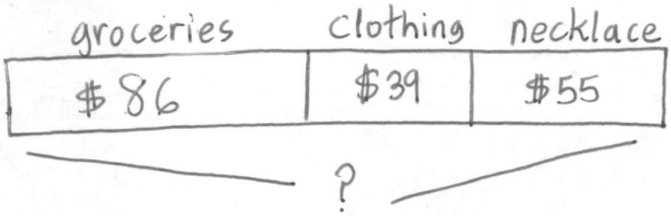


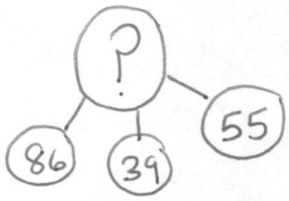




No! Even if Sally hadn't bought the clothes she would not have had enough to buy the necklace. After the groceries she only had $51.

d. How much money would Sally need to buy the groceries, clothing, and the necklace? Show your work with a model.





86 + 39 + 55

85 (1) 40

85 + 40 + 55

5 50

90 + 90 = 180

Sally would have needed $180 to buy the groceries, clothing, and necklace.

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Answer Key

Eureka Math Grade 2 Module 4

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Answer Key

GRADE 2 • MODULE 4

Addition and Subtraction Within 200 with Word Problems to 100

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Lesson 1

Problem Set

1. a. 67
   b. 76
   c. 65
   d. 56
   e. 46
   f. 89
   g. 57
   h. 73
   i. 10 less
   j. 1 less
2. a. 1 less
   b. 10 more
3. a. 40, 41, 42
   b. 38, 28, 18
   c. 49, 48, 47
   d. 29, 39, 49
4. a. 40; 66; 32; 79
   b. 33, 10; 77, 76
   c. 58, 10, 78, 79, 80
5. a. 55, 54, 53, 43, 33
   b. 60, 59, 69, 79, 78
6. a. Problem solved using the arrow way; 62
   b. Problem solved using the arrow way; 49

Exit Ticket

1. a. 43, 42, 41
   b. 28, 18, 8
   c. 52, 62, 61
2. a. Answers will vary.
   b. Answers will vary.

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Homework

1. a. 38
   b. 47
   c. 36
   d. 27
   e. 48
   f. 30
   g. 35
   h. 39
   i. 1 less
   j. 10 more
2. a. 46, 47; +1
   b. 34, 14; –10
   c. 54, 64; +10
   d. 44, 41; –1
   e. 64, 54, 24; -10
   f. 40, 39; –1
3. a. True
   b. False
   c. False
   d. False
4. a. 60; 51; blue
   b. Problem solved using the arrow way; 48

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Lesson 2

Problem Set

1. a. 8, 80; 9, 90
   b. 54, 74, 64
   c. 57, 77, 87
   d. 30, 40, 50
   e. 30, 40, 60
2. a. 6, 60; 4, 40
   b. 38, 26, 38
   c. 60, 20, 50
   d. 60, 20, 50
3. a. 30
   b. 57
   c. 2 tens
   d. 3 tens
   e. 2 tens 8 ones
4. 48; arrow way will vary.

Exit Ticket

1. 70
2. 7
3. 2
4. 83
5. 2

Homework

1. a. 5, 50; 5, 4, 54
   b. 9, 90; 9, 9, 99
   c. 68; 48; 98
   d. 55; 85; 35
   e. 10; 30; 70
   f. 40; 50; 80
2. a. 63 > 53
   b. 68 = 68
   c. 79 > 69
   d. 74 > 69
   e. 91 < 98
   f. 85 < 86
3. a. 4, 40; 3, 3, 33
   b. 3, 30; 3, 9, 39
   c. 35, 45, 35
   d. 50, 30, 60
   e. 20, 20, 30
4. a. 38
   b. 76
   c. 68
   d. 14
5. 28; arrow way will vary.

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Lesson 3

Sprint

Side A

1.	4	12.	60	23.	80	34.	70
2.	40	13.	63	24.	84	35.	72
3.	41	14.	45	25.	57	36.	36
4.	32	15.	20	26.	20	37.	30
5.	2	16.	25	27.	29	38.	36
6.	20	17.	43	28.	56	39.	72
7.	25	18.	59	29.	97	40.	93
8.	34	19.	37	30.	37	41.	57
9.	57	20.	8	31.	64	42.	13
10.	9	21.	48	32.	37	43.	86
11.	79	22.	49	33.	39	44.	88

Side B

1.	3	12.	70	23.	70	34.	60
2.	30	13.	73	24.	75	35.	63
3.	31	14.	55	25.	48	36.	27
4.	22	15.	30	26.	10	37.	40
5.	1	16.	34	27.	19	38.	46
6.	10	17.	52	28.	46	39.	82
7.	15	18.	66	29.	87	40.	83
8.	24	19.	44	30.	27	41.	47
9.	47	20.	8	31.	54	42.	23
10.	9	21.	58	32.	47	43.	76
11.	69	22.	59	33.	49	44.	78

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Problem Set

1. Solved using the arrow way
   a. 58, 59, 57
   b. 87, 88, 86
   c. 24, 23, 25
   d. 25, 24, 26
2. a. 69, 70, 68
   b. 93, 94, 92
   c. 64, 63, 65
   d. 53, 55, 57
   e. 44, 23, 56
3. 90

Exit Ticket

1. Solved using the arrow way or number bonds
   a. 73
   b. 92
   c. 31
   d. 9
2. Answers will vary.

Homework

1. Solved using the arrow way
   a. Answers provided.
   b. 96, 97, 95
   c. 28, 27, 29
   d. 37, 36, 38
2. a. 28, 27, 29
   b. 36, 35, 37
   c. 77, 78, 76
   d. 92, 93, 91
   e. 37, 36, 38
   f. 78, 79, 77
3. $45
4. a. 43 cm
   b. Yes

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Lesson 4

Problem Set

1. Tape diagram drawn and labeled
   a. 23 – 9 = 24 – 10 = 14
   b. 32 – 19 = 33 – 20 = 13
   c. 50 – 29 = 51 – 30 = 21
   d. 47 – 28 = 49 – 30 = 19
2. Tape diagram drawn and labeled
   a. 29 + 46 = 30 + 45 = 75
   b. 38 + 45 = 40 + 43 = 83
   c. 61 + 29 = 60 + 30 = 90
   d. 27 + 68 = 25 + 70 = 95

Exit Ticket

1. Tape diagram drawn and labeled
   a. 26 + 38 = 24 + 40 = 64
   b. 83 – 46 = 87 – 50 = 37
2. Drawings will vary; 9

Homework

1. Tape diagram drawn and labeled
   a. 17 – 9 = 18 – 10 = 8
   b. 33 – 19 = 34 – 20 = 14
   c. 60 – 29 = 61 – 30 = 31
   d. 56 – 38 = 58 – 40 = 18
2. Number bond drawn
   a. 28 + 43 = 30 + 41 = 71
   b. 49 + 26 = 50 + 25 = 75
   c. 43 + 19 = 42 + 20 = 62
   d. 67 + 28 = 65 + 30 = 95
3. Drawings will vary; 35 oranges.

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Lesson 5

Sprint

Side A

1.	4	12.	60	23.	80	34.	70
2.	40	13.	63	24.	84	35.	72
3.	41	14.	45	25.	57	36.	36
4.	32	15.	20	26.	20	37.	30
5.	2	16.	25	27.	29	38.	36
6.	20	17.	43	28.	56	39.	72
7.	25	18.	59	29.	97	40.	93
8.	34	19.	37	30.	37	41.	57
9.	57	20.	8	31.	64	42.	13
10.	9	21.	48	32.	37	43.	86
11.	79	22.	49	33.	39	44.	88

Side B

1.	3	12.	70	23.	70	34.	60
2.	30	13.	73	24.	75	35.	63
3.	31	14.	55	25.	48	36.	27
4.	22	15.	30	26.	10	37.	40
5.	1	16.	34	27.	19	38.	46
6.	10	17.	52	28.	46	39.	82
7.	15	18.	66	29.	87	40.	83
8.	24	19.	44	30.	27	41.	47
9.	47	20.	8	31.	54	42.	23
10.	9	21.	58	32.	47	43.	76
11.	69	22.	59	33.	49	44.	78

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Problem Set

1. 87
2. 38
3. 75
4. a. 39
   b. 107
5. a. 15
   b. 62
6. 24

Exit Ticket

1. a. 83
   b. 42
2. 87

Homework

1. 81
2. 33
3. 75
4. a. 96 cm
   b. 29 cm
5. a. $47
   b. $66
   c. $79

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Lesson 6

Problem Set

1. a. 14, 38, 44, 84
   b. 12, 27, 32, 82
2. a. 40, 41
   b. 30, 31
   c. 69, 72
   d. 90, 92
   e. 71, 68
   f. 81, 83
   g. 86, 88
3. 72
4. a. 41
   b. 37
   c. 66

Exit Ticket

1. 72
2. 71
3. 92

Homework

1. a. 13, 39, 43, 83
   b. 14, 28, 34, 84
2. a. 30, 31
   b. 30, 32
   c. 48, 51
   d. 70, 72
   e. 88, 93
   f. 100, 103
   g. 101, 98
   h. 90, 93
   i. 93, 89
3. 85
4. 93
5. $63

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Lesson 7

Problem Set

1. a. 30, 30
   b. 51, 51
   c. 82, 82
   d. 95, 95
2. 85
3. a. 64
   b. 93

Exit Ticket

1. a. 81
   b. 81
2. Answers will vary.

Homework

1. a. 40, 40
   b. 60, 60
   c. 93, 93
2. 41, 52
3. 91
4. a. 64 cm
   b. 46 cm

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Lesson 8

Problem Set

1. a. 42; solved vertically; disks drawn
   b. 70; solved vertically; disks drawn
   c. 79; solved vertically; disks drawn
   d. 92; solved vertically; disks drawn
   e. 72; solved vertically; disks drawn
   f. 86; solved vertically; disks drawn
2. 50
3. 84

Exit Ticket

11 ones bundled instead of 10 ones; 94; solved vertically; disks drawn

Homework

1. a. 61; solved vertically; disks drawn
   b. 42; solved vertically; disks drawn
   c. 62; solved vertically; disks drawn
   d. 69; solved vertically; disks drawn
   e. 91; solved vertically; disks drawn
2. 52
3. 66 cm

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Lesson 9

Sprint

Side A

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

Side B

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

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Problem Set

1. a. 139
   b. 190
   c. 142
   d. 195
2. a. 162
   b. 181

Exit Ticket

1. 154 + 37 = 191
2. 175

Homework

1. a. 141
   b. 181
   c. 145
2. 148 + 26 = 174
3. a. 71
   b. 67

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Lesson 10

Sprint

Side A

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

Side B

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

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Problem Set

1. a. 145
   b. 152
   c. 150
   d. 177
   e. 186; 1, 7, 16; 1, 8, 6
2. a. $58
   b. $94

Exit Ticket

1. 164
2. 1, 5, 14
   1, 6, 4
   Explanations will vary.

Homework

1. a. 142
   b. 162
   c. 163
   d. 187
2. 158 + 34 = 192; 1, 9, 2
3. a. 57
   b. 92

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Lesson 11

Problem Set

1. a. 1, 31, 30, 29
   b. 1, 81, 80, 79
2. a. 21, 19
   b. 20, 19
   c. 25, 28
   d. 25, 19
   e. 28, 18
   f. 42, 52
3. 28; explanations will vary.
4. 15
5. 42

Exit Ticket

1. 15
2. 46

Homework

1. a. 1, 21, 20, 19
   b. 1, 51, 50, 49
2. a. 31, 29
   b. 31, 29
   c. 35, 36
   d. 26, 29
   e. 34, 36
   f. 29, 39
3. a. 14; explanations will vary.
   b. 39; explanations will vary.
4. a. 45 – 37 = 8
   b. 52 – 37 = 15
   c. 48 – 37 = 11
   d. 55 – 37 = 18

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Lesson 12

Problem Set

1. a. Answer provided
   b. 8
   c. 9
   d. 7
   e. 24
   f. 44
2. Pam; explanations will vary.
3. a. 25
   b. 17

Exit Ticket

Sherry forgot to unbundle a ten.

Homework

1. a. Answer provided
   b. 25
   c. 18
   d. 28
   e. 35
   f. 47
2. a. 9
   b. 28
   c. 9

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Lesson 13

Sprint

Side A

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

Side B

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

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Problem Set

1. a. 12
   b. 22
   c. 18
   d. 18
   e. 18
   f. 19
2. 4; 10; false
3. 35; 35; true
4. 13

Exit Ticket

1. 47
2. 28

Homework

1. a. 16
   b. 26
   c. 43
2. a. 12
   b. 23
   c. 12
   d. 23
   e. 22
   f. 23

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Lesson 14

Problem Set

1. a. 111
   b. 128
   c. 107
   d. 135
   e. 138
2. a. 35
   b. 135

Exit Ticket

1. 117
2. 112

Homework

1. a. 114
   b. 114
   c. 118
2. a. 105
   b. 117
3. a. 165 – 28 = 137; 137
   b. 165 – 19 = 146; 146
   c. 137 – 19 = 118; 118

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Lesson 15

Sprint

Side A

1. 51	12. 21	23. 44	34. 30
2. 62	13. 32	24. 30	35. 38
3. 73	14. 43	25. 36	36. 63
4. 84	15. 54	26. 10	37. 27
5. 93	16. 10	27. 17	38. 83
6. 21	17. 11	28. 10	39. 29
7. 31	18. 20	29. 18	40. 74
8. 29	19. 22	30. 44	41. 56
9. 38	20. 30	31. 40	42. 48
10. 47	21. 35	32. 41	43. 57
11. 56	22. 40	33. 43	44. 78

Side B

1. 41	12. 11	23. 44	34. 40
2. 52	13. 22	24. 30	35. 48
3. 63	14. 33	25. 36	36. 64
4. 74	15. 44	26. 10	37. 28
5. 83	16. 10	27. 17	38. 82
6. 91	17. 11	28. 10	39. 19
7. 21	18. 20	29. 18	40. 54
8. 19	19. 22	30. 35	41. 36
9. 28	20. 30	31. 50	42. 28
10. 37	21. 35	32. 51	43. 37
11. 46	22. 40	33. 44	44. 48

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Problem Set

1. a. 131
   b. 135
   c. 126
   d. 131
   e. 129
2. a. 17
   b. 117

Exit Ticket

1. 115
2. 108

Homework

1. a. 122
   b. 115
   c. 123
   d. 123
2. a. Lisa correctly modeled 166 on place value chart, unbundled 1 ten for 10 ones, subtracted 8 ones from 16 ones; explanations will vary.
   b. Lisa needs to fix vertical form, 4 tens from 5 tens is 1 ten, 4 tens should be crossed off on the place value chart, the answer should be 118; explanations will vary.

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Lesson 16

Problem Set

1. 41
2. 26
3. 34
4. 74
5. a. 18
   b. 25

Exit Ticket

1. a. 37
   b. 9

Homework

1. 47; models will vary.
2. 17
3. 12
4. 81

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Lesson 17

Problem Set

1. a. 8 ones; 8
   8 tens; 80
   b. 4 ones; 4
   4 tens; 40
   c. 1; 10
   10; 100
   20; 200
   d. 1; 10
   2; 200
   e. 2; 20
   2; 200

2. a. 1, 3; 13
   1, 3; 130
   b. 1, 2; 12
   1, 2; 120
   c. 1, 3; 13
   1, 3; 130

3. a. Answer provided
   b. 130, 200; 76, 200
   c. 10, 100, 200; 193, 200
   d. 100, 190, 200; 130, 200
   e. 40, 100, 130; 92, 130
   f. 100, 106, 146; 48, 146

Exit Ticket

1. a. 6 ones; 6; 6 tens; 60
   b. 1; 10; 2; 200
2. 70, 80, 90, 100; 37, 100

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Homework

1. a. 6 ones; 6
   6 tens; 60
   b. 3 ones; 3
   3 tens; 30
   c. 19; 19
   109; 109
   190; 190
   d. 1 ten; 10
   1 hundred; 100
   e. 1, 1; 11
   1, 1; 110
   f. 1, 8; 18
   1, 8; 180

2. a. 1, 1; 11
   1, 1; 110
   b. 1, 2; 12
   1, 2; 120
   c. 1, 7; 17
   1, 7; 170

3. a. Answer provided
   b. 80, 90, 100; 22, 100
   c. 70, 80, 90, 100, 200; 139, 200
   d. 30, 100, 200; 173, 200

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Lesson 18

Sprint

Side A

1.	39	12.	54	23.	92	34.	52
2.	49	13.	60	24.	94	35.	60
3.	59	14.	61	25.	80	36.	61
4.	69	15.	62	26.	81	37.	60
5.	39	16.	64	27.	82	38.	62
6.	49	17.	70	28.	85	39.	60
7.	59	18.	61	29.	70	40.	62
8.	69	19.	62	30.	71	41.	80
9.	50	20.	64	31.	84	42.	82
10.	51	21.	90	32.	50	43.	40
11.	52	22.	91	33.	51	44.	43

Side B

1.	29	12.	44	23.	82	34.	42
2.	39	13.	50	24.	84	35.	50
3.	49	14.	51	25.	70	36.	51
4.	59	15.	52	26.	71	37.	50
5.	29	16.	54	27.	72	38.	52
6.	39	17.	60	28.	75	39.	60
7.	49	18.	61	29.	60	40.	62
8.	59	19.	62	30.	61	41.	70
9.	40	20.	64	31.	62	42.	72
10.	41	21.	80	32.	40	43.	90
11.	42	22.	81	33.	41	44.	93

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Problem Set

1. a. 110; 130
   b. 111; 122
   c. 131; 141
   d. 121; 132
   e. 191; 200
2. a. 1st and 4th statements circled
   b. 1st, 2nd, and 4th statements circled
3. 45 + 95 = 140; 140
4. 130
5. Kim; explanations will vary.

Exit Ticket

1. 100
2. 105
3. 91
4. 156

Homework

1. a. 110; 130
   b. 122; 141
   c. 131; 142
   d. 162; 142
   e. 100; 200
2. a. 2nd and 4th statements circled
   b. 1st and 4th statements circled
3. a. 86 + 57 = 143; 143
   b. 129 + 78 = 207; 207
4. a. 100
   b. 111
   c. 121

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Lesson 19

Problem Set

1. a. 91
   b. 119
   c. 129
   d. 132
   e. 143
   f. 143
   g. 200
   h. 200
2. a. 117
   b. 196

Exit Ticket

1. 132
2. 167

Homework

1. a. 121
   b. 121
   c. 114
   d. 142
   e. 144
   f. 142
   g. 200
   h. 200
2. a. 123
   b. 197

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Lesson 20

Sprint

Side A

1.	39	12.	54	23.	92	34.	52
2.	49	13.	60	24.	94	35.	60
3.	59	14.	61	25.	80	36.	61
4.	69	15.	62	26.	81	37.	60
5.	39	16.	64	27.	82	38.	62
6.	49	17.	70	28.	85	39.	60
7.	59	18.	61	29.	70	40.	62
8.	69	19.	62	30.	71	41.	80
9.	50	20.	64	31.	84	42.	82
10.	51	21.	90	32.	50	43.	40
11.	52	22.	91	33.	51	44.	43

Side B

1.	29	12.	44	23.	82	34.	42
2.	39	13.	50	24.	84	35.	50
3.	49	14.	51	25.	70	36.	51
4.	59	15.	52	26.	71	37.	50
5.	29	16.	54	27.	72	38.	52
6.	39	17.	60	28.	75	39.	60
7.	49	18.	61	29.	60	40.	62
8.	59	19.	62	30.	61	41.	70
9.	40	20.	64	31.	62	42.	72
10.	41	21.	80	32.	40	43.	90
11.	42	22.	81	33.	41	44.	93

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Problem Set

1. a. 80
   b. 101
   c. 112
   d. 122
   e. 156
2. Explanations will vary.

Exit Ticket

1. 111
2. 131

Homework

1. a. 80
   b. 80
   c. 135
   d. 163
   e. 162
2. a. 67 and 83 circled
   b. 92 and 58 circled
   c. 75 and 75 circled

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Lesson 21

Problem Set

1. a. 140
   b. 113
   c. 110
   d. 190
2. Bundled 10 tens and renamed them as 1 hundred, both vertically and on the place value chart.
   Bundled 10 ones but forgot to rename them as 1 ten, both vertically and on the place value chart.

Exit Ticket

1. 125
2. 132

Homework

1. a. 121
   b. 151
   c. 176
   d. 205
2. a. 106
   b. 175

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Lesson 22

Problem Set

1. a. 17; 67; 167
   b. 15; 135; 145
   c. 20; 120; 170
2. Strategy to make 10 or 100 shown
3. Strategies will vary; $80

Exit Ticket

1. 98
2. 198

Homework

1. a. 16; 76; 166
   b. 15; 135; 165
   c. 20; 120; 190
2. a. 90
   b. 166
   c. 94
   d. Red and Green
   e. Blue and Black

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Lesson 23

Sprint

Side A

1.	9	12.	58	23.	15	34.	9
2.	8	13.	6	24.	85	35.	79
3.	18	14.	7	25.	3	36.	8
4.	38	15.	17	26.	4	37.	68
5.	8	16.	67	27.	24	38.	8
6.	9	17.	5	28.	2	39.	78
7.	19	18.	6	29.	3	40.	7
8.	49	19.	16	30.	33	41.	87
9.	7	20.	76	31.	1	42.	9
10.	8	21.	4	32.	2	43.	39
11.	18	22.	5	33.	42	44.	59

Side B

1.	8	12.	68	23.	15	34.	9
2.	18	13.	6	24.	35	35.	89
3.	28	14.	7	25.	3	36.	8
4.	48	15.	17	26.	4	37.	38
5.	8	16.	77	27.	44	38.	8
6.	9	17.	5	28.	2	39.	58
7.	19	18.	6	29.	3	40.	7
8.	59	19.	16	30.	53	41.	77
9.	7	20.	86	31.	1	42.	9
10.	8	21.	4	32.	2	43.	69
11.	18	22.	5	33.	22	44.	49

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Problem Set

1. a. Answer provided
   b. 26
   c. 34
   d. 35
   e. 53
   f. 67
   g. 69
   h. 69
   i. 76
   j. 72
2. 100 – 80 = 20; 20 + 26 = 46

Exit Ticket

1. 64
2. 86
3. 94

Homework

1. a. Answer provided.
   b. 31
   c. 32
   d. 65
   e. 76
   f. 79
   g. 76
   h. 98
2. 62
3. 78

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Lesson 24

Problem Set

1. a. 20; 19; 100; 99
   b. 110; 100; 90
2. a. 64; yes; no
   b. 116; no; yes
   c. 73; yes; yes
   d. 58; yes; yes
   e. 69; yes; yes
   f. 109; no; yes
   g. 12; yes; yes
   h. 89; yes; yes
   i. 58; yes; yes
   j. 76; yes; yes
   k. 108; no; yes
   l. 67; yes; yes
3. 78
4. a. 87
   b. 58

Exit Ticket

1. 83; yes; no
2. 78; yes; yes

Homework

1. a. 30; 29; 100; 99
   b. 110; 100; 90
2. a. 65; yes; no
   b. 68; yes; yes
   c. 49; no; yes
   d. 147; no; yes
   e. 77; yes; yes
   f. 96; yes; yes
   g. 32; yes; yes
   h. 33; yes; yes
   i. 75; yes; yes
   j. 94; yes; yes
   k. 85; yes; yes
   l. 49; yes; yes
3. 86

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Lesson 25

Problem Set

1. a. 23
   b. 34
   c. 88
   d. 33
   e. 91
   f. 89
   g. 38
   h. 29
2. 82 cookies
3. Yes; $68 left over

Exit Ticket

1. 28
2. 56

Homework

1. a. 27
   b. 17
   c. 51
   d. 53
   e. 97
   f. 89
   g. 16
   h. 69
2. $79
3. b. 144 – 88

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Lesson 26

Sprint

Side A

1. 29	12. 84	23. 29	34. 79
2. 38	13. 85	24. 28	35. 29
3. 47	14. 75	25. 27	36. 39
4. 46	15. 25	26. 37	37. 49
5. 45	16. 26	27. 46	38. 59
6. 41	17. 36	28. 55	39. 69
7. 42	18. 47	29. 64	40. 68
8. 52	19. 57	30. 73	41. 58
9. 72	20. 58	31. 74	42. 16
10. 73	21. 68	32. 75	43. 27
11. 83	22. 88	33. 76	44. 28

Side B

1. 19	12. 74	23. 19	34. 69
2. 28	13. 75	24. 18	35. 19
3. 37	14. 85	25. 17	36. 29
4. 36	15. 15	26. 27	37. 39
5. 35	16. 16	27. 36	38. 49
6. 31	17. 26	28. 45	39. 59
7. 32	18. 37	29. 54	40. 58
8. 42	19. 47	30. 63	41. 48
9. 62	20. 48	31. 64	42. 15
10. 63	21. 58	32. 65	43. 26
11. 73	22. 78	33. 66	44. 37

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Problem Set

1. a. 118
   b. 82
   c. 96
   d. 89
   e. 36
2. Tanisha; she forgot to take away 4 tens.

Exit Ticket

1. 107
2. 39

Homework

1. a. 49
   b. 83
   c. 52
   d. 59
   e. 58
2. 4; place value chart and chips drawn to model 123 – 54 = 69

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Lesson 27

Sprint

Side A

1.	9	12.	48	23.	18	34.	82
2.	90	13.	6	24.	15	35.	18
3.	89	14.	60	25.	85	36.	40
4.	89	15.	59	26.	30	37.	94
5.	8	16.	59	27.	29	38.	30
6.	80	17.	7	28.	28	39.	93
7.	79	18.	70	29.	25	40.	57
8.	79	19.	65	30.	75	41.	92
9.	5	20.	65	31.	90	42.	41
10.	50	21.	20	32.	89	43.	96
11.	48	22.	19	33.	88	44.	32

Side B

1.	5	12.	88	23.	28	34.	83
2.	50	13.	7	24.	25	35.	17
3.	49	14.	70	25.	75	36.	30
4.	49	15.	69	26.	20	37.	93
5.	8	16.	69	27.	19	38.	40
6.	80	17.	6	28.	18	39.	94
7.	79	18.	60	29.	15	40.	58
8.	79	19.	55	30.	85	41.	96
9.	9	20.	55	31.	90	42.	42
10.	90	21.	30	32.	89	43.	92
11.	88	22.	29	33.	88	44.	33

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Problem Set

1. a. 10
   b. 10
   c. 10
   d. 10
2. a. 39
   b. 21
   c. 193
   d. 113
   e. 74

Exit Ticket

1. 56
2. 124

Homework

1. a. 63
   b. 51
   c. 151
   d. 143
   e. 117
2. Answers will vary.

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Lesson 28

Problem Set

1. a. 53
   b. 69
   c. 45
   d. 77
2. 52
3. 63 stamps

Exit Ticket

1. 29
2. 74

Homework

1. a. 42
   b. 48
   c. 139
   d. 93
   e. 57
2. 64 shells

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Lesson 29

Problem Set

1. a. 46
   b. 93
2. a. 12, 170; 182
   b. 10, 20, 100; 130
   c. 6, 90, 100; 196
   d. 8, 90, 100; 198
   e. 9, 80, 100; 189
   f. 9, 90, 100; 199

Exit Ticket

1. 9, 100; 109
2. 11, 70, 100; 181
3. 12, 90, 100; 202
4. 9, 110, 100; 219

Homework

1. a. 15, 60; 75
   b. 11, 80, 100; 191
   c. 8, 110, 100; 218
   d. 9, 110, 100; 219
   e. 12, 70, 100; 182
   f. 10, 90, 100; 200
   g. 10, 100, 100; 210
   h. 11, 80, 100; 191
2. Solved vertically using totals below
   16, 130; 146 apples

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Lesson 30

Sprint

Side A

1. 29	12. 84	23. 29	34. 79
2. 38	13. 85	24. 28	35. 29
3. 47	14. 75	25. 27	36. 39
4. 46	15. 25	26. 37	37. 49
5. 45	16. 26	27. 46	38. 59
6. 41	17. 36	28. 55	39. 69
7. 42	18. 47	29. 64	40. 68
8. 52	19. 57	30. 73	41. 58
9. 72	20. 58	31. 74	42. 16
10. 73	21. 68	32. 75	43. 27
11. 83	22. 88	33. 76	44. 28

Side B

1. 19	12. 74	23. 19	34. 69
2. 28	13. 75	24. 18	35. 19
3. 37	14. 85	25. 17	36. 29
4. 36	15. 15	26. 27	37. 39
5. 35	16. 16	27. 36	38. 49
6. 31	17. 26	28. 45	39. 59
7. 32	18. 37	29. 54	40. 58
8. 42	19. 47	30. 63	41. 48
9. 62	20. 48	31. 64	42. 15
10. 63	21. 58	32. 65	43. 26
11. 73	22. 78	33. 66	44. 37

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Problem Set

1. Explanations will vary.
2. Solution strategies will vary.
3. Each problem solved two different ways
   a. 182
   b. 152
   c. 121
   d. 191

Exit Ticket

1. Solution strategies will vary.
2. Explanations will vary.

Homework

1. Explanations will vary.
2. a. Solution strategies will vary.
   b. Explanations will vary.
3. Solution strategies will vary.

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Lesson 31

Problem Set

1. 100
2. a. 37
   b. 91
3. a. 85
   b. 40
4. 9

Exit Ticket

1. a. 103
   b. 160
2. 67

Homework

1. a. 93
   b. 149
2. 30
3. 52
4. $78

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