Lesson Overview

LESSON 8

Use Addition and Subtraction Strategies with Two-Digit Numbers

Lesson Objectives

Content Objectives

- Fluently break apart two-digit numbers into tens and ones as a place-value strategy for addition and subtraction.
- Fluently determine when regrouping a ten is necessary and carry out the regrouping to find a sum.
- Fluently determine when decomposing a ten is necessary and carry out the decomposition to find a difference.
- Use addition to solve a subtraction problem.
- Use addition to check the solution to a subtraction problem.

Language Objectives

- Record sums and differences found by using models.
- Draw an open number line to model adding or subtracting two-digit numbers.
- Write addition and subtraction equations to represent word problems.
- Explain how to solve addition and subtraction problems with two-digit numbers.
- Explain why and how addition and subtraction strategies work.

Prerequisite Skills

- Identify place value in two-digit numbers.
- Model two-digit numbers.
- Fluently add and subtract within 20.
- Apply the commutative property of addition.

Standards for Mathematical Practice (SMP)

SMPs 1, 2, 3, 4, 5, and 6 are integrated in every lesson through the *Try-Discuss-Connect* routine.*

In addition, this lesson particularly emphasizes the following SMPs:

4 Model with mathematics.

5 Use appropriate tools strategically.

7 Look for and make use of structure.

*See page 1i to see how every lesson includes these SMPs.

Lesson Vocabulary

There is no new vocabulary. Review the following key terms.

- **difference** the result of subtraction.
- **regroup** to put together or break apart ones, tens, or hundreds. For example, 10 ones can be regrouped as 1 ten, or 1 hundred can be regrouped as 10 tens.
- **sum** the result of addition.

Learning Progression

In Grade 1 students begin adding and subtracting with two-digit numbers within 100, with and without composing a ten to add. They mentally find ten more or ten less than a given number and use addition to solve subtraction problems.

In Grade 2 students become fluent in two-digit addition and subtraction. They count on to add, fluently count by tens, use fact families, and explore how to use inverse operations to solve addition and subtraction problems.

In this lesson students build fluency with addition and subtraction of two-digit numbers. They compose and decompose tens and apply inverse operations to find sums and differences. They use and explain picture models, number models, open number lines, and equations for addition and subtraction problems. Students check their solutions to subtraction problems by using the inverse operation of addition.

In Grade 3 students fluently add and subtract numbers within 1,000. They apply concepts of place value to multiplication by adding two-digit numbers when combining partial products, and they recognize the role of subtraction in division with a remainder.

Lesson Pacing Guide

Whole Class Instruction

SESSION 1
Explore
45–60 min

Interactive Tutorial* *(Optional)*
Prerequisite Review: Subtract Within 100 on Number Lines

Using Addition and Subtraction Strategies with Two-Digit Numbers
- Start *5 min*
- Try It *10 min*
- Discuss It *10 min*
- Connect It *15 min*
- Close: Exit Ticket *5 min*

Additional Practice
Lesson pages 191–192

SESSION 2
Develop
45–60 min

Strategies to Find a Missing Addend
- Start *5 min*
- Try It *10 min*
- Discuss It *10 min*
- Model Its *5 min*
- Connect It *10 min*
- Close: Exit Ticket *5 min*

Additional Practice
Lesson pages 197–198

Fluency
Strategies to Find a Missing Addend

SESSION 3
Develop
45–60 min

Using Subtraction Strategies with Two-Digit Numbers
- Start *5 min*
- Try It *10 min*
- Discuss It *10 min*
- Model Its *5 min*
- Connect It *10 min*
- Close: Exit Ticket *5 min*

Additional Practice
Lesson pages 203–204

Fluency
Using Subtraction Strategies with Two-Digit Numbers

SESSION 4
Refine
45–60 min

Using Addition and Subtraction Strategies with Two-Digit Numbers
- Start *5 min*
- Example *10 min*
- Apply It *25 min*
- Close: Exit Ticket *5 min*

Additional Practice
Lesson pages 207–208

SESSION 5
Refine
45–60 min

Using Addition and Subtraction Strategies with Two-Digit Numbers
- Start *5 min*
- Apply It *15 min*
- Small Group Differentiation *20 min*
- Close: Exit Ticket *5 min*

Lesson Quiz or **Digital Comprehension Check**

Small Group Differentiation

Teacher Toolbox

PREPARE

Ready Prerequisite Lesson

Grade 1
- Lesson 29 Add Two-Digit Numbers

RETEACH

Tools for Instruction

Grade 1
- Lesson 29 Two-Digit Addition with Regrouping

Grade 2
- Lesson 8 Two-Digit Addition and Subtraction

REINFORCE

Math Center Activity

Grade 2
- Lesson 8 First to 5 (or 10)

EXTEND

Enrichment Activity

Grade 2
- Lesson 8 Strategy Detective

Independent Learning

i-Ready

PERSONALIZE

Learning Games
- *Hungry Fish*
- *Match*
- *Cupcake*
- *Pizza*

Lesson Materials

Lesson *(Required)*	*Per student:* base-ten blocks *Per pair:* 24 connecting cubes
Activities	*Per student:* 35 connecting cubes, base-ten blocks, open number lines
Math Toolkit	connecting cubes, base-ten blocks, hundred charts, bar models, open number lines
Digital Math Tools	Base-Ten Blocks, Number Line

*We continually update the Interactive Tutorials. Check the Teacher Toolbox for the most up-to-date offerings for this lesson.

Connect to Family, Community, and Language Development

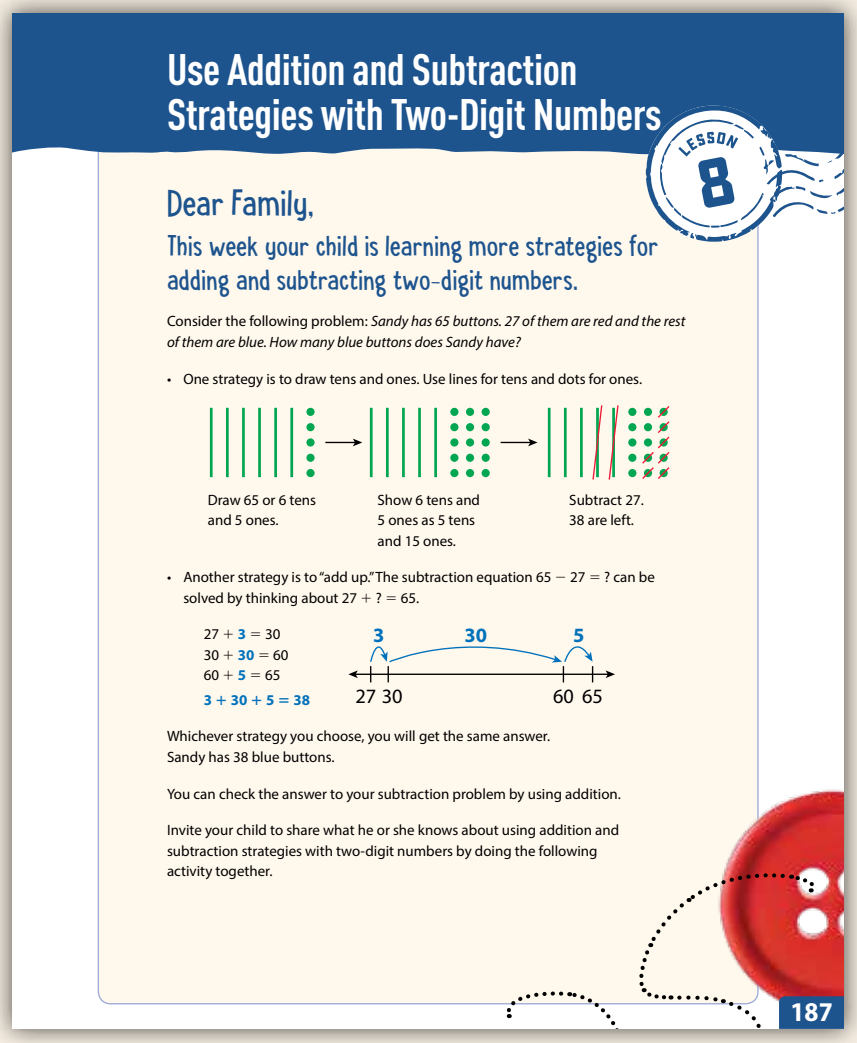
The following activities and instructional supports provide opportunities to foster school, family, and community involvement and partnerships.

Connect to Family

Use the **Family Letter**—which provides background information, math vocabulary, and an activity—to keep families apprised of what their child is learning and to encourage family involvement.

Available in Spanish

Teacher Toolbox



Use Addition and Subtraction Strategies with Two-Digit Numbers

LESSON 8

Dear Family,

This week your child is learning more strategies for adding and subtracting two-digit numbers.

Consider the following problem: *Sandy has 65 buttons. 27 of them are red and the rest of them are blue. How many blue buttons does Sandy have?*

- One strategy is to draw tens and ones. Use lines for tens and dots for ones.

Draw 65 or 6 tens and 5 ones. → Show 6 tens and 5 ones as 5 tens and 15 ones. → Subtract 27. 38 are left.

- Another strategy is to "add up." The subtraction equation $65 - 27 = ?$ can be solved by thinking about $27 + ? = 65$.

$27 + 3 = 30$
$30 + 30 = 60$
$60 + 5 = 65$
$3 + 30 + 5 = 38$

Whichever strategy you choose, you will get the same answer. Sandy has 38 blue buttons.

You can check the answer to your subtraction problem by using addition.

Invite your child to share what he or she knows about using addition and subtraction strategies with two-digit numbers by doing the following activity together.

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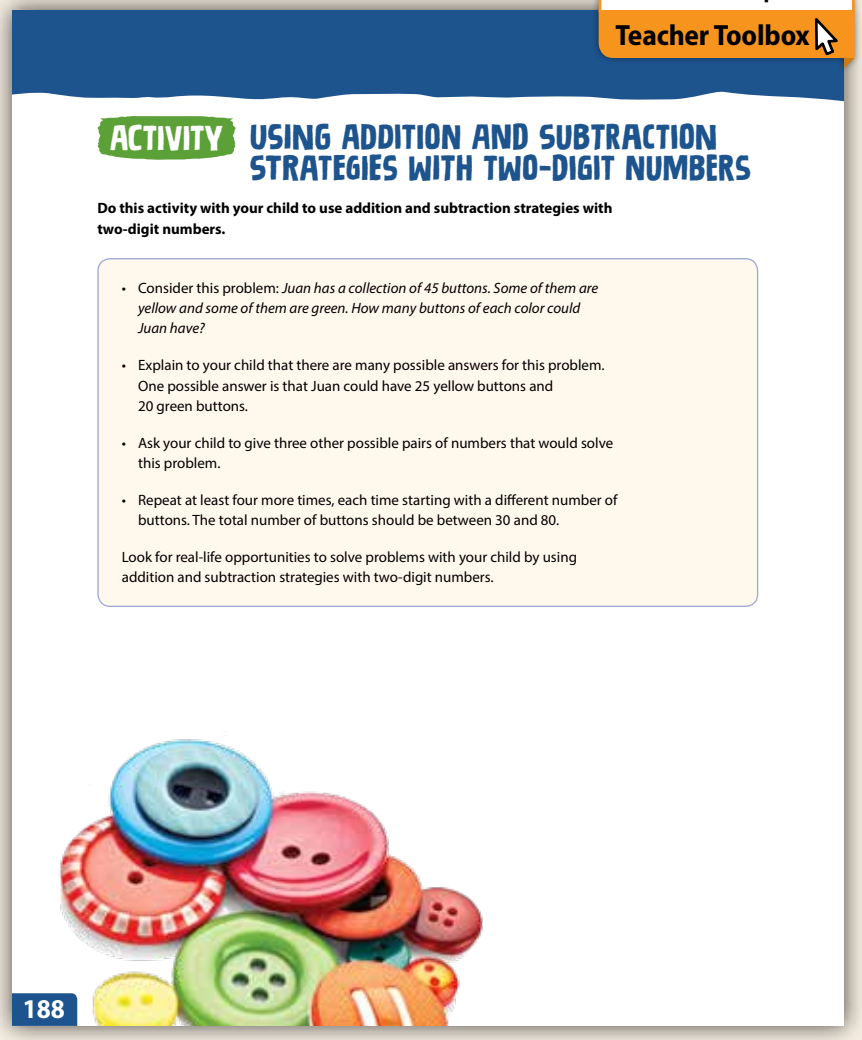

ACTIVITY USING ADDITION AND SUBTRACTION STRATEGIES WITH TWO-DIGIT NUMBERS

Do this activity with your child to use addition and subtraction strategies with two-digit numbers.

- Consider this problem: *Juan has a collection of 45 buttons. Some of them are yellow and some of them are green. How many buttons of each color could Juan have?*
- Explain to your child that there are many possible answers for this problem. One possible answer is that Juan could have 25 yellow buttons and 20 green buttons.
- Ask your child to give three other possible pairs of numbers that would solve this problem.
- Repeat at least four more times, each time starting with a different number of buttons. The total number of buttons should be between 30 and 80.

Look for real-life opportunities to solve problems with your child by using addition and subtraction strategies with two-digit numbers.

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Goal

The goal of the Family Letter is to help students apply what they know about adding and subtracting two-digit numbers to different problems.

Activity

Understanding how to add and subtract two-digit numbers will prepare students to solve real-world one-step word problems. Look at the activities for using addition and subtraction strategies with two-digit numbers. Adjust them if necessary to connect with your students.

Math Talk at Home

Encourage students to think of a real-world situation in their home to practice adding and subtracting two-digit numbers. Examples of items that they can add or subtract include socks, eating utensils, pages in two different books, and so on. Encourage students to discuss with family members the strategy they use in each case.

Conversation Starters Below are additional conversation starters students can write in their Family Letter or math journal to engage family members.

- *How do you add/subtract two-digit numbers? Can you do it mentally?*
- *Are there other ways to add or subtract the same numbers? Can you show me how?*
- *How can we check if the answer is correct?*

Connect to Community and Cultural Responsiveness

Use these activities to connect with and leverage the diverse backgrounds and experiences of all students.

Session 1 Use with *Try It*.

- Have students work in groups to think of a time when they may have helped to organize a large number of items at home or at school. Examples might include cookies or brownies at a bake sale or at a family celebration, books at home or at the school library, and so on. Ask students to think of approximately how many items they organized. Have them show how they organized the items, and think of additional ways that the items could be organized.

Session 2 Use with *Try It*.

- Ask students to think of a time when they had to wait in line for something they looked forward to doing. What was it? Examples include buying a toy, a treat, tokens for an arcade, a ride at a carnival or amusement park, tickets for a concert, and so on. Ask students to share why they thought there was a long line. Use those experiences to help generate a real-world problem involving adding two-digit numbers to solve.

Session 3 Use with *Try It*.

- Use this opportunity to help students make personal connections by having them think about and discuss the type of transportation they use to get to and from school. Ask: *How do you get home from school? What are some advantages of using this type of transportation?* [Possible answers: School buses allow students to meet and talk to other students; traveling by car might provide the opportunity to listen to music; walking provides an opportunity to get exercise.] *Is there another type of transportation students would like to try to use?*

Connect to Language Development

For ELLs, use the Differentiated Instruction chart to plan and prepare for specific activities in every session.

ELL English Language Learners: Differentiated Instruction

Prepare for Session 1
Use with *Try It*.

Levels 1–3	Levels 2–4	Levels 3–5
Speaking/Listening Have students read the ***Try It*** problem aloud. Have them work with a partner to answer the question: *If Elizabeth has 35 toy cars, what number could we choose to fit on the top shelf?* Draw three bookcases with two shelves. Label them *top shelf* and *bottom shelf*. Ask for three volunteers to share their responses with the class. Write each value shared by students on the top shelf of each bookshelf drawing. Tell students to work with a partner to find how many toys could be put on the bottom shelf based on those three scenarios. Have students check their answers by sharing their work with other pairs of students.	**Writing/Reading** Have students read the ***Try It*** problem aloud and discuss ideas with a partner. Have them apply a strategy to find one solution and to check their answer. Have each pair of students share their work with another pair of students. Each pair must have a speaker and a writer. Encourage speakers to use the sequence words *first*, *next*, *then*, and *finally* to explain their work. Meanwhile, have writers write down what they hear from the speaker of the other pair of students. Have the writers read aloud their notes. Repeat the process by having students switch roles.	**Listening/Speaking** Have students read the ***Try It*** problem and discuss ideas with a partner. Have partners apply a strategy to find one solution and check their answer. On an index card, have each student generate another solution applying the same strategy, but starting with a different number of toy cars on the top shelf. Have them share their work with their partner and then trade index cards. Repeat the process using the back side of an index card for students to generate a third possibility using the strategy they first chose. Students should write and share three examples of the strategy.

LESSON 8

SESSION 1 Explore

Purpose In this session, students draw on strategies for adding two-digit numbers to solve an addition problem with two unknown addends. They explore and share solution strategies for finding pairs of addends with a sum of 35. They look ahead to using place-value understanding with strategies of drawing pictures and writing equations to solve two-digit addition problems.

Start

Connect to Prior Knowledge

Materials For each pair: 24 connecting cubes

Why Support students' knowledge of breaking apart numbers, foreshadowing finding possible pairs of addends for a given sum.

How Have students identify three pairs of numbers that have a sum of 12.

Find three different pairs of numbers that each have a sum of 12. Complete each equation.

..... + ... = 12

..... + ... = 12

..... + ... = 12

Possible Solutions

11 + 1 = 12;
10 + 2 = 12;
9 + 3 = 12;
8 + 4 = 12;
7 + 5 = 12;
6 + 6 = 12; or equivalent equations with addends reversed

TRY IT

Make Sense of the Problem

To support students in making sense of the problem, help them understand that 35 is the total number of toy cars that Elizabeth has, she will put groups of cars on two shelves, and there are different ways to put the 35 cars into two groups.

DISCUSS IT

Support Partner Discussion

Encourage students to use the *Discuss It* questions and sentence starters on the Student Worktext page as they talk to each other.

Look for, and prompt as necessary, understanding of:

- two groups as parts of a larger group of 35
- the number in each of the two parts is unknown
- choosing the number for one part determines the number in the second part

LESSON 8 SESSION 1 ● ○ ○ ○ ○

Explore Using Addition and Subtraction Strategies with Two-Digit Numbers

You know how to add and subtract two-digit numbers. Use what you know to try to solve the problem below.

Elizabeth has 35 toy cars. How can she put her toy cars on the top and bottom shelves of her bookcase? Show three ways.

Learning Target

- Explain why addition and subtraction strategies work, using place value and the properties of operations.

SMP 1, 2, 3, 4, 5, 6, 7

TRY IT

Possible student work:

Sample A

30 + 5 = 35

20 + 15 = 35

10 + 25 = 35

top	bottom
30 cars	5 cars
20 cars	15 cars
10 cars	25 cars

Sample B

14, 24, 34, 35. I counted on 21.

23, 33, 34, 35. I counted on 12.

30, 31, 32, 33, 34, 35. I counted on 5.

Elizabeth could have:

14 cars on the top shelf and 21 cars on the bottom shelf.

23 cars on the top shelf and 12 cars on the bottom shelf.

30 cars on the top shelf and 5 cars on the bottom shelf.

Math Toolkit

- connecting cubes
- base-ten blocks
- hundred charts
- bar models
- open number lines

DISCUSS IT

Ask your partner: How did you get started?

Tell your partner: I started by . . .

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Common Misconception Look for students who do not understand that when they choose a value for one of the parts, there is only one possible value for the second part and, therefore, choose addends that do not sum to 35.

Select and Sequence Student Solutions

One possible order for whole class discussion:

- connecting cubes or base-ten blocks to represent 35 broken apart in different ways
- hundred chart to model counting on to 35 from numbers less than 35
- open number lines to model counting on to 35 from different numbers less than 35
- equations to solve ? + ? = 35 or 35 − ? = ?

Support Whole Class Discussion

Encourage students to share their solutions so that as many different strategies for finding addend pairs as possible are shared. Prompt students to note the relationship between the pairs of addends shown in each model and 35.

Ask *How do [student name]'s and [student name]'s models each show two parts of 35? Why are there more than three solutions for this problem?*

Listen for The pairs are different, but add up to 35. There are more than three solutions because any number of toy cars up to 35 could be on one shelf.

CONNECT IT

1 LOOK BACK

Look for understanding that the two numbers in each pair must add to 35.

Hands-On Activity

Use connecting cubes to find parts of a two-digit number.

If . . . *students are unsure about finding two unknown addends for a two-digit sum,*

Then . . . *use this activity to have them model a similar problem.*

Materials For each student: 20 connecting cubes

- Write *? and ? are parts of 20* on the board. Tell students that they will use connecting cubes to find missing addends for 20.
- Have students arrange their cubes in two groups. Ask volunteers to share the numbers of cubes in their groups, writing each number below a ? on the board. Explain that the number pairs represent addends that sum to 20. Write equations in the form __ + __ = 20 beside the number pairs.
- Have students put their blocks into one group of 20 again. Identify an addend that is not shown and have students form a group with that number of cubes. Ask volunteers to share the number of cubes left in the other group [all responses will be the same]. Explain that when one addend of a sum is known, there is only one possible value for the other addend. Write the equation corresponding to these addends.
- Have volunteers identify the remaining pairs of addends until all 10 have been identified and equations written. Explain that the order of the numbers in each pair does not matter.

2 LOOK AHEAD

Point out that some problems may have more than one unknown number and more than one solution.

Students should be able to recognize that drawing pictures and writing equations are two ways to find unknown values that will solve the problem.

Students will spend more time learning about strategies in the Additional Practice.

CONNECT IT

1 LOOK BACK

What are three ways that Elizabeth can put her toy cars on the top and bottom shelves of the bookcase?

Answers will vary. Possible answers: 17 on the top shelf and 18 on the bottom shelf; 18 on the top shelf and 17 on the bottom shelf; 20 on the top shelf and 15 on the bottom shelf

2 LOOK AHEAD

You can use different strategies to solve addition and subtraction problems. Think about this problem.

Gary has 50 marbles. What are some different ways he can put them all into two bags?

Complete the equations to show three different ways.

Possible answers:

35 + **15** = 50

50 − **25** = **25**

50 = **40** + **10**

3 REFLECT

Are there other ways Gary could put the marbles into the two bags? Explain.

Yes; Possible explanation: Any two numbers with a sum of 50 are numbers of marbles that Gary could put into the two bags.

Close: Exit Ticket

3 REFLECT

Look for understanding that there are multiple ways that a number can be broken into two parts without changing the total value of the number. Student responses may include examples of other number pairs with a sum of 50 or the idea that any two numbers with a sum of 50 represent a way for Gary to put his marbles into two bags.

Common Misconception **If** students are unclear in their explanations that there are many ways to show two parts of 50, **then** provide 4 tens rods and 10 ones units and have students put the tens rods in one group and the ones units in the other. Discuss that the groups show 40 + 10 = 50. Have students move 1 ones unit over to the group of tens rods and write the equation the groups now represent [41 + 9 = 50]. Repeat until only 1 ones unit remains in the second group.

Real-World Connection

Encourage students to share ideas about everyday places or situations in which they may use different pairs of addends for a known sum. Examples include putting 12 apples into two different bowls or using allowance money for saving or spending.

Solutions

Support Vocabulary Development

1 Ask students to think of ways they can add and subtract. Refer to anchor charts, open number lines, and base-ten blocks to generate student responses. Explain that the word *strategy* refers to a careful plan for solving a problem. Note that all the answers they generated represent many ways, or *strategies*, to solve a problem. Encourage students to draw examples of the strategies generated by the class to complete the graphic organizer.

2 Have students think about the word *strategy*. Remind students there may be more than one way to solve a problem. Ask if *counting up* is a strategy that could be used to solve the problem. [yes] Ask: *Based on Clark's work, how else could* counting up *be used to obtain a correct answer that could be checked?*

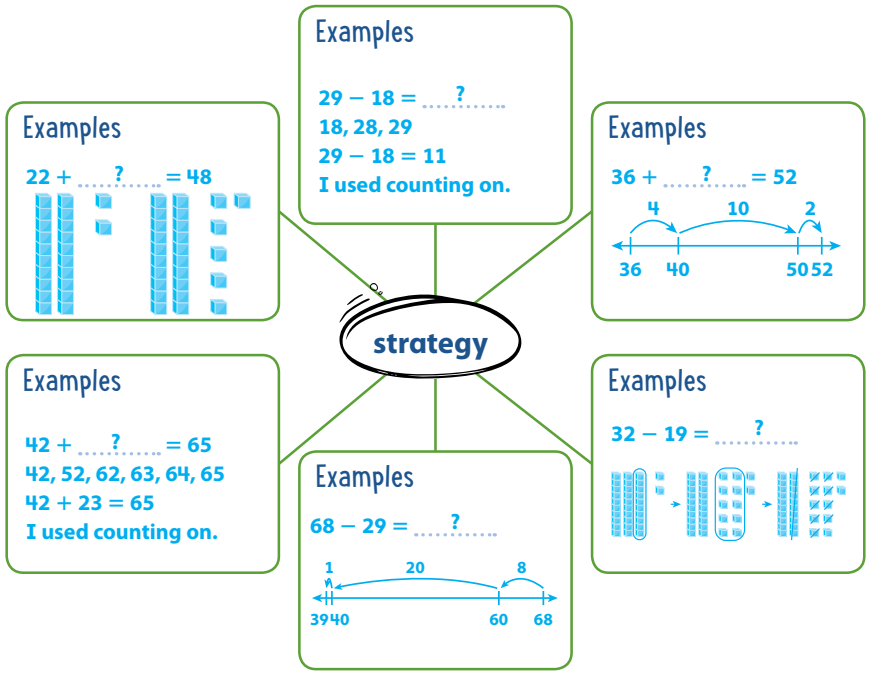
Supplemental Math Vocabulary

- *solution*
- *model*

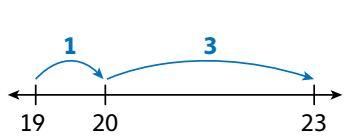
Name: _____ LESSON 8 SESSION 1

Prepare for Using Addition and Subtraction Strategies

1 Think about what you know about different ways to add and subtract. Fill in each box. Use words, numbers, and pictures. Show as many ideas as you can. **Possible answers:**



2 Clark solves ? − 23 = 19 by counting up on a number line. Did he use his strategy correctly? Explain.



Possible answer: No. He should have started at 23 and added on 19 to get 42.

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3 Solve the problem. Show your work.

Diana has 42 dolls. How can she put her dolls on the top and bottom shelves of her bookcase? Show three ways.

Possible student work using equations:

30 + 12 = 42

20 + 22 = 42

10 + 32 = 42

Solution **She could have 30 dolls on the top and 12 dolls on the bottom, 20 dolls on the top and 22 dolls on the bottom, or 10 dolls on the top and 32 dolls on the bottom.**

4 Check your answer. Show your work.

Possible student work:

30, 40, 41, 42. I counted on 12.

20, 30, 40, 41, 42. I counted on 22.

32, 42. I counted on 10.

All my answers are correct.

3 Assign problem 3 to provide another look at solving an addition or subtraction problem with two-digit numbers.

This problem is very similar to the problem about the number of toy cars Elizabeth can put on the top and bottom shelves of her bookcase. In both problems, students find different combinations of numbers that add to a specific two-digit number. This question asks how many dolls Diana can put on her top and bottom shelf if she has 42 dolls.

Students may want to use base-ten blocks.

Suggest that students read the problem three times, asking themselves one of the following questions each time:

- *What is this problem about?*
- *What is the question I am trying to answer?*
- *What information is important?*

Solution: Answers will vary. Accept all answers where the number of dolls on the top shelf plus the number of dolls on the bottom shelf equals 42. Possible answers: 30 dolls on the top shelf and 12 dolls on the bottom shelf, 20 dolls on the top shelf and 22 dolls on the bottom shelf, 10 dolls on the top shelf and 32 dolls on the bottom shelf

Medium

4 Have students solve the problem a different way to check their answer.

ELL English Language Learners: Differentiated Instruction

Prepare for Session 2
Use with *Try It*.

Levels 1–3	Levels 2–4	Levels 3–5
Reading/Writing Have students read the ***Try It*** problem aloud. Create or refer to an anchor chart showing the different strategies for adding and subtracting two-digit numbers. Use the graphic organizer for *strategy* from Session 1 if needed. Have students select a strategy and apply it to find a solution. When complete, have them write a reflection using the sentence starters: *I used the strategy _____. First, I _____. Then I _____. Finally, I _____.* Provide students with vocabulary to use in their sentences. For example: *add*, *ten*, *more*, *ones*, and *answer*.	**Listening/Speaking** Have students read the ***Try It*** problem aloud and discuss ideas with a partner. Have them decide on a strategy to use to find a solution. Provide time for each student to think about their steps and how to describe the steps to their partner using the sequence words: *first*, *then*, and *finally*. Have students share their steps with their partner. Ask partner A to share and partner B to repeat the steps back to partner A. Have partners switch roles and repeat. Once complete, have them solve the problem. Have partners share their work to check their answers.	**Reading/Writing** Have students read the ***Try It*** problem with a partner and discuss their ideas. Have them decide on two different strategies to find a solution. Have partner A use one strategy and partner B use the other. Allow them to think about their steps and how to express the steps in writing. After writing, ask partners to read their steps and show their work. When finished, students should have used different strategies to find the same solution. Have students write a reflection using the sentence starter: *I can check my answers by _____.*

LESSON 8

SESSION 2 Develop

Purpose In this session, students solve a put-together word problem that involves two-digit numbers. Students model a start of 39, an unknown change, and an ending quantity of 93, either on paper or with manipulatives. The purpose of this problem is to reinforce strategies, such as using an open number line or adding to the next ten, in order to gain fluency with adding two-digit numbers.

Start

Connect to Prior Knowledge

Materials For each student: open number lines

Why Support students' knowledge of adding tens, foreshadowing using an open number line to add two-digit numbers.

How Have students use an open number line to add a number of tens to two-digit numbers.

Use an open number line to complete each equation.

48 + 30 = ...

34 + 50 = ...

28 + 60 = ...

17 + 40 = ...

Solutions

78 (jump of 30 from 48 to 78);

84 (jump of 50 from 34 to 84);

88 (jump of 60 from 28 to 88);

57 (jump of 40 from 17 to 57)

Develop Language

Why Clarify the meaning of the phrase *what you know* and how it relates to math problems.

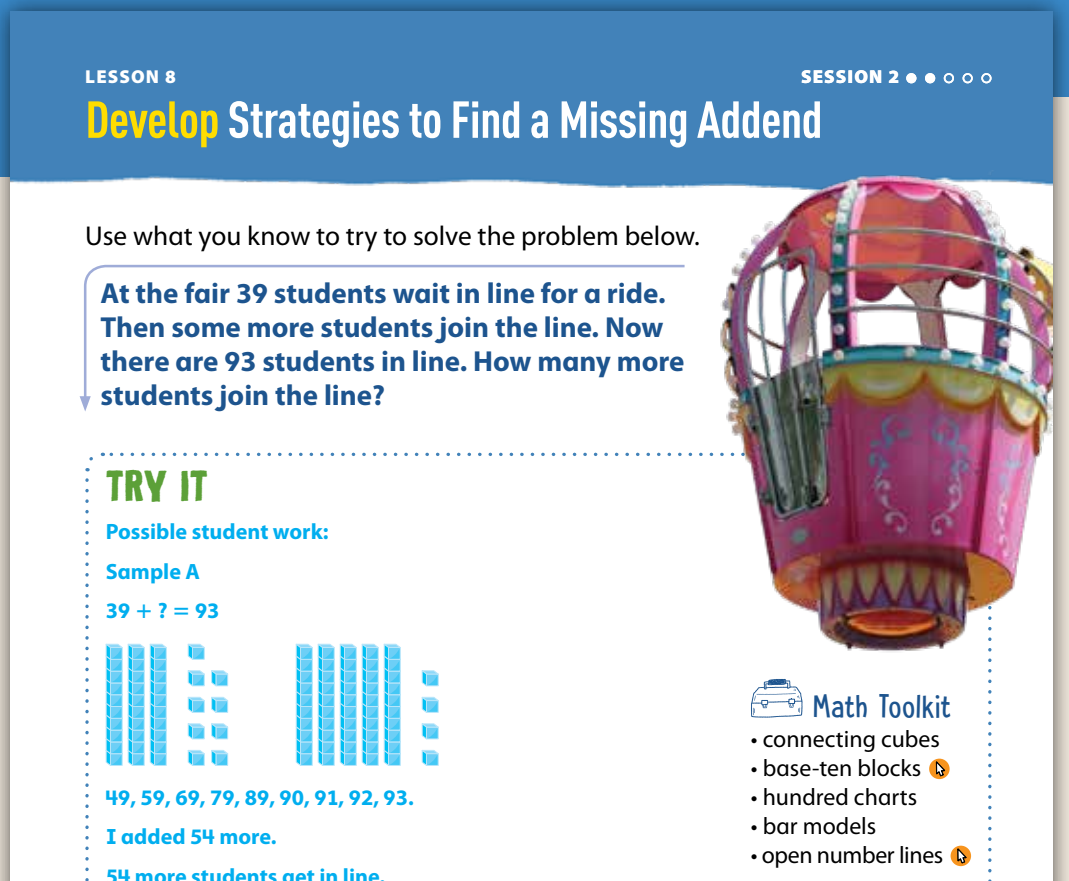
How Tell students that the phrase *what you know* can refer to strategies they know to solve a problem or to the information available in the problem. Ask students what strategies they know and can use to solve the *Try It* problem.

TRY IT

Make Sense of the Problem

To support students in making sense of the problem, have them identify that there are 39 students in line at the start and 93 in line after more join them.

Ask *What number is at the start? What number is at the end?*



LESSON 8 SESSION 2 ● ● ○ ○ ○

Develop Strategies to Find a Missing Addend

Use what you know to try to solve the problem below.

At the fair 39 students wait in line for a ride. Then some more students join the line. Now there are 93 students in line. How many more students join the line?

TRY IT

Possible student work:

Sample A

39 + ? = 93

49, 59, 69, 79, 89, 90, 91, 92, 93.

I added 54 more.

54 more students get in line.

Sample B

39 + 1 = 40

40 + 53 = 93

53 + 1 = 54

54 more students get in line.

Math Toolkit

- connecting cubes
- base-ten blocks
- hundred charts
- bar models
- open number lines

DISCUSS IT

Ask your partner: Can you explain that again?

Tell your partner: I am not sure how to find the answer because . . .

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DISCUSS IT

Support Partner Discussion

Encourage students to name the model or strategy they used to solve the problem as they talk to each other.

Support as needed with questions such as:

- *Why did you solve the problem the way you did?*
- *How did your partner solve the problem?*

Common Misconception Look for students who do not recognize the problem as a missing-addend problem and add 39 and 93. As students present solutions, be sure to have them specify the parts and the whole in the problem.

Select and Sequence Student Solutions

One possible order for whole class discussion:

- base-ten blocks or connnecting cubes to model counting up from 39 to 93 or counting back from 93 from 39
- a hundred chart to model counting up from 39 to 93 or counting back from 93 to 39
- an open number line to model counting up from 39 to 93 or counting back from 39 from 93
- equations to solve the problem by first adding up to the next ten

Support Whole Class Discussion

Compare and connect the numbers in the problem and how they are shown on student representations of the problem.

Ask *Why does [student name]'s counting up model show the same difference as [student name]'s counting back model?*

Listen for You can count forward or backward to find the difference between two numbers.

MODEL ITS

If no student presented these models, connect them to the student models by pointing out the ways they each represent:

- 39 as one of the parts and an unknown number as the other part
- 93 as the whole

Ask *How are 39 and 93 shown on each* Model It*? How is the unknown number represented?*

Listen for 39 is the starting number. 93 is the number both models add up to. The unknown number is the total of the jumps on the number line or the total added on in the equations.

For using an open number line, prompt students to connect how the unknown number of students is shown as jumps from 39 to 93.

- *How do you think the first jump of 50 was chosen?*
- *Why is the last jump 3?*

For going to the next ten, prompt students to describe how the equations show finding the unknown number of students.

- *Why is 1 the first number added to 39?*
- *How are the equations from the* Model Its*,* $50 + 1 + 3 = ?$ *and* $1 + 50 + 3 = ?$*, the same? Why is the order of the addends different?*

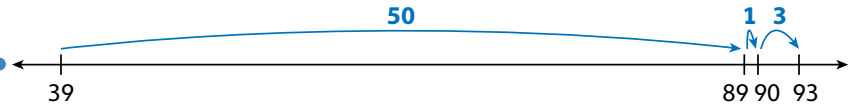
Develop different ways to find a missing addend.

At the fair 39 students wait in line for a ride. Then some more students join the line. Now there are 93 students in line. How many more students join the line?

MODEL IT

You can use an open number line.

Start at 39.
Add tens until you reach 89.
Next, **add 1** to reach 90.
Then **add 3** more ones to reach 93.



50 + 1 + 3 = ?

MODEL IT

You can add up to the next ten.

39 **+ 1** = 40
40 **+ 50** = 90
90 **+ 3** = 93
1 + 50 + 3 = ?

Deepen Understanding

Number Line Model

SMP 7 Look for structure.

When discussing the number-line model, prompt students to consider how it is labeled to help find the unknown change in the word problem.

Ask *Why is 39 the first number labeled on the number line? Why is 93 the last number labeled? How do you decide the values of each of the jumps?*

Listen for The start of the problem is 39 students waiting in line, so that is where I start. I am counting up to the 93 students at the end, so 93 is the last number labeled. The jumps show numbers that are easy to add on. Adding on tens and making a ten are ways to break up the jumps to make the addition easier.

Generalize *Could you use an open number line to find the unknown change in any word problem? How would you label the number line? How would you decide the values of the jumps?* Have students explain their thinking. Listen for understanding that the start number would be labeled first and that the number at the end would be labeled to its right. The jumps from the start to the end could be jumps that make a ten or jumps that are easy to add on, such as tens.

CONNECT IT

- Remind students that one thing that is alike about all the representations is the starting number of 39 and the total of 93.
- Explain that on this page, students will use those numbers to find the value of the unknown number that is added 39 to give a total of 93.

Monitor and Confirm

1 – 3 Check for understanding that:

- the value of the unknown number is 54
- the value of the unknown number remains the same, regardless of the strategy used to find it

Support Whole Class Discussion

4 Be sure students understand that the problem is asking them to select and apply a strategy for finding the unknown part that, together with 47, sums to 83.

Ask *What do you know about the parts of the addition equation? The whole? What strategy do you like best? What is the value of the unknown number?*

Listen for Explanations should include ideas such as: One part of the addition problem is 47. The other part is unknown. 83 is the whole. 47 and the unknown number sum to 83. I can show jumps on a number line to make tens and add tens. I can show adding tens and making a ten using equations. I can make a quick drawing of tens and ones for 47 and then add more tens and ones until I reach 83. The unknown number is 36.

5 REFLECT Have all students focus on the strategies used to solve this problem. If time allows, have students share their preferences with a partner.

CONNECT IT

Now you will solve the problem from the previous page to help you understand strategies for adding two-digit numbers.

1 Look at the first **Model It** on the previous page.

What is 50 + 1 + 3? 54

2 Look at the second **Model It** on the previous page.

What is 1 + 50 + 3? 54

3 Why are your answers the same for problems 1 and 2?

Possible answer: The answers are the same for both problems because I am adding the same numbers in a different order.

They both tell how much to add to 39 to get to 93.

4 Explain how you would find the missing addend in the equation below.

? + 47 = 83

Possible answer: I would add 47 + 3 to go to the next ten, or 50. Then I would add 50 + 30 = 80. Last, I would add 80 + 3 = 83. 3 + 30 + 3 = 36, so ? = 36.

5 REFLECT

Look back at your **Try It**, strategies by classmates, and **Model Its**. Which models or strategies do you like best for finding a missing addend? Explain.

Possible answer: I like to draw a number line because it helps me see the numbers that I'm adding and it is easy to add to the next ten.

195

Hands-On Activity

Use base-ten blocks to help connect various models used to represent and solve two-digit addition problems.

If . . . *students are unsure about why different strategies for finding the unknown number in this problem will give the same value,*

Then . . . *use the activity below to connect open number-line and equation representations with a concrete model.*

Materials For each student: base-ten blocks

- Have students model 39 using base-ten blocks. Prompt them to add more blocks by first adding 5 tens, then adding 1 to make 90, and then adding 3 to make 93. Discuss the connections to the open number line in *Model It*.
- Have students separate the blocks into groups of 39 and 54. Next, prompt them to add blocks to make a ten first, then to add 5 tens, and then to add 3 to make 93. Discuss the connections to the equation in *Model It*.
- Ask: *Why is the solution the same? Does it matter that 1, 3, and 50 are added in a different order in each of the* Model Its*?*
- If time allows, repeat the process to solve another problem such as 26 + ? = 61.

APPLY IT

For all problems, encourage students to use a drawing, model, or equations to support their thinking.

6 27 new stamps; See Student Worktext page. Students also could solve the problem by adding tens first and writing 55 + 20 = 75, 75 + 7 = 82, and 20 + 7 = 27.

7 37; See Student Worktext page. Students also may use an open number line showing jumps from 58 to 88, from 88 to 90, and from 90 to 95. 30 + 2 + 5 = 37.

Close: Exit Ticket

8 **B**; Students could use an open number line or write equations to add up from 31 to 60.

Students' solutions should indicate understanding of:

- 31 + ? = 60 can be used to solve ? + 31 = 60, because the order of the addends does not affect the sum
- counting up from 31 to 60 can be used to find the value of the unknown number

Error Alert **If** students chose **A**, **C**, or **D**, **then** use base-ten blocks to model the problem by adding up from 31 to 60. Explain that the unknown value is a part of 60, so it must be less than 60. Model adding tens first, as 2 tens rods, and then point out that 9 ones units are then needed to reach 60.

APPLY IT

Use what you just learned to solve these problems.

6 Ricardo has 55 stamps. He gets some new stamps. Now Ricardo has 82 stamps. How many stamps does he get? Show your work.

Possible student work:

55 + 5 = 60

60 + 22 = 82

5 + 22 = 27

Solution Ricardo got 27 new stamps.

7 Solve the problem by going to the next ten.

58 + ? = 95

Show your work.

Possible student work:

58 + 2 = 60

60 + 30 = 90

90 + 5 = 95

2 + 30 + 5 = 37

Solution ? = 37

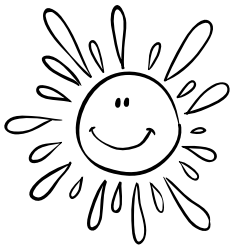
8 Lee finds some seashells on Monday. He finds 31 seashells on Tuesday. Over the two days he finds 60 seashells. How many seashells does Lee find on Monday?

Ⓐ 23

Ⓑ 29

Ⓒ 90

Ⓓ 91



Solutions

1. Students should draw base-ten blocks showing 26 in one color and base-ten blocks showing 25 in a second color.
Basic

2. 25; $25
Basic

Name: _____ LESSON 8 SESSION 2

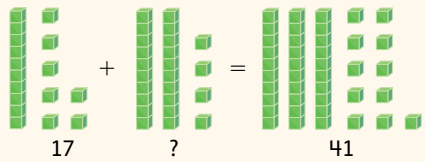
Practice Strategies to Find a Missing Addend

Study the Example showing how to use base-ten blocks to find a missing addend. Then solve problems 1–5.

EXAMPLE

Ms. Acosta's class reads 41 books in February and March. They read 17 of the books in February. How many books do they read in March?

Find 17 + ? = 41.



17 + 24 = 41

Ms. Acosta's class reads 24 books in March.

Danny has $26. His parents give him some money for his birthday. Then he has $51. How much money do his parents give him?

1. Draw base-ten blocks for 26 in one color. Then use a different color to draw more base-ten blocks so that you have 51.

Check students' drawings. Students should draw 26 base-ten blocks in one color and 25 base-ten blocks in a second color.

2. How many more blocks did you draw? 25

How much money do Danny's parents give him? $ 25

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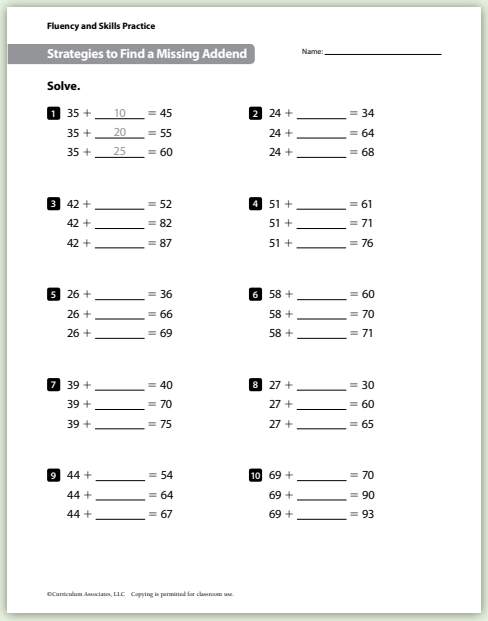
Fluency & Skills Practice Teacher Toolbox

Assign *Strategies to Find a Missing Addend*

In this activity students practice finding a missing addend. Students use their knowledge of adding a multiple of ten to a two-digit number and adding to get to a multiple of ten to help them find a missing addend. Such practice builds fluency and can cultivate mental math skills useful in everyday life.



Fluency and Skills Practice

Strategies to Find a Missing Addend

Name: _____

Solve.

1. 35 + 10 = 45
35 + 20 = 55
35 + 25 = 60

2. 24 + _____ = 34
24 + _____ = 64
24 + _____ = 68

3. 42 + _____ = 52
42 + _____ = 82
42 + _____ = 87

4. 51 + _____ = 61
51 + _____ = 71
51 + _____ = 76

5. 26 + _____ = 36
26 + _____ = 66
26 + _____ = 69

6. 58 + _____ = 60
58 + _____ = 70
58 + _____ = 71

7. 39 + _____ = 40
39 + _____ = 70
39 + _____ = 75

8. 27 + _____ = 30
27 + _____ = 60
27 + _____ = 65

9. 44 + _____ = 54
44 + _____ = 64
44 + _____ = 67

10. 69 + _____ = 70
69 + _____ = 90
69 + _____ = 93

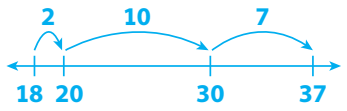
3 19 miles; See Student Worktext page. Students also may solve the problem by writing equations to add up, adding a ten first: $18 + 10 = 28$, $28 + 2 = 30$, $30 + 7 = 37$; $10 + 2 + 7 = 19$.
Medium

4 **A**, **B**, **C**, **E**
Challenge

5 See Student Worktext page. Students may also show 5 added to 25 in order to get 30 and then 60 added to 30 in order to find the sum of 90.
Medium

3 Chen hikes some miles during the first week of his vacation. During the second week of his vacation, he hikes 18 miles. He hikes 37 miles total during both weeks. How many miles does Chen hike during the first week? Show your work.

Possible work:



Solution **Chen hikes 19 miles during the first week.**

4 A bakery sells 48 muffins in the morning. Some of the muffins are blueberry and the rest of the muffins are cherry. Which equations show how many of each type of muffin the bakery could sell?

Ⓐ $48 = 47 + 1$
Ⓑ $30 + 18 = 48$
Ⓒ $24 + 24 = 48$
Ⓓ $48 + 12 = 60$
Ⓔ $48 = 14 + 34$

5 Nirupa adds to the next ten to find $65 + 25$. Tell how she might find the sum. Show your work.

Possible answer: Nirupa could add 5 to 65 to get 70. Then she adds 20 to 70 to find the sum of 90.

ELL English Language Learners: Differentiated Instruction

Prepare for Session 3
Use with *Try It*.

Levels 1–3

Speaking/Writing Read the ***Try It*** problem aloud. Create an anchor chart or have students refer to the graphic organizer from session 1 for the word *strategy*. Divide students into groups of three and help them decide on a strategy to solve the problem. Have each group assign one of these roles to its members: recorder, speaker, and writer. Have the recorder show the work to solve the problem. The writer describes each step using sentence starters: *First, we _____. Next, we _____. Finally, we _____.* When finished, groups present the work. The speaker reads the writer's work, the recorder holds the work, and the writer points to the work as steps are read.

Levels 2–4

Speaking/Writing Have students read the ***Try It*** problem aloud. Divide students into groups of three to discuss the following questions: *What information do you know? What strategy could you use to find the solution? Why?*

Have students discuss their answers to the questions with their group. Then have them write the strategy they are applying to find the solution. Ask them to write their steps in complete sentences. If needed, provided the following sentence starters:

First, we _____. Next, we _____. Finally, we _____.

Levels 3–5

Listening/Speaking Have students read the ***Try It*** problem with a partner. Have each student select a strategy to solve the problem. Provide students with an index card to write the strategy and the steps they will use to solve the problem. When complete, have partners take turns being the interviewer and the interviewee. The interviewer will ask: *What information do you know? What could the equation look like? What strategy will you use? Why?*

Once each of the students has played both roles, instruct her to answer the problem and check her answer by comparing each other's work.

LESSON 8

SESSION 3 Develop

Purpose In this session, students solve a take-apart word problem that involves two-digit numbers. They model a total of 85 students, a part of 26 students, and a part of unknown value either on paper or with manipulatives. The purpose of this problem is to reinforce subtraction strategies, such as regrouping a ten first or using an open number line, in order to gain fluency with subtracting two-digit numbers.

Start

Connect to Prior Knowledge

Materials For each student: base-ten blocks

Why Support students' knowledge of regrouping a number as tens and ones, foreshadowing regrouping numbers to subtract two-digit numbers.

How Have students regroup 1 ten as 10 ones in different numbers.

Use base-ten blocks. For each number, regroup 1 ten as 10 ones.

48 = 3 tens and ..... ones.

65 = 5 tens and ..... ones.

Solutions

3 tens and 18 ones;
5 tens and 15 ones

Develop Language

Why Clarify the meaning of the word *some*.

How Have students find and circle the word *some* in the *Try It* problem. Explain that the word *some* refers to an unknown or unspecified amount. Ask: *Do you know the amount of students that went home on a bus?* After students solve the problem, invite them to replace *some* with the answer and read the first three sentences again.

TRY IT

Make Sense of the Problem

To support students in making sense of the problem, have them identify that there are 85 students going home and that 26 of the students did not go home on the bus.

Ask *What are you trying to find out?*

Develop Using Subtraction Strategies with Two-Digit Numbers

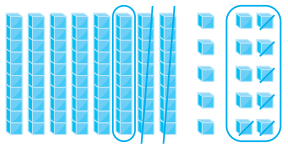
Use what you know to try to solve the problem below.

After school 85 students go home. Some of the students go home on a bus, but 26 students do not go home on a bus. How many students go home on a bus?

TRY IT

Possible student work:

Sample A



59 students go home on a bus.

Sample B

26, 36, 46, 56, 66, 76, 80, 85

I started at 26 and counted up by ten 5 times, added 4 to get to 80 and added 5 to get to 85.

50 + 4 + 5 = 59

59 students go home on a bus.

Math Toolkit

- connecting cubes
- base-ten blocks
- hundred charts
- bar models
- open number lines

DISCUSS IT

Ask your partner: Why did you choose that strategy?

Tell your partner: The strategy I used to find the answer was . . .

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DISCUSS IT

Support Partner Discussion

To reinforce students' understanding of different problem situations, encourage them to use the terms *part* and *whole* as they talk to each other.

Support as needed with questions such as:

- *How could you solve the problem in a way that is different from both of your strategies?*
- *What did you try to solve the problem that did not work?*

Common Misconception Look for students who get stuck trying to regroup and can't think of another strategy. As students present, be sure to have several students show different strategies and describe why they chose them.

Select and Sequence Student Solutions

One possible order for whole class discussion:

- base-ten blocks to model subtracting 26 from 85 by first regrouping
- quick drawings to model counting up from 26 to 85 or counting back from 85 from 26
- an open number line to model the problem by counting up or counting back
- writing equations to solve $85 - 26 = ?$ or $26 + ? = 85$

Support Whole Class Discussion

Compare and connect the numbers in the problem to the student representations of the problem.

Ask *How do all of the models show the unknown number?*

Listen for The unknown number is the number I find when I add the value of all the jumps on the number line. The value of all of the blocks I added to the group of 26 to make 85 is the unknown number. The sum of all the numbers I counted up from 26 to 85 is the value of the unknown number.

MODEL ITS

If no student presented these models, connect them to the student models by pointing out the ways they each represent:

- 85 students going home after school
- 26 students not taking the bus to go home
- An unknown number of students who do take the bus to go home

Ask *How are 85 and 26 shown with the base-ten blocks? On the open number line?*

Listen for 85 is shown with 8 tens and 5 ones first, and then with 7 tens and 15 ones. 85 is shown as the largest number on the open number line.

For regrouping a ten first and then subtracting, prompt students to identify how the base-ten blocks show subtracting 26 from 85.

- *Why are $85 - ? = 26$ and $85 - 26 = ?$ the same?*
- *Why is 85 shown as 7 tens and 15 ones in the model?*

For using an open number line, prompt students to identify how the jumps on the open number line show 26 being subtracted from 85.

- *Why is the second jump on the model a jump of 1?*
- *How do the numbers above the jumps show the value of the unknown number?*

Develop different ways to understand subtraction strategies with two-digit numbers.

After school 85 students go home. Some of the students go home on a bus, but 26 students do not go home on a bus. How many students go home on a bus?

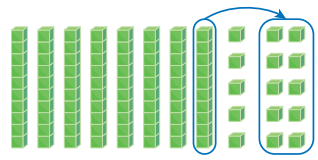
MODEL IT

You can regroup a ten first and then subtract.

Find $85 - ? = 26$.

$85 - ? = 26$ is the same as $85 - 26 = ?$.

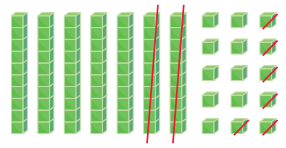
85 is 7 tens and 15 ones.



First make 10 ones with 1 ten in 85.

Then subtract.

7 tens and 15 ones
− **2 tens** and **6 ones**

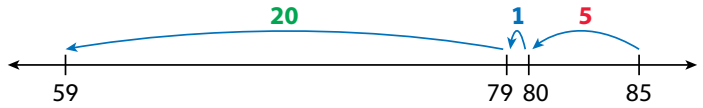


MODEL IT

You can use an open number line.

Subtract 26 from 85 to find how many students go home on a bus.

Start at 85. Subtract **5** to the next ten.
Next, subtract **1** more. Then subtract **20**.



Deepen Understanding

Writing Subtraction Equations

SMP 4 Model with mathematics.

When discussing the two subtraction equations used to represent the word problem, prompt students to consider how the equations are connected.

Ask *Why is solving $85 - ? = 26$ the same as solving $85 - 26 = ?$*

Listen for Taking one part away from the whole of 85 will give the value of the other part. So, $85 - ? = 26$ shows that taking the number of students who went home on a bus away from 85 leaves the 26 students who do not go home on a bus. $85 - 26 = ?$ shows that taking the 26 students who did not go home on the bus away from 85 leaves the number of students who did go home on a bus. The value of the parts is the same, even though the value of the unknown part is shown in different places in the equations.

Generalize *Could you always write two equations to solve a subtraction word problem in which the whole and one of the parts are known?* Listen for understanding that two equations could always be written because either part could be subtracted from the whole in order to find the other part.

CONNECT IT

- Remind students that one thing that is alike about all the representations is that they show 85 as the whole, 26 as one of the parts, and an unknown value as the other part.
- Explain that on this page, students will use the numbers they know to find the value of the unknown number.

Monitor and Confirm

1–3 Check for understanding that:

- the difference of 7 tens and 15 ones and 2 tens and 6 ones is 5 tens and 9 ones, or 59
- subtracting 26 as jumps from 85 to lesser numbers will end at the value of 85 − 26
- different strategies showing different ways to subtract 26 from 85 will give the same solution

Support Whole Class Discussion

4 Be sure students understand that the question is asking them how to check their work on the subtraction problem by using addition.

Ask *What equation shows your solution to the subtraction problem?*

Listen for I solved the subtraction equation, 85 − 26 = 59.

Ask *How can you rewrite the equation as the sum of the parts? Show how your addition equation shows that the solution for your subtraction equation is correct.*

Listen for The parts of 85 I have are 26 and 59. So, 26 + 59 should equal 85. I can add 59 by first making a ten and finding 26 + 4 = 30. Then I can add 30 + 50 = 80, and 80 + 5 = 85. Since 4 + 50 + 5 = 59, the solution is correct.

5 REFLECT Have all students focus on the strategies used to solve this problem. If time allows, have students share their preferences with a partner.

CONNECT IT

Now you will use the problem from the previous page to help you understand strategies to subtract two-digit numbers.

1 Look at the first **Model It**. What is 7 tens and 15 ones minus 2 tens and 6 ones?

5 tens and 9 ones or 59

2 Look at the second **Model It**.

What number did you land on? 59

3 Why are your answers the same for problems 1 and 2?

Possible answer: Both times we started with 85 and subtracted 26.

4 Explain how you can use addition to make sure your solution for 85 − ? = 26 is correct.

Possible answer: The problem 85 − ? = 26 is the same as ? + 26 = 85. If my answer is correct, adding it to 26 should give 85. 59 + 26 = 85, so my solution of 59 is correct.

5 REFLECT

Look back at your **Try It**, strategies by classmates, and **Model Its**. Which models or strategies do you like best for subtracting two-digit numbers? Explain.

Possible answer: I like to draw tens and ones because then it is easy to see if I need to regroup. I can subtract tens and ones by crossing them out in my picture.

Visual Model

Explore another way to subtract using an open number-line model.

If . . . *students are unsure about using an open number line to represent known and unknown numbers in a subtraction problem,*

Then . . . *use the activity to explore a different strategy for using an open number line to solve a subtraction problem with one unknown part.*

- Draw an open number line with labels for 26 and 85. Reread the problem, pointing out that when the number of students who go home on a bus is taken away from 85, the 26 students who do not go home on a bus will be left.
- Model the subtraction, making a ten to subtract by drawing a jump of 5 from 85 to 80, then subtracting tens as a jump of 50 from 80 to 30, and finally subtracting 4 as a jump from 30 to 26. Discuss how to find the value of the unknown number on the open number line.
- Compare how the whole, the known part, and the unknown part are represented on each open number line. Discuss with students why both strategies using the open number line will find the same solution.
- If time allows, solve 77 − ? = 18, using both open number-line strategies.

APPLY IT

For all problems, encourage students to use a drawing or model to support their thinking.

6 53 cherries; Students also could solve the problem by using an open number line to count back 12 from 65 as a jump of 5 from 65 to 60 and then a jump of 7 from 60 to 53.

7 Kate's answer is not correct. Possible explanation: If Kate's answer is correct, the sum of 58 and 38 should be 86. When I add 58 and 38 I get 96. So, I know her answer is not correct.

Close: Exit Ticket

8 **D**; Sean has 50 crayons.

Students' solutions should indicate understanding of:

- using subtraction to find the number that is 14 fewer than 64
- accurate use of a strategy or model to represent the problem

Error Alert **If** students chose **A**, **then** remind them that Sean has fewer crayons than Keisha and, therefore, a number of crayons less than 64. **If** students chose **B**, **then** remind students that after subtracting 4 from 64 to make a ten, or 60, they still need to subtract 10 more. **If** students chose **C**, **then** remind students that after subtracting 10 to get 54, they still need to subtract 4 more.

APPLY IT

Use what you just learned to solve these problems.

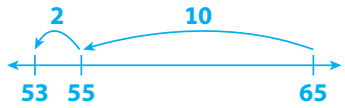
6 There are 65 cherries in a bowl. Dan eats 12 cherries with his lunch. How many cherries are in the bowl now?

Use two different strategies to solve this problem. Show your work.

Possible student work:

6 tens − 1 ten = 5 tens

5 ones − 2 ones = 3 ones



Solution **There are 53 cherries in the bowl now.**

7 Look at how Kate solves a subtraction problem at the right. Is her answer correct? Explain how you can use addition to check her answer.

$$\begin{array}{r} 86 \\ -\ 58 \\ \hline 38 \end{array}$$

No, her answer is not correct. Possible explanation: I could check her answer by adding the difference to the number being subtracted. If her answer is correct, I should get the number that I started with. 38 + 58 = 96 and not 86, so her answer is not correct.

8 Sean has 14 fewer crayons than Keisha. Keisha has 64 crayons. How many crayons does Sean have?

Ⓐ 78 Ⓑ 60

Ⓒ 54 Ⓓ 50

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Solutions

1 Dave scored 15 more points than Lily.
See Student Worktext page for possible work.
Medium

Name: _____ LESSON 8 SESSION 3

Practice Using Subtraction Strategies with Two-Digit Numbers

Study the Example showing one way to subtract two-digit numbers. Then solve problems 1–4.

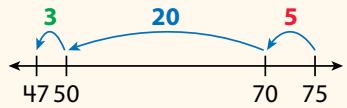
EXAMPLE

75 people are at a baseball game. 28 of the people are adults. The rest are children. How many children are at the baseball game?

$75 - 28 = ?$

Count back.

$75 - 5 = 70$
$70 - 20 = 50$
$50 - 3 = 47$

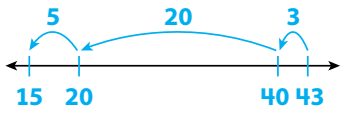


So, 47 children are at the baseball game.

Dave scores 43 points in a game and Lily scores 28. How many more points does Dave score than Lily?

1 Use an open number line to solve the problem. Show your work.

Possible student work:



Solution Dave scores 15 more points than Lily.

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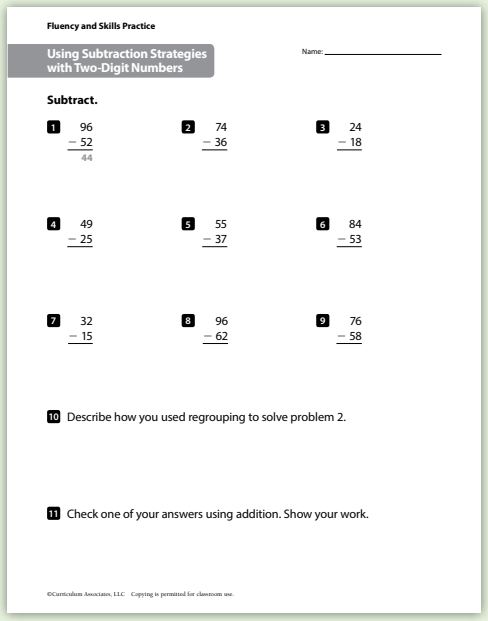
Fluency & Skills Practice

Teacher Toolbox

Assign *Using Subtraction Strategies with Two-Digit Numbers*

In this activity students practice subtracting 2 two-digit numbers. Some problems require regrouping, but others do not. The skills that students exercise by choosing and applying an appropriate strategy for solving will continue to help them build fluency with subtraction.



Fluency and Skills Practice

Using Subtraction Strategies with Two-Digit Numbers

Name: _____

Subtract.

1 96 − 52 = 44
2 74 − 36
3 24 − 18
4 49 − 25
5 55 − 37
6 84 − 53
7 32 − 15
8 96 − 62
9 76 − 58

10 Describe how you used regrouping to solve problem 2.

11 Check one of your answers using addition. Show your work.

2 **C, D, E**
Challenge

3 See Student Worktext page.
Challenge

4 See Student Worktext page.
Medium

2 Which equations can you use to check if this subtraction equation is correct?

$72 - 24 = 48$

Ⓐ $72 + 24 = 96$

Ⓑ $48 + 48 = 96$

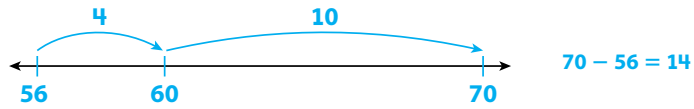
Ⓒ $48 + 24 = 72$

Ⓓ $72 - 48 = 24$

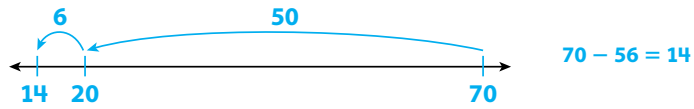
Ⓔ $24 + 48 = 72$

3 Show two different ways that you can use a number line to find $70 - 56$.

Check students' number lines. Possible student work:



$70 - 56 = 14$



$70 - 56 = 14$

4 Which of the two number line strategies you used to solve problem 3 do you like best? Explain.

Possible answer: I like to start at the lesser number and add up to get to the greater number. This makes it easy for me to add up the jumps that make up the difference.

ELL English Language Learners: Differentiated Instruction

Prepare for Session 4
Use with *Apply It*.

Levels 1–3	Levels 2–4	Levels 3–5
Listening/Speaking Read ***Apply It*** problem 2 and have students discuss answers to the following questions: *Can we use addition? Why? Can we use subtraction? Why?* Focus on addition and ask students: *What will your equation look like if you use addition?* Ask for volunteers to share aloud or write the equation on the board. Repeat the process, asking: *What will your equation look like if you use subtraction?* Once complete, have students work in pairs to solve the problem using addition or subtraction. Have partners label each step as *Step 1*, *Step 2*, *Step 3*, and so on.	**Speaking/Writing** Have students work in partners to read ***Apply It*** problem 2 and discuss their ideas to solve the problem. Ask students to stand up if they plan to add and to remain seated if they plan to subtract. Have students who stood up partner with a student who remained seated. Have pairs discuss their decision to add or subtract. When their discussion is complete, have students work independently to find the solution using their choice of adding or subtracting. Have partners share their work to check their answers. Ask students to write a sentence that explains how they can check their answer, using the sentence starter: *I can check my answer by* _____.	**Speaking/Writing** Have students read ***Apply It*** problem 2 with a partner and discuss their ideas to solve the problem. In partners, have them decide on addition or subtraction to find a solution. Then have students identify a strategy. Have each student solve the problem and check each other's work for the correct answer. When complete, have pairs split up and partner with other students who chose the opposite operation. Have both students share their work. When the work is complete, have students write a reflection.

LESSON 8

SESSION 4 Refine

Purpose In this session, students use different strategies to add and subtract two-digit numbers, first sharing their thinking with a partner and then working independently or in small groups to consolidate their learning.

Start

Connect to Prior Knowledge

Why Support students' knowledge of related addition and subtraction equations, foreshadowing using addition to check subtraction with two-digit numbers.

How Have students write a related addition equation for a given subtraction equation.

Write a related addition equation for each subtraction equation.

$12 - 8 = 4$ $\quad$ $20 - 11 = 9$

$42 - 24 = 18$ $\quad$ $54 - 37 = 17$

Solutions

$4 + 8 = 12$;
$9 + 11 = 20$;
$18 + 24 = 42$;
$17 + 37 = 54$
Addends may be in reverse order.

EXAMPLE

See Student Worktext page.

Look for Understanding that choosing one addend will determine the only possible value for the other.

APPLY IT

1 See Student Worktext page.
DOK 1

Look for Subtracting one of the numbers in the number pair from 80 will give the other number in the number pair.

LESSON 8 SESSION 4 ● ● ● ● ○

Refine Using Addition and Subtraction Strategies with Two-Digit Numbers

Complete the Example below. Then solve problems 1–3.

EXAMPLE

Two numbers have a sum of 80. What could the two numbers be? Write addition equations to show three possible pairs of numbers.

You can use any two numbers that have a sum of 80.

$20 + 60 = 80$
$80 = 45 + 35$
$50 + 30 = 80$

Solution The two numbers could be 20 and 60, 45 and 35, or 50 and 30.

APPLY IT

1 Show a related subtraction equation for each of the addition equations shown in the Example.
Possible answers given.

$80 - \underline{20} = \underline{60}$

$80 - \underline{35} = \underline{45}$

$\underline{50} = 80 - \underline{30}$

How are addition and subtraction related?

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2 28 granola bars; See Student Worktext page for possible work.
DOK 2

Look for 57 is at the start and 29 is at the end, after a change of an unknown number.

3 **A**; Students could rewrite the equation $? - 24 = 50$ as $? = 50 + 24$ to solve the problem.

Explain why the other two answer choices are not correct:

B is not correct because 5 tens + 2 tens = 7 tens, not 6 tens.

D is not correct because Brad sold 24 *more* tickets than Lisa. So, the answer must be a number greater than 50.

DOK 3

Close: Exit Ticket

Check for Understanding

Materials For remediation: base-ten blocks, open number lines, *Activity Sheet* Hundred Chart

Have students solve the following problem:

Kendra read some pages in her book on Saturday. Then she read 19 pages in her book on Sunday. Kendra read a total of 60 pages on both days. How many pages did Kendra read on Saturday? [41]

For students who are still struggling, use the table below to guide remediation.

After providing remediation, check students' understanding using the following problem:

Jerome earned $21 walking dogs. He earned some more money raking leaves. He earned a total of $50 for both jobs. How much money did Jerome earn raking leaves? [$29]

2 A store has 57 granola bars. Then some of the granola bars are sold. Now there are 29 granola bars left. How many granola bars are sold? Show your work.

Will you add or subtract to solve this problem?

Possible student work:

57 − ? = 29 is the same as 29 + ? = 57.

29 + 1 = 30

30 + 20 = 50

50 + 7 = 57

I added on 1 + 20 + 7. 1 + 20 + 7 = 28

Solution **The store sells 28 granola bars.**

3 Lisa sells 24 fewer tickets than Brad for the school's Fun Fair. Lisa sells 50 tickets. How many tickets does Brad sell?

If Lisa sells fewer tickets than Brad, who sells more tickets?

Ⓐ 74

Ⓑ 64

Ⓒ 26

Ⓓ 16

Tyler chose Ⓒ as the correct answer. How did Tyler get his answer?

Possible answer: Tyler subtracted 50 − 24 = 26 to find how many tickets Brad sold. He should have added 50 + 24 = 74, because Brad sold 24 more tickets than Lisa.

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Error Alert

If the error is . . .	*Students may . . .*	*To support understanding . . .*
39	have counted back 40 to 20 but then subtracted 1 from 40 instead of adding 1 to 40.	Model the problem on an open number line. Point out that since 61 is the total number of pages that Kendra read on Saturday and Sunday, the number of pages that she read on Saturday must be 19 less than 61.
51	have added 1 to 19 and then counted tens to get to 60 but double-counted the 20.	Use a hundred chart or open number line to help students see the numbers that need to be counted to get from 19 to 60.
59	have subtracted 10 from 60 and 0 from 9.	Model the subtraction problem using base-ten blocks. Students should see that after subtracting 10, 50 blocks are left. Guide students to see their error and encourage them to write down each step to make sense of the subtraction problem.

Solutions

1. David has 24 fewer animal cards than Carmen. See Student Worktext page for possible work. ***Medium***

2. Carmen has 24 more animal cards than David. See Student Worktext page for possible work. ***Medium***

Name: _____ LESSON 8 SESSION 4

Practice Using Addition and Subtraction Strategies

1. Carmen has 53 animal cards. David has 29 animal cards. How many fewer cards does David have than Carmen? Show your work.

Do you need to add or subtract to solve this problem?

Possible student work:

I need to find 53 − 29. I will subtract tens first.

53 − 20 = 33

Then I will subtract the ones.

33 − 3 = 30

30 − 6 = 24

I subtracted 20 + 3 + 6 or 29.

53 − 29 = 24

Solution **David has 24 fewer animal cards than Carmen.**

2. For problem 1 above, find how many more animal cards Carmen has than David.

How are problems 1 and 2 alike?

Carmen has **24** more animal cards than David.

What do you notice about your answers for problems 1 and 2? Explain.

The answers are the same. Possible explanation: There is a difference of 24 between the number of animal cards that Carmen and David have. So how many more animal cards Carmen has than David is the same as how many fewer animal cards David has than Carmen.

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3 **B** (No);

C (Yes);

F (No);

G (Yes)

Challenge

4 See Student Worktext page. Students also may write ? + 47 = 83 or 83 − ? = 47.

Medium

5 **D**; Students may write the equations 50 − 10 = 40 and 40 − 8 = 32

Explain why the other two answer choices are not correct:

B is not correct because the number of miles Raj rode his bike will be 18 less than 50, not 2 less than 50.

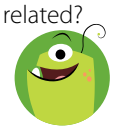
C is not correct because when 50 is regrouped as 4 tens and 10 ones to subtract the 8 ones in 18, 1 ten is subtracted from 4 tens, not 5 tens.

Challenge

3 Choose *Yes* or *No* to tell if you can use the equations to solve for ? in the problem below.

? − 23 = 61

How are the numbers in the equation related?



	Yes	No
61 − ? = 23	Ⓐ	Ⓑ
23 + 61 = ?	Ⓒ	Ⓓ
61 − 23 = ?	Ⓔ	Ⓕ
? − 61 = 23	Ⓖ	Ⓗ

4 Of the 83 students on a field trip, 47 are girls. How many boys are on the field trip? Write an addition equation and a subtraction equation that can be used to find the solution.

How are addition and subtraction related?

Possible answers: 47 + ? = 83 and 83 − 47 = ?

5 During one month, Lily rides her bike 18 more miles than Raj. Lily rides her bike 50 miles. How many miles does Raj ride his bike?

If Lily rides more miles than Raj, then who rides fewer miles?

Ⓐ 68

Ⓑ 48

Ⓒ 42

Ⓓ 32

Cindy chose Ⓐ as the correct answer.

How did Cindy get her answer?

Possible answer: Cindy added 50 + 18 = 68 to find how many miles Raj rides his bike. She should have subtracted 50 − 18 = 32.

LESSON 8

SESSION 5 Refine

Purpose In this session, students gain fluency with strategies for adding and subtracting two-digit numbers.

Start

Develop Fluency

Why Support students' knowledge of strategies to represent and solve problems involving the addition and subtraction of two-digit numbers.

How Have students solve a word problem by writing an addition equation and a subtraction equation.

Write an addition equation and a subtraction equation to solve the problem.

Jan makes 52 sandwiches for a party. 22 have ham and the rest have turkey. How many sandwiches have turkey?

Solution

30 sandwiches have turkey.

Possible equations:

$52 - 22 = 30$

$22 + 30 = 52$

APPLY IT

1 $93 - 27 = 66$

DOK 2

2 **A** (Yes);

C (Yes);

F (No);

G (Yes)

DOK 1

3 **A**; Students could write the equations: $19 + 1 = 20$, $20 + 50 = 70$, $70 + 5 = 75$, and $1 + 50 + 5 = 56$.

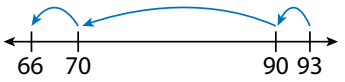
DOK 2

Refine Using Addition and Subtraction Strategies with Two-Digit Numbers

APPLY IT

Solve the problems.

1 Dalila makes this model to solve a problem. What problem does she solve? Write an equation.



93 – 27 = 66

2 A farmer has 76 horses. There are 27 horses inside the barn. The rest are outside. How many horses are outside?

Tell if you use the equation to solve the problem.

	Yes	No
$27 + ? = 76$	Ⓐ	Ⓑ
$76 = ? + 27$	Ⓒ	Ⓓ
$76 + 27 = ?$	Ⓔ	Ⓕ
$76 - 27 = ?$	Ⓖ	Ⓗ

3 Tim takes $75 to the store to buy some clothes. When he leaves the store, he has $19. How much does Tim spend at the store?

Ⓐ $56 Ⓑ $66

Ⓒ $84 Ⓓ $94

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Differentiated Instruction

RETEACH

Hands-On Activity

Use connecting cubes to check subtraction with addition.

Students struggling with how to check their solution

Will benefit from using connecting cubes to check subtraction with addition.

Materials For each student: 35 connecting cubes

- Write $25 - 13 = ?$ on the board. Have each student count out 25 cubes.
- Ask: *How could you show subtracting 13?* [I could take 13 cubes away.] Have students move 13 cubes to a second group. Ask: *How many cubes are left?* [12]
- Replace the ? on the board with *12*. Ask: *How will putting the groups back together check that 25 − 13 = 12?* [When put together, there should be 25 cubes.] Have students join the groups. Connect adding the groups with $13 + 12 = 25$. Then connect $13 + 12 = 25$ to $25 - 13 = 12$.
- Repeat for other problems, such as $34 - 18$ and $29 - 21$.

4 **Part A**

29; Students may use a variety of strategies to solve 47 − 18 = 29.

Part B

22; Students may use a variety of strategies to solve 51 − 29 = 22.

DOK 2

Close: Exit Ticket

5 MATH JOURNAL Student responses should demonstrate understanding that word problems involving two-digit numbers may be solved using a variety of strategies and models for addition and subtraction.

Error Alert **If** students subtract incorrectly, **then** have them try a different strategy to solve the same problem.

☑ SELF CHECK Have students consider whether they feel they are ready to check off any new skills on the Unit 2 Opener.

4 Ahmed and Jenna pick up cans. Yesterday, Ahmed picked up 18 more cans than Jenna. Ahmed picked up 47 cans.

Part A How many cans did Jenna pick up? Show your work.

Possible student work:

47 cans − 18 cans = ?
3 tens 17 ones − 1 ten 8 ones = 2 tens 9 ones = 29

Jenna picked up **29** cans.

Part B Today Jenna picks up 51 cans. How many more cans does Jenna pick up today than yesterday? Show your work.

Possible student work:

29 + ? = 51
29 + 1 = 30
30 + 20 = 50
50 + 1 = 51

29 + 22 = 51

Jenna picks up **22** more cans today than yesterday.

5 MATH JOURNAL

Show one of the strategies used in Part A or Part B in problem 4 with a model or quick drawing.

Answers will vary. Students may show addition or subtraction on an open number line or using a quick drawing to represent tens and ones.

☑ SELF CHECK Go back to the Unit 2 Opener and see what you can check off.

EXTEND

Challenge Activity

Explore order when counting back.

Students who have achieved proficiency with solving two-digit subtraction problems

Will benefit from exploring order to deepen understanding of counting back.

Materials For each student: blank open number lines

- Remind students that the order in which the parts of a number are added, when adding up to subtract, does not change the solution. Ask: *Which is more, 54 − 20 − 7 or 54 − 7 − 20? Use an open number line to support your answer.*
- Allow students to work independently before discussing their ideas with the class. Students should see that in both cases, they are subtracting a total of 27, not 20 − 7, or 13.
- Have students write two other subtraction problems that have a start of 54, subtract two numbers, and have the same result as the previous problems. Ask them to check their subtraction problems by counting back on an open number line.

PERSONALIZE

i-Ready

Provide students with opportunities to work on their personalized instruction path with *i-Ready* Online Instruction to:

- fill prerequisite gaps
- build up grade-level skills

Lesson Overview

LESSON 9

Solve Word Problems with Two-Digit Numbers

Lesson Objectives

Content Objectives

- Analyze word problems to determine the operation needed to solve them.
- Apply the use of fact families as a strategy to solve one-step problems and build number sense.
- Interpret models that represent a one-step problem with two-digit numbers.

Language Objectives

- Write an equation to represent a word problem.
- Compare two models for solving a problem and tell how they are the same or different.
- Talk with a partner about strategies used to solve a problem.

Prerequisite Skills

- Add and subtract within 100.
- Use fact families fluently.
- Understand addition and subtraction situations involving adding to, taking from, putting together, taking apart, and comparing.
- Understand how a model represents a numerical situation.
- Solve one-step problems involving one-digit numbers.

Standards for Mathematical Practice (SMP)

SMPs 1, 2, 3, 4, 5, and 6 are integrated in every lesson through the *Try-Discuss-Connect* routine.*

In addition, this lesson particularly emphasizes the following SMPs:

4 Model with mathematics.

5 Use appropriate tools strategically.

8 Look for and express regularity in repeated reasoning.

*See page 1i to see how every lesson includes these SMPs.

Lesson Vocabulary

There is no new vocabulary. Review the following key terms.

- **difference** the result of subtraction.
- **sum** the result of addition.

Learning Progression

In Grade 1 students solve simple one-step problems involving addition and subtraction within 20. They represent problems with objects, drawings, and equations that use a symbol to represent the unknown.

In Grade 2 students are expected to master solving one- and two-step problems with the unknown in all positions. They model problems using physical objects and diagrams and write equations using a symbol to represent the unknown.

In this lesson students interpret and solve one- and two-step word problems involving two-digit numbers. They utilize concepts of fact families by representing a problem using more than one equation. They build fluency with representing and solving word problems using models such as number bonds, bar models, open number lines, and equations.

In Grade 3 students apply problem-solving strategies to problems involving multiplication and division. At this level and beyond, students recognize mathematics as a tool for solving problems that arise within the context of a lesson and in daily life.

Lesson Pacing Guide

Whole Class Instruction

SESSION 1
Explore
45–60 min

Interactive Tutorial* *(Optional)*
Prerequisite Review: Add to Subtract Within 100 on Number Lines, Part 1

Solving Word Problems with Two-Digit Numbers
- Start *5 min*
- Try It & Discuss It *20 min*
- Connect It *15 min*
- Close: Exit Ticket *5 min*

Additional Practice
Lesson pages 215–216

SESSION 2
Develop
45–60 min

Ways to Model Word Problems
- Start *5 min*
- Try It & Discuss It *20 min*
- Picture It & Model Its *5 min*
- Connect It *10 min*
- Close: Exit Ticket *5 min*

Additional Practice
Lesson pages 221–222

Fluency
Ways to Model Word Problems

SESSION 3
Develop
45–60 min

More Ways to Model Word Problems
- Start *5 min*
- Try It & Discuss It *20 min*
- Model Its *5 min*
- Connect It *10 min*
- Close: Exit Ticket *5 min*

Additional Practice
Lesson pages 227–228

Fluency
More Ways to Model Word Problems

SESSION 4
Develop
45–60 min

Ways to Solve Two-Step Word Problems
- Start *5 min*
- Try It & Discuss It *20 min*
- Picture It & Model It *5 min*
- Connect It *10 min*
- Close: Exit Ticket *5 min*

Additional Practice
Lesson pages 233–234

Fluency
Ways to Solving Two-Step Word Problems

SESSION 5
Solving Word Problems with Two-Digit Numbers
- Start *5 min*
- Example & Apply It *35 min*
- Close: Exit Ticket *5 min*

Additional Practice
Lesson pages 237–238

Lesson Quiz or **Digital Comprehension Check**

SESSION 6
Refine
45–60 min

Solving Word Problems with Two-Digit Numbers
- Start *5 min*
- Apply It *15 min*
- Small Group Differentiation *20 min*
- Close: Exit Ticket *5 min*

Lesson Materials

Lesson	none
Activities	*Activity Sheets:* Digit Cards: 0–9, Hundred Chart, Number Bond Mat, Two-Digit Number Cards
Math Toolkit	connecting cubes, base-ten blocks, bar models, hundred charts, open number lines, number bonds
Digital Math Tools	Base-Ten Blocks, Number Line

Teacher Toolbox

Small Group Differentiation

PREPARE

Ready Prerequisite Lesson

Grade 1
- Lesson 17 Word Problems to 20

RETEACH

Tools for Instruction

Grade 1
- Lesson 17 Solve Word Problems with Totals to 20

Grade 2
- Lesson 9 Solve Subtraction Word Problems

REINFORCE

Math Center Activity

Grade 2
- Lesson 9 Word Problem Race

EXTEND

Enrichment Activity

Grade 2
- Lesson 9 Finding the Balance

i-Ready

Independent Learning

PERSONALIZE

i-Ready Lesson*

Grade 2
- Solve Two-Step Problems

Learning Games
- *Cupcake*
- *Pizza*

*We continually update the Interactive Tutorials. Check the Teacher Toolbox for the most up-to-date offerings for this lesson.

Connect to Family, Community, and Language Development

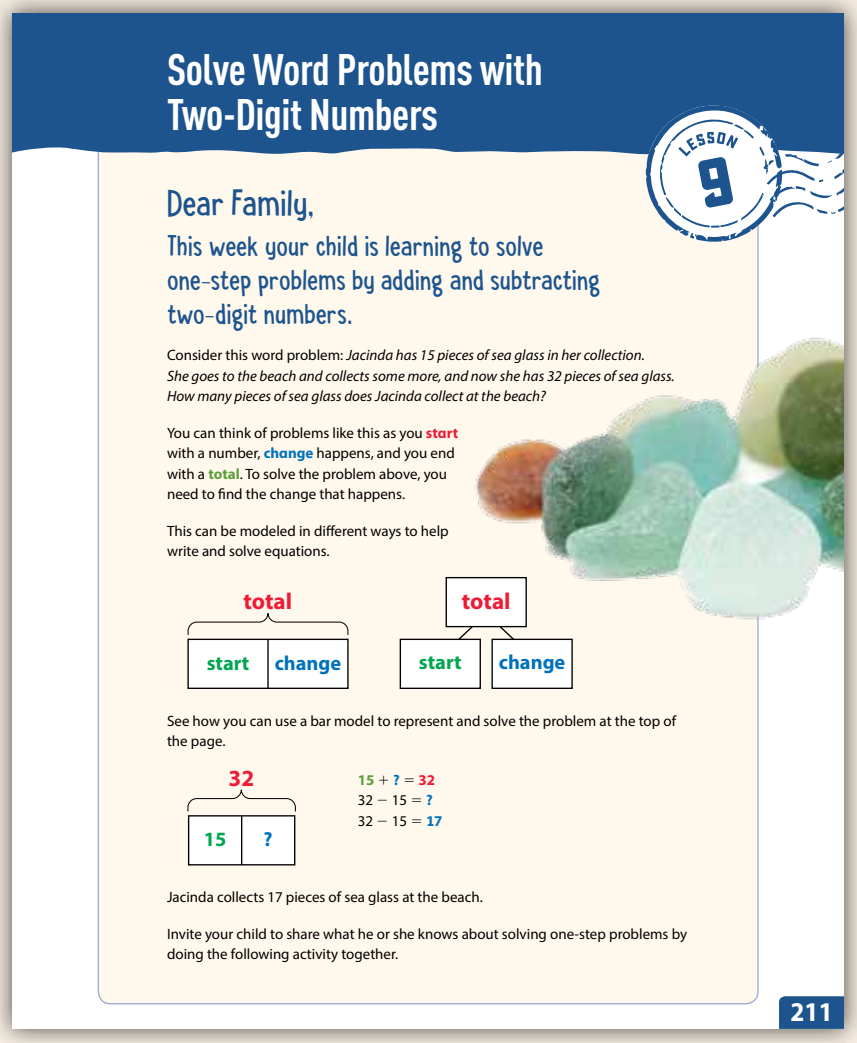
The following activities and instructional supports provide opportunities to foster school, family, and community involvement and partnerships.

Connect to Family

Use the **Family Letter**—which provides background information, math vocabulary, and an activity—to keep families apprised of what their child is learning and to encourage family involvement.

Available in Spanish

Teacher Toolbox



Solve Word Problems with Two-Digit Numbers

LESSON 9

Dear Family,

This week your child is learning to solve one-step problems by adding and subtracting two-digit numbers.

Consider this word problem: *Jacinda has 15 pieces of sea glass in her collection. She goes to the beach and collects some more, and now she has 32 pieces of sea glass. How many pieces of sea glass does Jacinda collect at the beach?*

You can think of problems like this as you **start** with a number, **change** happens, and you end with a **total**. To solve the problem above, you need to find the change that happens.

This can be modeled in different ways to help write and solve equations.

See how you can use a bar model to represent and solve the problem at the top of the page.

$15 + ? = 32$
$32 - 15 = ?$
$32 - 15 = 17$

Jacinda collects 17 pieces of sea glass at the beach.

Invite your child to share what he or she knows about solving one-step problems by doing the following activity together.

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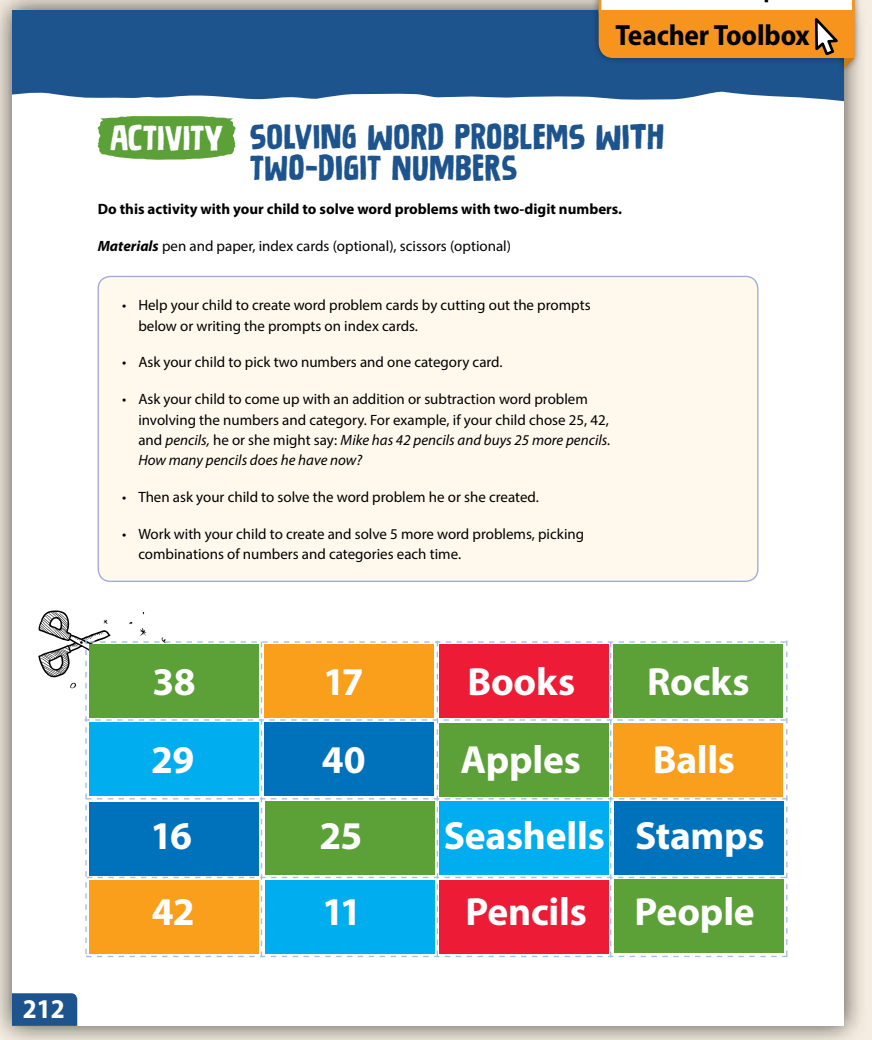

ACTIVITY SOLVING WORD PROBLEMS WITH TWO-DIGIT NUMBERS

Do this activity with your child to solve word problems with two-digit numbers.

Materials pen and paper, index cards (optional), scissors (optional)

- Help your child to create word problem cards by cutting out the prompts below or writing the prompts on index cards.
- Ask your child to pick two numbers and one category card.
- Ask your child to come up with an addition or subtraction word problem involving the numbers and category. For example, if your child chose 25, 42, and *pencils*, he or she might say: *Mike has 42 pencils and buys 25 more pencils. How many pencils does he have now?*
- Then ask your child to solve the word problem he or she created.
- Work with your child to create and solve 5 more word problems, picking combinations of numbers and categories each time.

38	17	Books	Rocks
29	40	Apples	Balls
16	25	Seashells	Stamps
42	11	Pencils	People

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Goal

The goal of the Family Letter is to help students learn different strategies to solve one-step word problems with two-digit numbers. Using models such as bar graphs and open number lines will be useful throughout this lesson.

Activity

Understanding how to add and subtract two-digit numbers in one-step word problems will prepare students for solving two-step word problems in future lessons. Look at the activity for solving one-step word problems using word problem cards. Adjust it if necessary to connect with your students.

Math Talk at Home

Encourage students to discuss with family members real-world one-step problems they might encounter at home involving two digits such as comparing the number of items bought at the grocery store from one week to the next, or comparing the number of guests arrived and yet to arrive at a party.

Conversation Starters Below are additional conversation starters students can write in their Family Letter or math journal to engage family members.

- *When could you solve one-step problems in daily life?*
- *Do you find it easier to add or subtract when solving one-step problems? Why?*

Connect to Community and Cultural Responsiveness

Use these activities to connect with and leverage the diverse backgrounds and experiences of all students.

Session 1 Use with *Try It*.

- In the problem, Mr. Soto's students are working together to raise resources for school supplies. Have students make connections to other types of collections or fundraisers they have experienced. Were these for school, an organization, and so on? What item(s) were being collected? Was there a goal? Ask students to think of why it is important to pay attention to how much is raised and what remains to be raised for a collection. How does this inform others? Does it help to motivate? If so, how?

Session 2 Use with *Try It*.

- In the problem, Todd is playing a video game. Explain that video games are popular with many children in the United States and in other countries. However, video games have not always existed, nor are they common with children of every country. Encourage students to think of other types of games they like to play, games that family members might have taught them to play, or games that are played as a tradition in other countries. Based on their responses, create a one-step word problem with two digits (For example: The class knows a total of _____ games. _____ are played with two players. How many games are played with more than one player?) Encourage students to generate variations of word problems using the data the class has collected. Provide opportunities to solve the problems any time throughout the lesson.

Connect to Language Development

For ELLs, use the Differentiated Instruction chart to plan and prepare for specific activities in every session.

ELL English Language Learners: Differentiated Instruction

Prepare for Session 1
Use with *Try It*.

Levels 1–3	Levels 2–4	Levels 3–5
Listening/Speaking Have students read the ***Try It*** problem aloud. Refer to anchor charts from past lessons showing strategies for adding and subtracting two-digit numbers or the graphic organizer for *strategies* in Lesson 8. Have students work in pairs to determine which strategy they will apply to find the solution. Then have students discuss their steps to solve the problem using the sequence words *first, next,* and *then*. Once completed, have students solve the problem.	**Writing/Speaking** Have students read the ***Try It*** problem aloud. Refer to anchor charts from past lessons showing strategies for adding and subtracting two-digit numbers or the graphic organizer for *strategies* in Lesson 8. Have students work in pairs to determine which strategy they will apply to find the solution. Then have them write their steps to solve the problem using the sequence words *first, next*, and *then*. Once completed, have students solve the problem.	**Reading/Writing** Have students read the ***Try It*** problem with a partner. Have the partners participate in a written conversation to discuss steps and strategies to solve the problem. Have partners take turns using the following sentence frames: *I think the first step is _____ because _____.* *The second step could be _____.* *It would help if next we _____.* *Afterward, we could _____.* Once completed, have students take turns reading aloud their sentences and using the steps and strategies described to solve the problem.

LESSON 9

SESSION 1 Explore

Purpose In this session, students draw on the models and strategies they used for solving problems with one-digit numbers to solve a problem with two-digit numbers. They share models to represent finding an unknown change in a word problem. They look ahead to using different models and equations to represent the start, change, and total in a word problem.

Start

Connect to Prior Knowledge

Why Support students' understanding of solving a word problem with one-digit numbers in preparation for solving word problems with two-digit numbers.

How Have students solve a word problem in which the change is unknown.

Solve the problem. Show your work.

Sharon has 8 seashells. She finds some more at the beach. Now she has 15 seashells. How many seashells does Sharon find?

Solution

Sharon finds 7 seashells; Possible equations:

$8 + 7 = 15$,

$15 - 8 = 7$

TRY IT

Make Sense of the Problem

To support students in making sense of the problem, have them identify that 75 is the total milk caps needed and that there are 49 so far.

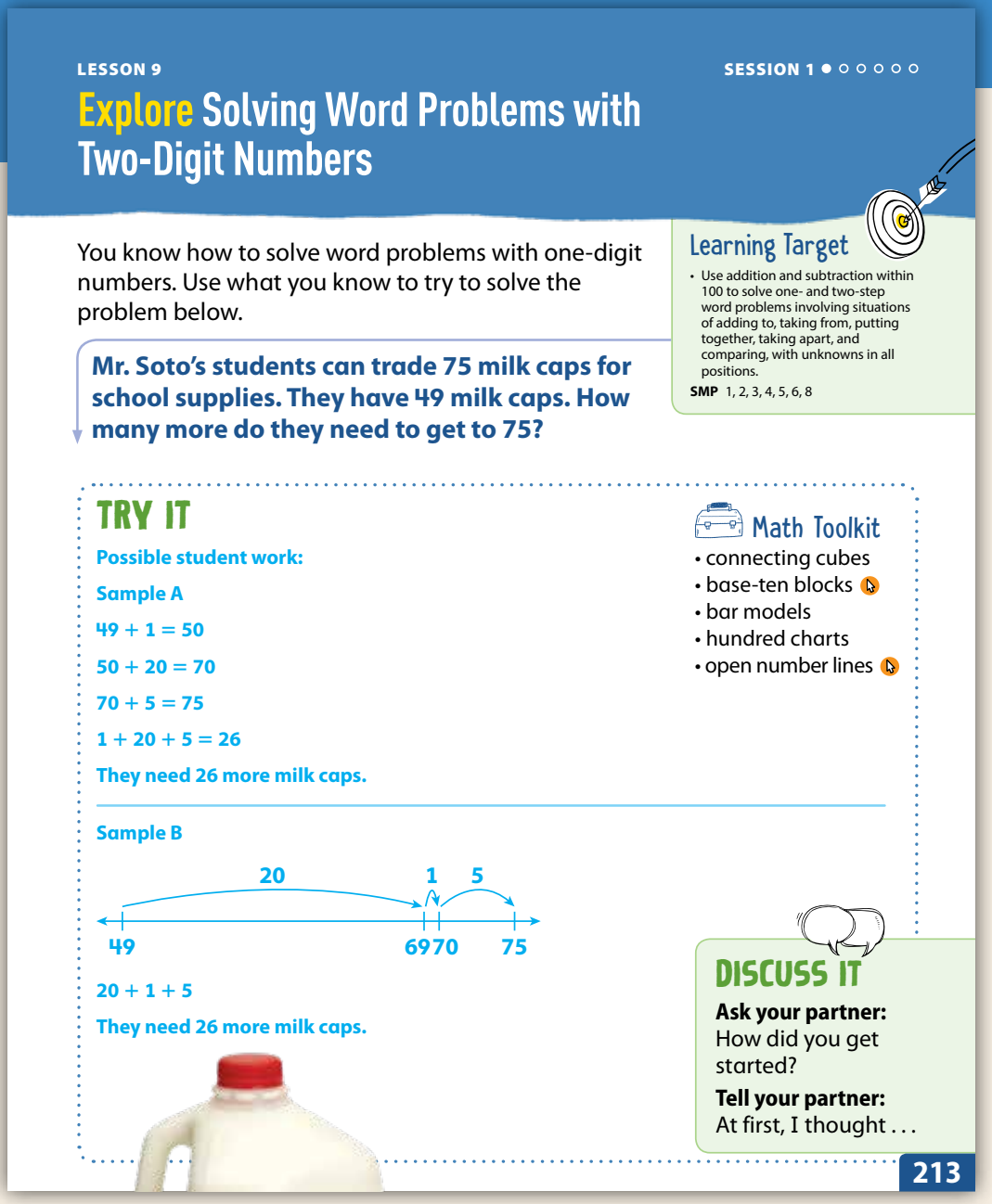
DISCUSS IT

Support Partner Discussion

To reinforce the problem type that is represented, encourage students to use *start*, *change*, and *total* as they talk to each other.

Look for, and prompt as necessary, understanding of:

- 49 as the start
- 75 as the total
- an unknown change that must be added to 49



LESSON 9 SESSION 1 ● ○ ○ ○ ○ ○

Explore Solving Word Problems with Two-Digit Numbers

You know how to solve word problems with one-digit numbers. Use what you know to try to solve the problem below.

Mr. Soto's students can trade 75 milk caps for school supplies. They have 49 milk caps. How many more do they need to get to 75?

Learning Target

- 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.

SMP 1, 2, 3, 4, 5, 6, 8

TRY IT

Possible student work:

Sample A

49 + 1 = 50

50 + 20 = 70

70 + 5 = 75

1 + 20 + 5 = 26

They need 26 more milk caps.

Sample B

20 + 1 + 5

They need 26 more milk caps.

Math Toolkit

- connecting cubes
- base-ten blocks
- bar models
- hundred charts
- open number lines

DISCUSS IT

Ask your partner: How did you get started?

Tell your partner: At first, I thought . . .

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Common Misconception Look for students who are not comfortable with the concept of an unknown addend and may add 49 and 75. As students present solutions, be sure to have them specify how they know 75 is the total rather than one of the addends.

Select and Sequence Student Solutions

One possible order for whole class discussion:

- base-ten blocks or quick drawings to represent counting up or counting back
- a number bond to represent the start, the total, and the unknown change
- an open number line to model counting up or counting back
- equations to solve 49 + ? = 75 or 75 − 49 = ?

Support Whole Class Discussion

Prompt students to note the relationship between the numbers in each model and the numbers in the problem.

Ask *How do [student name]'s and [student name]'s solutions show the start? The change? The total?*

Listen for 75 is the total. 49 is the number from which you jump to 75 on the number line. The change is unknown and can be found by subtracting 49 from 75.

CONNECT IT

1 LOOK BACK

Look for understanding that the class needs 75 milk caps in all, so they need to collect 26 more than the 49 they start with.

Hands-On Activity

Use physical models to understand visual models.

If . . . *students are unsure about the concept of using the visual model of a number bond to represent the problem,*

Then . . . *use this activity to have them represent the problem with a physical model of a number bond and equations.*

Materials For each student: 3 rectangular strips of paper $\left(9\text{-in.} \times 3\text{-in.}, 4\frac{1}{2}\text{-in.} \times 3\text{-in.}, 4\frac{1}{2}\text{-in.} \times 3\text{-in.}\right)$, +, −, and = cards from Activity Sheet *Digit Cards: 0–9*

- Tell students to place the two small rectangles below the large one to resemble a number-bond model.
- Instruct students to print *Total: 75* on the long rectangle at the top, *Start: 49* on the small rectangle at the left, and *Change: ?* on the small rectangle at the right.
- Tell students to use the parts of their number bond and the operation and equal signs to show 4 different equations that represent the problem.
- Discuss how each equation represents the problem and how the equations can be solved to find the solution to the problem.

2 LOOK AHEAD

Point out that word problems may have an unknown number in any part of the problem situation and that they may be modeled in different ways.

Students should be able to use the terms *start*, *change*, and *total* when talking about word problems and relate models to equations in order to solve them.

Students will spend more time learning about models in the Additional Practice.

CONNECT IT

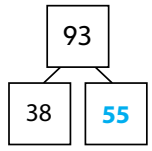
1 LOOK BACK

How many more milk caps does the class need? 26

2 LOOK AHEAD

Marta has 38 stickers. Tia gives her more stickers. Now Marta has 93 stickers. How many stickers does Tia give to Marta?

a. You can use a model to help find how many stickers Tia gives Marta. Complete the model.



b. You can also use equations to show how many stickers Tia gives Marta. Complete the equations.

38 + 55 = 93 93 − 38 = 55

3 REFLECT

Explain how you find the number of stickers Tia starts with if she has 27 left now.

Possible answer: You need to find the number that is 27 more than the number of stickers she gives Marta. You can add 27 and 55.

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Close: Exit Ticket

3 REFLECT

Look for understanding of representing known and unknown values of a problem situation to find a solution. Student responses should include references to the 55 stickers that Tia gave Marta, the 27 she has left now, and that the sum of the two numbers, 82, is the number of stickers that Tia started out with.

Common Misconception **If** students do not understand that 27 and 55 are both addends and subtract 27 from 55, **then** provide base-ten blocks and have students use them to model the 55 stickers given to Marta and the 27 stickers Tia now has left. Discuss whether Tia would have started with more or less than 27 to have been able to give away 55. Guide students to understand that in this problem situation, they know the addends that total the number of stickers Tia had at the start.

Real-World Connection

Encourage students to think about everyday places or situations where people might need to solve for an unknown start or change. Have volunteers share their ideas. Examples include saving money to buy a new toy or finding how many more home runs a baseball player must hit to break a record.

Solutions

Support Vocabulary Development

1 Ask students to think of situations in which they hear the word *model*. Note that the word can have more than one meaning or use (e.g., as a noun: model car, fashion model; as a verb: to model a process, such as a teacher who models or shows how to solve a problem). Explain that the verb *to model* means to show something. In math, the noun *model* is a representation showing important information from a problem or showing the process of solving a problem.

2 Have students circle the word *model*. Ask them to identify the name of the model on the right based on what they know about fact families. Explain that the model is one way to show or represent information. Ask students to identify another model that could be used to represent the number of marbles Elena had at first and how many she gave away.

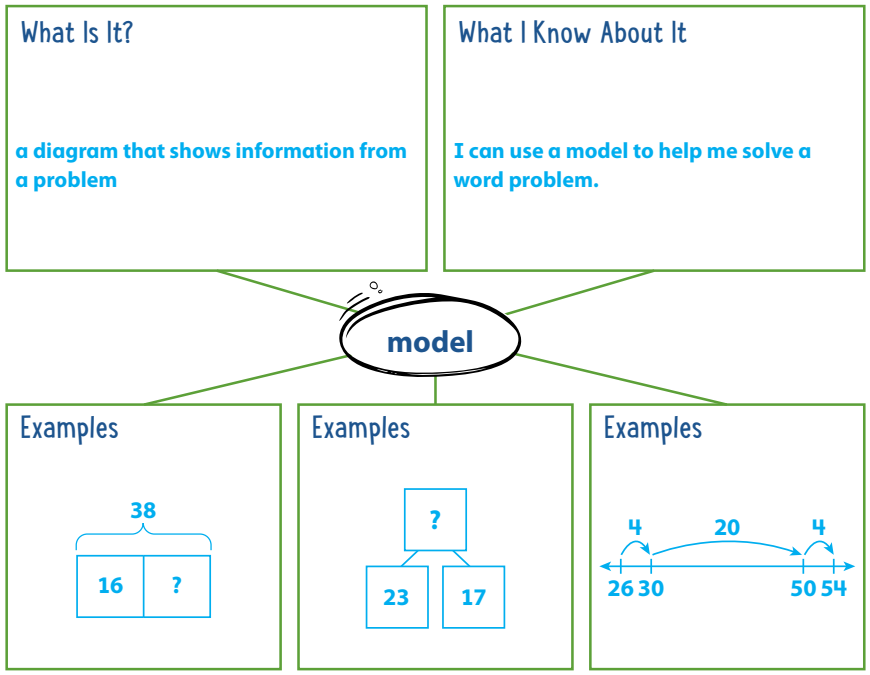
Supplemental Math Vocabulary

- *solution*
- *diagram*
- *model*

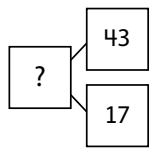
Name: _____ LESSON 9 SESSION 1

Prepare for Solving Word Problems with Two-Digit Numbers

1 Think about what you know about word problems. Fill in each box. Use words, numbers, and pictures. Show as many ideas as you can. **Possible answers:**



2 Elena has 43 marbles. She gives 17 marbles to her friend. Does the model at the right help her find how many marbles she has left? Why or why not?



Possible answer: No. This model shows 43 + 17 = ?, but it should show 43 − 17 = ?. The 43 and the ? need to switch places on the model.

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3 Assign problem 3 to provide another look at solving a one-step word problem with two-digit numbers.

This problem is very similar to the problem about collecting milk caps. In both problems, students will solve a one-step word problem with two-digit numbers. This question asks how many more bar codes are needed to get to 55.

Students may want to use base-ten blocks, connecting cubes, or dimes and pennies.

Suggest that students read the problem three times, asking themselves one of the following questions each time:

- *What is this problem about?*
- *What is the question I am trying to answer?*
- *What information is important?*

Solution:
Drew needs 23 more bar codes.
Medium

4 Have students solve the problem a different way to check their answer.

3 Solve the problem. Show your work.

Drew needs 55 bar codes to enter a contest. He has 32 bar codes. How many more bar codes does he need to get to 55?

Possible student work using equations:

32 + 8 = 40

40 + 10 = 50

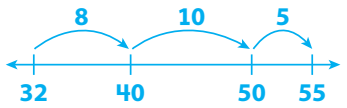
50 + 5 = 55

8 + 10 + 5 = 23

Solution Drew needs 23 more bar codes.

4 Check your answer. Show your work.

Possible student work:



8 + 10 + 5 = 23, so the solution is correct. Drew needs 23 more bar codes.

ELL English Language Learners: Differentiated Instruction

Prepare for Session 2
Use with *Try It*.

Levels 1–3

Speaking/Writing Have students read the ***Try It*** problem aloud. In partners, have students decide on a strategy to use based on what they know. Then ask them to write the steps in order using the sentence frames: *First, we* write 16 + ? = 55. *Next, we* use mental math. *Then we check by* subtracting 55 − 16. Once they have completed the frames, have students solve the problem, showing their work. Then have partners read aloud the sentences to another pair of students. Have both pairs check their answers by comparing their answers.

Levels 2–4

Listening/Speaking Read the ***Try It*** problem with students. In partners, have students discuss the steps to solve the problem. Ask them to decide on a strategy to use. Then have them discuss their steps in order using the sentence frames: *Our strategy is* to find the unknown *because* 16 added to the unknown is 55. *Our first step is* to write 16 + ? = 55. *Our next step is* to use mental math. *Our last step is* to check by subtracting 55 −16 = ?. Once the sentence frames are completed, have students solve the problem, showing their work. Then have partners compare and check their answers.

Levels 3–5

Reading/Writing Have students read the ***Try It*** problem. Have partners discuss ideas to solve the problem. Ask them to write their steps on index cards in complete sentences, one line per sentence. Then have them cut their sentences into strips, mix them up, and exchange with another pair of students. Have students work with their partner to arrange the sentences in order. Once the sentences are completed, have the partners read them aloud in order. Other partners check the order and provide feedback. Once all sentences are in the correct order, have groups of students solve the problem based on the ordered sentences.

LESSON 9

SESSION 2 Develop

Purpose In this session, students solve a word problem by using either addition or subtraction. They find the difference of 16 and 55 by modeling the numbers either on paper or with manipulatives. The purpose of this problem is to have students develop strategies for solving word problems, such as using a bar model or writing an equation.

Start

Connect to Prior Knowledge

Materials For each student: base-ten blocks

Why Support students' understanding of fact families with two-digit numbers, foreshadowing solving word problems by writing either an addition equation or a subtraction equation.

How Have students write a fact family, given 3 two-digit numbers.

Use these numbers. Write four equations that are in the same fact family.

12, 13, and 25

Solution

12 + 13 = 25;
13 + 12 = 25;
25 − 12 = 13;
25 − 13 = 12

Develop Language

Why Develop mathematical understanding of the multiple-meaning word *table*.

How Explain that the word *table* can refer to a piece of furniture often found in kitchens and cafeterias. If there is a table in the classroom, point it out. Explain that *table* has a different mathematical meaning. Tell students that in math, it refers to a collection of information that is arranged in rows and columns. Show students an example of a table from the lesson.

TRY IT

Make Sense of the Problem

To support students in making sense of the problem, have them identify 55 as the total points, 16 as the points for Level 2, and an unknown number of points for Level 1.

Ask *What are you trying to find out?*

Develop Ways to Model Word Problems

Read and try to solve the problem below.

Todd plays a game. The table shows his points.

Level 1	?
Level 2	16 points
Total	55 points

How many points does Todd get in Level 1?

TRY IT

Possible student work:

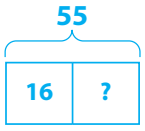
Sample A

55 − 16 = ?

55 − 16 = 39

Todd gets 39 points in Level 1.

Sample B



16 + ? = 55

16 + 39 = 55

Todd gets 39 points in Level 1.

Math Toolkit
- base-ten blocks
- number bonds
- bar models
- hundred charts
- open number lines

DISCUSS IT

Ask your partner: Can you explain that again?

Tell your partner: The strategy I used to find the answer was . . .

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DISCUSS IT

Support Partner Discussion

Encourage students to identify whether they need to find the start, the change, or the total in this problem.

Support as needed with questions such as:

- *What do the labels in the table tell you?*
- *How will you decide whether to add or subtract?*

Common Misconception Look for students who are not comfortable with the concept of finding the unknown value of a starting number in a word problem and add 16 and 55. As students present solutions, be sure to have them specify how they identified 55 as the total.

Select and Sequence Student Solutions

One possible order for whole class discussion:

- base-ten blocks or quick drawings to represent counting up or counting back
- a bar model to represent the unknown start, the change, and the end
- an equation modeling addition
- an equation modeling subtraction

Support Whole Class Discussion

Compare and connect the numbers in the word problem and how they are shown on student representations of the problem.

Ask *How does each model show the points in Level 1? In Level 2? The total points?*

Listen for The points in Level 1 is the number I need to find. The points in Level 2 is the known part of 16. The points for Level 1 and Level 2 total 55.

PICTURE IT & MODEL ITS

If no student presented these models, connect them to the student models by pointing out the ways they each represent:

- the unknown number of points for Level 1
- the number of points in Level 2
- the total number of points

Ask *How are the unknown points shown in each model?*

Listen for The unknown number is an addend in the bar model and addition equation. It is the difference in the subtraction equation.

For drawing a bar model, prompt students to identify how the bar model represents the problem.

- *How do you know where to put Todd's total points?*
- *Why are 16 and the unknown number in the same row of the bar model?*

For using an addition equation, prompt students to identify how addition represents the problem.

- *Why are the two scores added?*
- *Could the order of the addends be changed?*

For using a subtraction equation, prompt students to identify how subtraction represents the problem.

- *How does subtraction show Todd's scores for each level?*
- *Why is the unknown number in the subtraction equation the difference of 55 and 16?*

Explore different ways to understand modeling word problems.

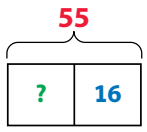
Todd plays a game. The table shows his points.

Level 1	?
Level 2	16 points
Total	55 points

How many points does Todd get in Level 1?

PICTURE IT

You can draw a bar model.



MODEL IT

You can use an addition equation.

Level 1 Score	+	Level 2 Score	=	Total Score
?	+	16	=	55

MODEL IT

You can use a subtraction equation.

Total Score	−	Level 2 Score	=	Level 1 Score
55	−	16	=	?

Deepen Understanding

Using Fact Families

SMP 8 Express regularity in repeated reasoning.

When discussing the addition and subtraction equations, prompt students to consider how a fact family can be used to write four possible equations that could be used to solve the problem.

Direct students' attention to the two *Model Its*.

Ask *Is there another addition equation that you could write to solve this problem? Another subtraction equation?*

Listen for Yes, I also could write 16 + ? = 55, because I can add two numbers in any order and still get the same sum. I could write 55 − ? = 16 because when I start with the total, I can subtract either one of the parts and I will get the other part.

Direct students' attention to the bar model in *Picture It* and discuss how the whole and the two parts in this word problem can be related by 4 equations.

Generalize Write another missing-addend problem on the board and ask volunteers to write the 4 related equations.

CONNECT IT

- Remind students that one thing that is alike about all the representations is the numbers and the unknown number.
- Explain that on this page, students will use those representations to solve the problem.

Monitor and Confirm

1 – 2 Check for understanding that:

- a value that is unknown can be represented by a ?
- related addition and subtraction equations can be used to solve the problem
- the Level 1 score can be found as the total of the jumps from the Level 2 score to the total score

Support Whole Class Discussion

3 Be sure students understand that the question is asking them to explain how to use an open number line in order to solve the problem and then to describe another way to solve the problem.

Ask *How did you decide where to start on your number line? Where to stop? How does your number line show the number of points scored in Level 1?*

Listen for I start at 16, the known addend, and make jumps up to 55, the total number of points. My jumps add up to 39, which is the points for Level 1. I start at 55, the total, and make jumps back, totaling 16, which land at 39. So, 39 is the points for Level 1. Another way to find the answer is to subtract 16 from 55; $55 - 5 = 50$, $50 - 10 = 40$, and $40 - 1 = 39$. So, 39 is the number of points for Level 1.

Look for the idea that strategies will represent the 4 different equations that relate the start, change, and total.

4 REFLECT Have all students focus on the strategies used to solve this problem. If time allows, have students share their preferences with a partner.

CONNECT IT

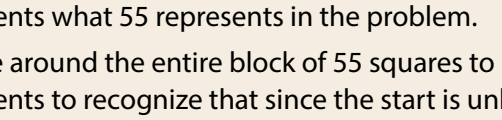
Now you will use the problem from the previous page to help you understand how to model word problems.

1 Look at the second **Model It**. Write a different subtraction equation that you could use to solve the problem.

55 – ? = 16

2 Show how to solve the problem from the previous page on an open number line. Then write your answer.

Possible work:



Solution Todd gets 39 points in Level 1.

3 How did you make your number line in problem 2? What is another way to find the answer?

Possible answer: I start at 16 and jump 4 to get to 20. Then I jump 30 and 5 to get to 55. Another way is to subtract 16 from 55. 55 − 5 = 50, 50 − 10 = 40, and 40 − 1 = 39.

4 REFLECT

Look back at your **Try It**, strategies by classmates, and **Picture It** and **Model Its**. Which models or strategies do you like best for modeling a word problem? Explain.

Possible answer: I like writing an addition or a subtraction equation because I can label the numbers with information from the problem.

Visual Model

Use a hundred chart to find the unknown starting value in a word problem.

If . . . *students are unsure about how to solve a problem with an unknown starting value,*

Then . . . *use the activity below to connect using a hundred chart to finding an unknown start value.*

Materials For each student: Activity Sheet *Hundred Chart*

- Project a hundred chart and use a marker to trace the square with 55. Ask students what 55 represents in the problem.
- Trace around the entire block of 55 squares to indicate the total. Guide students to recognize that since the start is unknown, you can count back 16 squares (beginning with 55) and shade them to represent the change.
- Students should identify that the first 39 unshaded squares represent the start.
- If time permits, reinforce the relationships between the start, the change, and the total by using the chart to demonstrate some of the other strategies students used.

APPLY IT

For all problems, encourage students to use models and equations to support their thinking.

5 18 cards; Students also could subtract $90 - 72 = 18$.
DOK 2

6 25 flowers; Students also could add on from 18 to 43: $18 + 2 = 20$; $20 + 20 = 40$; $40 + 3 = 43$. So, $2 + 20 + 3 = 25$.
DOK 2

Close: Exit Ticket

7 **A**, **C**, **D**; Students could write all 4 equations for the fact family: $27 + 35 = ?$, $35 + 27 = ?$, $? - 27 = 35$, and $? - 35 = 27$.
DOK 2

Students' solution should indicate understanding of:

- representing word problems with equations
- equivalent forms of fact family equations

Error Alert **If** students chose **B** or **E**, **then** suggest that students use a number bond to show 27 pictures and 35 pictures as the two parts of the unknown total number of pictures and then write the 4 equations in the fact family.

APPLY IT

Use what you just learned to solve these problems.

5 Matt has 72 sports cards. Then he buys more cards. Now he has 90 cards. How many more cards does Matt buy? Show your work.

Possible student work: $72 + 8 = 80$; $80 + 10 = 90$; $8 + 10 = 18$

Solution 18 cards

6 Neve has some flowers. Then she picks 18 more flowers. Now she has 43 flowers. How many flowers does Neve have at the start? Show your work.

Possible student work: $43 - 18 = ?$; $25 + 18 = 43$, so $43 - 18 = 25$.

Solution 25 flowers

7 Shari has a new camera. She takes 27 pictures on Monday. She takes 35 pictures on Tuesday. Which equations could you solve to find how many pictures Shari takes on the two days?

Ⓐ $? = 27 + 35$
Ⓑ $? = 35 - 27$
Ⓒ $? = 35 + 27$
Ⓓ $? - 35 = 27$
Ⓔ $35 - ? = 27$

Solutions

1. See Student Worktext page.
Basic

2. 48 fish; Possible work: 73 − 20 = 53 and 53 − 5 = 48
Medium

Name: _____ LESSON 9 SESSION 2

Practice Ways to Model Word Problems

Study the Example showing how to use equations to solve word problems. Then solve problems 1–6.

EXAMPLE

Ted has some beads. Then he gets 18 more beads. Now Ted has 42 beads. How many beads does Ted have to begin with?

Use addition:
start + change = total
? + 18 = 42

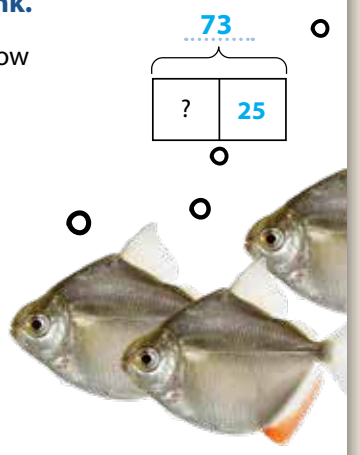
or

Use subtraction:
total − change = start
42 − 18 = ?

? = 24

Ted has 24 beads to begin with.

Mrs. Tate has some fish in her fish tank. She buys 25 more fish. Now there are 73 fish in the fish tank.



1. Complete the model and the equations to show how many fish are in the fish tank at the start.

? + 25 = 73

73 − 25 = ?

2. How many fish are in the fish tank at the start? Show your work.

Possible work: 73 − 20 = 53; 53 − 5 = 48

Solution 48 fish

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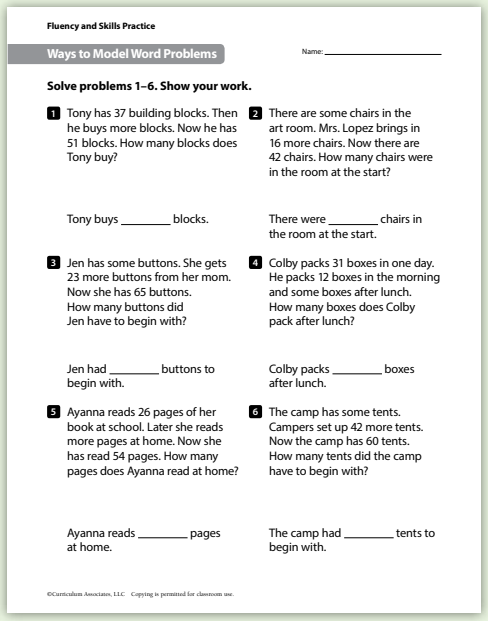
Fluency & Skills Practice

Teacher Toolbox

Assign *Ways to Model Word Problems*

In this activity students practice solving word problems using addition or subtraction of two-digit numbers. Through this practice, students build fluency in solving word problems with unknowns in different positions. This skill is useful for solving similar real-world problems involving addition or subtraction.



Fluency and Skills Practice

Ways to Model Word Problems

Name: _____

Solve problems 1–6. Show your work.

1. Tony has 37 building blocks. Then he buys more blocks. Now he has 51 blocks. How many blocks does Tony buy?

Tony buys _____ blocks.

2. There are some chairs in the art room. Mrs. Lopez brings in 16 more chairs. Now there are 42 chairs. How many chairs were in the room at the start?

There were _____ chairs in the room at the start.

3. Jen has some buttons. She gets 23 more buttons from her mom. Now she has 65 buttons. How many buttons did Jen have to begin with?

Jen had _____ buttons to begin with.

4. Colby packs 31 boxes in one day. He packs 12 boxes in the morning and some boxes after lunch. How many boxes does Colby pack after lunch?

Colby packs _____ boxes after lunch.

5. Ayanna reads 26 pages of her book at school. Later she reads more pages at home. Now she has read 54 pages. How many pages does Ayanna read at home?

Ayanna reads _____ pages at home.

6. The camp has some tents. Campers set up 42 more tents. Now the camp has 60 tents. How many tents did the camp have to begin with?

The camp had _____ tents to begin with.

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3 See Student Worktext page.
Medium

4 59 miles north; See Student Worktext page.
Medium

5 28 cards; Students also could write the equations
$41 - 1 = 40, 40 - 20 = 20, 20 - 7 = 13$.
$1 + 20 + 7 = 28$
Medium

6 Answers will vary; See Student Worktext page.
Challenge

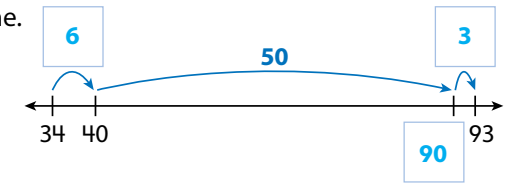
Mrs. Lopez drives a number of miles north. Then she drives 34 miles west. She drives 93 miles in all.

3 Complete the equations to show how many miles Mrs. Lopez drives north.

? + 34 = 93 and 93 − 34 = ?

4 Complete the open number line. Then solve the problem. Show your work.

Possible work: 6 + 50 + 3 = 59



Mrs. Lopez drives 59 miles north.

Stella has some cards. Then she makes 13 more cards. Now she has 41 cards.

5 How many cards does Stella start with? Show your work.

Possible work: 41 − 13 = ?; 41 − 10 = 31; 31 − 3 = 28

Solution 28 cards

6 Write and solve a problem like problem 5. Use different numbers.

Possible answer: Jon has some cards. Then he buys 25 more cards. Now he has 63 cards. How many cards does he have to begin with? 25 + 5 = 30; 30 + 33 = 63; 5 + 33 = 38. Jon has 38 cards to begin with.

ELL English Language Learners: Differentiated Instruction

Prepare for Session 3
Use with *Try It*.

Levels 1–3

Reading/Writing Read the ***Try It*** problem aloud. Refer to the anchor chart from past lessons showing addition and subtraction strategies for two-digit numbers. In partners, have students decide on a strategy to use in order to solve the problem.

Ask each student to use a different color of pencil, crayon, or marker. Tell them that they will take turns writing a model to show their work. Once the model is complete, help students summarize and write their steps using the words *first, then, next*, and *finally*. When finished, have students read their sentences to their partner.

Levels 2–4

Reading/Writing Have students read the ***Try It*** problem with a partner. Refer to the anchor chart from past lessons showing addition and subtraction strategies for two-digit numbers. In partners, have students decide on two strategies to solve the problem.

Have them write a model to show their work in finding a solution to the problem. Then have students summarize and write their steps using the words *first, then, next*, and *finally*. When finished, have students read their sentences to their partner.

Levels 3–5

Speaking/Writing Have students read the ***Try It*** problem independently, and then discuss their ideas to solve the problem with a partner. In partners, have students decide on two strategies to use to find the solution.

Have partners write a model to show their work. Then have them write the steps using the words *first, then, next*, and *finally*. If both students got the same answer, have them high-five each other. If not, have them check each other's work and correct their mistakes.

LESSON 9

SESSION 3 Develop

Purpose In this session, students solve a word problem with an unknown start, using either addition or subtraction. They find the unknown number by modeling the problem either on paper or with manipulatives. The purpose of this problem is to have students build fluency with solving word problems involving two-digit numbers.

Start

Connect to Prior Knowledge

Why Support students' understanding of solving a word problem with the start unknown, foreshadowing solving similar problems involving two-digit numbers.

How Have students find the solution to a word problem that involves one-digit numbers with the start unknown by writing and solving an equation.

Write an equation with an unknown number to represent the problem. Then solve your equation.

Some birds are in a tree. Then 9 birds fly away. Now there are 6 birds in the tree. How many birds were in the tree to start?

Solution

15 birds; Possible equations:

$? - 9 = 6$; $? - 6 = 9$;

$6 + 9 = ?$; $9 + 6 = ?$

Develop Language

Why Clarify the meaning of the phrase *to begin with* as it is used in word problems.

How Read the *Try It* example and have students note the phrase *to begin with* in the question. Explain that the phrase refers to the original amount of books in the problem. Have students find a phrase with the same meaning in the example in *Practice* (*at the start*). Then ask students to reword the question using *to begin with*.

TRY IT

Make Sense of the Problem

To support students in making sense of the problem, have them identify that the total number of books on the shelf at the start is unknown, there were 24 books taken from the shelf, and 38 are left on the shelf at the end.

Ask *What are you trying to find out?*

Develop More Ways to Model Word Problems

Read and try to solve the problem below.

Some books are on a shelf. Students take 24 books from the shelf. Then there are 38 books on the shelf. How many books are on the shelf to begin with?

TRY IT

Possible student work:

Sample A

?	
24	38

$? - 24 = 38$

$62 - 24 = 38$

There are 62 books to begin with.

Sample B

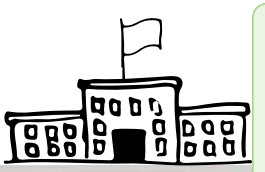
$38 + 24 = ?$

$38 + 24 = 62$

There are 62 books to begin with.

Math Toolkit

- base-ten blocks
- number bonds
- bar models
- hundred charts
- open number lines



DISCUSS IT

Ask your partner: How did you choose that strategy?

Tell your partner: I disagree with this part because . . .

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DISCUSS IT

Support Partner Discussion

Encourage students to discuss the situation described in the problem in order to determine if this is an "add to" or a "take from" problem.

Support as needed with questions such as:

- *What happens to the number of books on the shelf?*
- *How could you solve the problem using addition?*

Common Misconception Look for students who are not comfortable with the concept of finding the unknown start value in a "take from" situation and may subtract 24 from 38. As students present solutions, be sure to have them specify how they know that 24 and 38 are two parts of the unknown start.

Select and Sequence Student Solutions

One possible order for whole class discussion:

- a bar model to represent the unknown start, the change, and the total
- number bonds to represent the problem using words or numbers
- an open number line to model counting up 24 from 38 or counting up 38 from 24
- equations modeling addition and subtraction

Support Whole Class Discussion

Compare and connect the numbers in the word problem and how they are shown on student representations of the problem.

Ask *Where does each model show the number of books at the start, the number of books students take from the shelf, and the number of books left?*

Listen for The total number of books at the start is the unknown number. After 24 books are taken away, 38 books are left.

MODEL ITS

If no student presented these models, connect them to the student models by pointing out the ways they each represent:

- the unknown number of books at the start
- the 24 books students take away
- the 38 books left on the shelf at the end

Ask *How is the unknown number of books on the shelf to begin with shown in the number bond with words? With numbers?*

Listen for The unknown number of books is called the total books in the number bond with words; it is shown as the total with a question mark in the number bond with numbers.

For showing the problem with words, prompt students to identify how the number bond with words is helpful for solving the problem.

- *How are the words in the model and problem alike?*
- *How are the words in the model related to the numbers in the problem?*

For showing the problem with numbers, prompt students to identify how the number bond represents the problem.

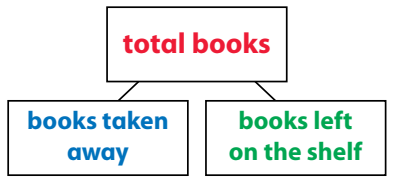
- *What does the ? represent in the number bond?*
- *Why are the change and ending numbers from the problem shown in the bottom boxes of the model?*

Explore more ways to understand modeling word problems.

Some books are on a shelf. Students take 24 books from the shelf. Then there are 38 books on the shelf. How many books are on the shelf to begin with?

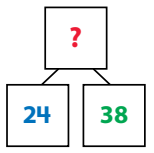
MODEL IT

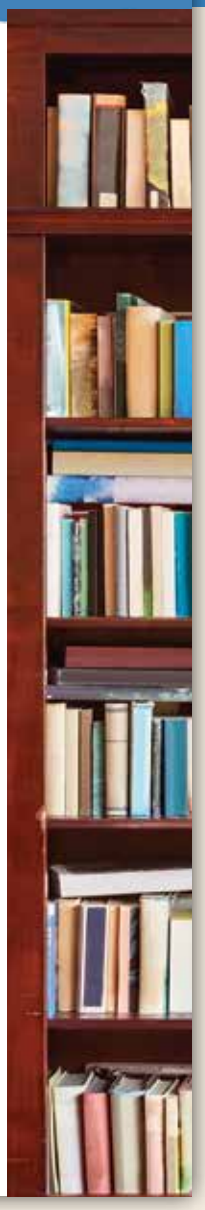
You can show the problem with words.



MODEL IT

You can show the problem with numbers.





Deepen Understanding

Number-Bond Models

SMP 4 Model with mathematics.

When discussing the number-bond models, prompt students to consider how a number bond can represent a word problem using words and numbers.

Ask *How do the number bonds show the number of books that are taken away? The number of books left on the shelf? The number of books that were on the shelf to begin with?*

Listen for The number bonds use the words *books taken away* and 24 as one of the parts of the whole; the words and the number are both blue. They use the words *books left on the shelf* and 38 as one of the parts of the whole; the words and the number are both green. They use the words *total books* and a question mark for the whole; the words and the question mark are both red.

Generalize *How does the number bond with words help connect the word problem to the number bond with numbers?* Listen for understanding that using words in a model can help to place the numbers and the ? in the correct places.

CONNECT IT

- Remind students that the first number bond represents the problem with words and the second number bond represents the problem with numbers.
- Explain that on this page, students will use those representations along with equations to find the number of books on the shelf at the start.

Monitor and Confirm

1–2 Check for understanding that:

- a word problem represented with a number bond has 4 related equations that can be used to find the unknown number
- the solution to the problem will be the same, using any of the 4 equations
- the sum of the books taken away and the books left on the shelf is the number of books on the shelf at the start

Support Whole Class Discussion

3 Be sure students understand that the question is asking them to find the total number of books on the shelf before any were taken away.

> **Ask** *Do you know the whole or the parts for this problem? What equation can be used to represent the problem?*
>
> ***Listen for*** 24 books are taken from the shelf. Then there are 38 books left. I know that one part is 24 and the other part is 38. The whole is unknown. I can write the equation ? = 24 + 38.

Look for the idea that a part-part-whole problem can be represented and solved using either addition or subtraction.

4 REFLECT Have all students focus on the strategies used to solve this problem. If time allows, have students share their preferences with a partner.

CONNECT IT

Now you will use the problem from the previous page to help you understand more ways to model and solve word problems.

1 Look at the second **Model It**. Write an addition equation and a subtraction equation for the problem.

Possible answer:

? = 24 + 38 ? − 38 = 24

2 Write a different addition equation that you could use to solve the problem. Possible answer:

38 + 24 = ?

3 What is the total number of books on the shelf to begin with? Show your work.

There are 62 books on the shelf at the start.
Possible work: ? = 24 + 38. 20 + 30 = 50 and 4 + 8 = 12. 50 + 12 = 62.

4 REFLECT

Look back at your **Try It**, strategies by classmates, and **Model Its**. Which models or strategies do you like best for modeling word problems? Explain.

Possible answer: I like using numbers to model a word problem because it helps me to understand what the total and the parts of the problem are. It also helps me decide if I need to find the total or one of the parts.

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Visual Model

Use an open number line to find the unknown starting value in a word problem.

If . . . *students are unsure about how to solve a problem with an unknown starting value,*

Then . . . *use the activity below to connect using an open number line to finding an unknown start value.*

- Revisit the word problem about books on a shelf and the number bond with numbers from the second *Model It*.
- Project an open number line or draw one on the board. Ask: *What is an addition equation that can be used to represent the problem?* [Possible answer: 24 + 38 = ?]
- Ask students what number they could start at in order to show the addition on the number line. [Possible answer: 24] Ask what jumps should be made from the starting number. [Possible answer: a jump of 6 from 24 to 30, a jump of 30 from 30 to 60, and a jump of 2 from 60 to 62, for jumps totaling 38]
- Prompt students to check their work by writing a subtraction equation using their solution. [62 − 38 = 24 or 62 − 24 = 38]

APPLY IT

For all problems, encourage students to use models and equations to support their thinking.

5 81 students; Students also could write the equations 48 + 30 = 78 and 78 + 3 = 81.
DOK 2

6 26 fewer people; Students also could write the equations 55 − 20 = 35, 35 − 5 = 30, and 30 − 4 = 26.
DOK 2

Close: Exit Ticket

7 Answers will vary; See Student Worktext page. Students also could use a bar model to show the parts of the problem with both words and numbers in the boxes of the model.
DOK 2

Students' solution should indicate understanding of:

- representing word problems with both words and numbers
- using a model to represent the known and unknown values in a word problem

Error Alert **If** students incorrectly identify the whole and parts in the word problem, **then** ask them to draw a number bond that has both words and numbers in each part of the model to support their thinking.

APPLY IT

Use what you just learned to solve these problems.

5 Students help clean the park. At noon, 33 students go home. Now there are 48 students cleaning the park. How many students helped at the start? Show your work.

81 started. Possible student work: ? = 33 + 48; 30 + 40 = 70, 3 + 8 = 11; 70 + 11 = 81

Solution **81 students**

6 55 people are in a red train car. 29 people are in a blue train car. How many fewer people are in the blue train car than the red train car? Show your work.

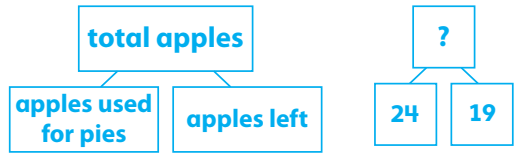
Possible student work: 29 + 1 = 30; 30 + 25 = 55; 25 + 1 = 26

Solution **26 fewer people**

7 First explain how to model the problem below using words. Then explain how to model it using numbers.

Kevin picks some apples. He uses 24 of the apples to make pies. He has 19 apples left. How many apples does Kevin pick?

I model this problem with words and numbers by using these drawings:



Solutions

1. See Student Worktext page.
Basic

2. Rick starts with 34 grapes. Students could write the equations $10 + 10 = 20$, $5 + 9 = 14$, and $20 + 14 = 34$.
Medium

Name: _____ LESSON 9 SESSION 3

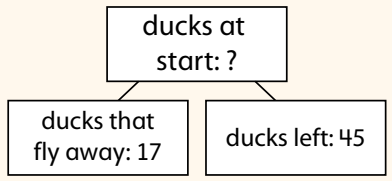
Practice More Ways to Model Word Problems

Study the Example showing how to model with words and numbers. Then solve problems 1–6.

EXAMPLE

There are some ducks in a pond. Then 17 ducks fly away. Now there are 45 ducks in the pond. How many ducks are in the pond at the start?

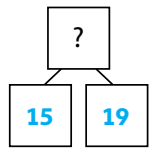
Model the problem with words or with numbers. Then write an equation.



$17 + 45 = 62$

There are 62 ducks to begin with.

Rick has some grapes. Rick eats 15 of the grapes. Then he has 19 grapes left.



1. Complete the number bond at the right to model the problem.

2. How many grapes does Rick start with? Show your work.
Possible work: $15 + 19 = ?$; $10 + 10 = 20$; $5 + 9 = 14$; $20 + 14 = 34$

Solution **Rick starts with 34 grapes.**

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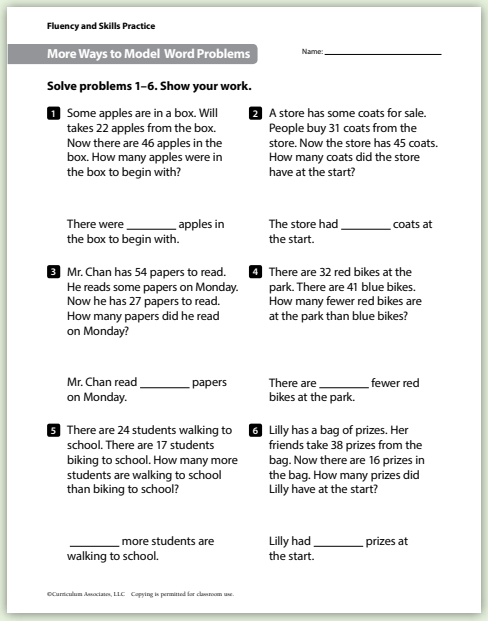
Fluency & Skills Practice

Teacher Toolbox

Assign *More Ways to Model Word Problems*

In this activity students practice solving two-digit addition and subtraction word problems using a variety of strategies. Students will gain further experience deciding on a solution strategy to solve word problems with unknowns in different positions.



Fluency and Skills Practice

More Ways to Model Word Problems

Name: _____

Solve problems 1–6. Show your work.

1. Some apples are in a box. Will takes 22 apples from the box. Now there are 46 apples in the box. How many apples were in the box to begin with?

There were _____ apples in the box to begin with.

2. A store has some coats for sale. People buy 31 coats from the store. Now the store has 45 coats. How many coats did the store have at the start?

The store had _____ coats at the start.

3. Mr. Chan has 54 papers to read. He reads some papers on Monday. Now he has 27 papers to read. How many papers did he read on Monday?

Mr. Chan read _____ papers on Monday.

4. There are 32 red bikes at the park. There are 41 blue bikes. How many fewer red bikes are at the park than blue bikes?

There are _____ fewer red bikes at the park.

5. There are 24 students walking to school. There are 17 students biking to school. How many more students are walking to school than biking to school?

_____ more students are walking to school.

6. Lilly has a bag of prizes. Her friends take 38 prizes from the bag. Now there are 16 prizes in the bag. How many prizes did Lilly have at the start?

Lilly had _____ prizes at the start.

3 See Student Worktext page.
Basic

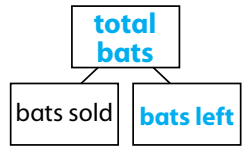
4 80 bats; Students also could write the equations $34 + 6 = 40$ and $40 + 40 = 80$.
Medium

5 18 people; Students also could write the equations $41 - 1 = 40$, $40 - 20 = 20$, and $20 - 2 = 18$.
Medium

6 16 people; Students also could write the equations $23 + 7 = 30$, $30 + 9 = 39$, and $7 + 9 = 16$.
Medium

A sports store sells baseball bats. In one week, 34 bats are sold. Then the store has 46 bats left. How many bats does the store have to begin with?

3 Model the problem with words. Complete the number bond at the right.

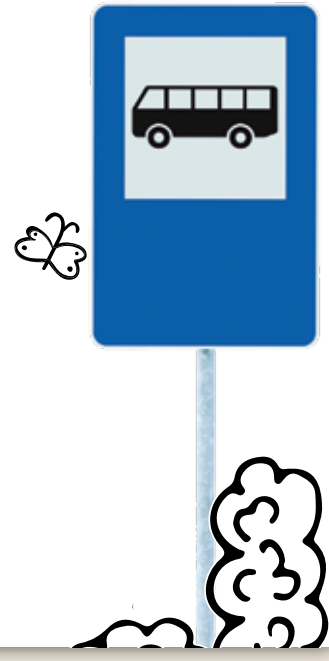


4 Solve the problem. Show your work.

Possible work: ? = 34 + 46; 30 + 40 = 70; 4 + 6 = 10; 70 + 10 = 80

Solution 80 bats

There are 41 people waiting at a bus stop. Then 23 of them get on a bus. Now there are 39 people on the bus.



5 How many people are still waiting at the bus stop now? Show your work.

Possible work: 41 − 23 = ?; 41 − 20 = 21; 21 − 3 = 18

Solution 18 people

6 How many people were on the bus to begin with? Show your work.

Possible work: 23 + ? = 39; 23 + 7 = 30; 30 + 9 = 39; 7 + 9 = 16

Solution 16 people

ELL English Language Learners: Differentiated Instruction

Prepare for Session 4
Use with *Try It*.

Levels 1–3

Speaking/Writing Read the ***Try It*** problem aloud. Tell students to choose a strategy they will use to create a model to solve the problem. Remind them that they can choose to add or subtract to find the solution. Have students orally explain or draw a model to show how they will solve the problem. Encourage them to use the words *first, next*, and *then*. When finished, have students solve the problem.

Have students check their work by sharing with a partner and comparing their answers. If their answers are different, have students work with another pair of students to correct their mistakes.

Levels 2–4

Speaking/Writing Have students read the ***Try It*** problem aloud. In pairs, have them discuss a strategy to find the solution to the problem by asking: *Will you add or subtract? Why?* Once students decide on a strategy, ask them to draw a model. Ask students to provide a written explanation of how they solved the problem using the words *first, next,* and *then*.

Encourage partners to work with other students to check their work.

Levels 3–5

Listening/Speaking In pairs, have students read the ***Try It*** problem and discuss their ideas for solving it. Challenge students to come up with two models for adding and subtracting. Have them discuss the steps they'll follow to create both models using the words *first, next*, and *then*.

When finished have students solve the problem using both models. Then have students check their answers by comparing the final result. Once complete, have partners find students who used a different model for adding and subtracting. Have them share and compare their work.

LESSON 9

SESSION 4 Develop

Purpose In this session, students solve a problem that requires two addition or subtraction steps and involves two-digit numbers. Students model each step either on paper or with manipulatives. The purpose of this problem is to have students apply strategies they have used for one-step problems to solving two-step word problems involving two-digit numbers.

Start

Connect to Prior Knowledge

Why Support students' understanding of solving a two-step problem involving one-digit numbers, foreshadowing solving a two-step word problem involving two-digit numbers.

How Have students use addition and subtraction to solve a two-step word problem involving one-digit numbers.

Solve the problem. Show your work.

Libby has 6 flowers. Then she picks 8 more flowers. She gives 5 flowers to her teacher. How many flowers does Libby have now?

Solution

9 flowers; $6 + 8 = 14$; $14 - 5 = 9$

Develop Language

Why Clarify how some words in a problem may signal addition or subtraction.

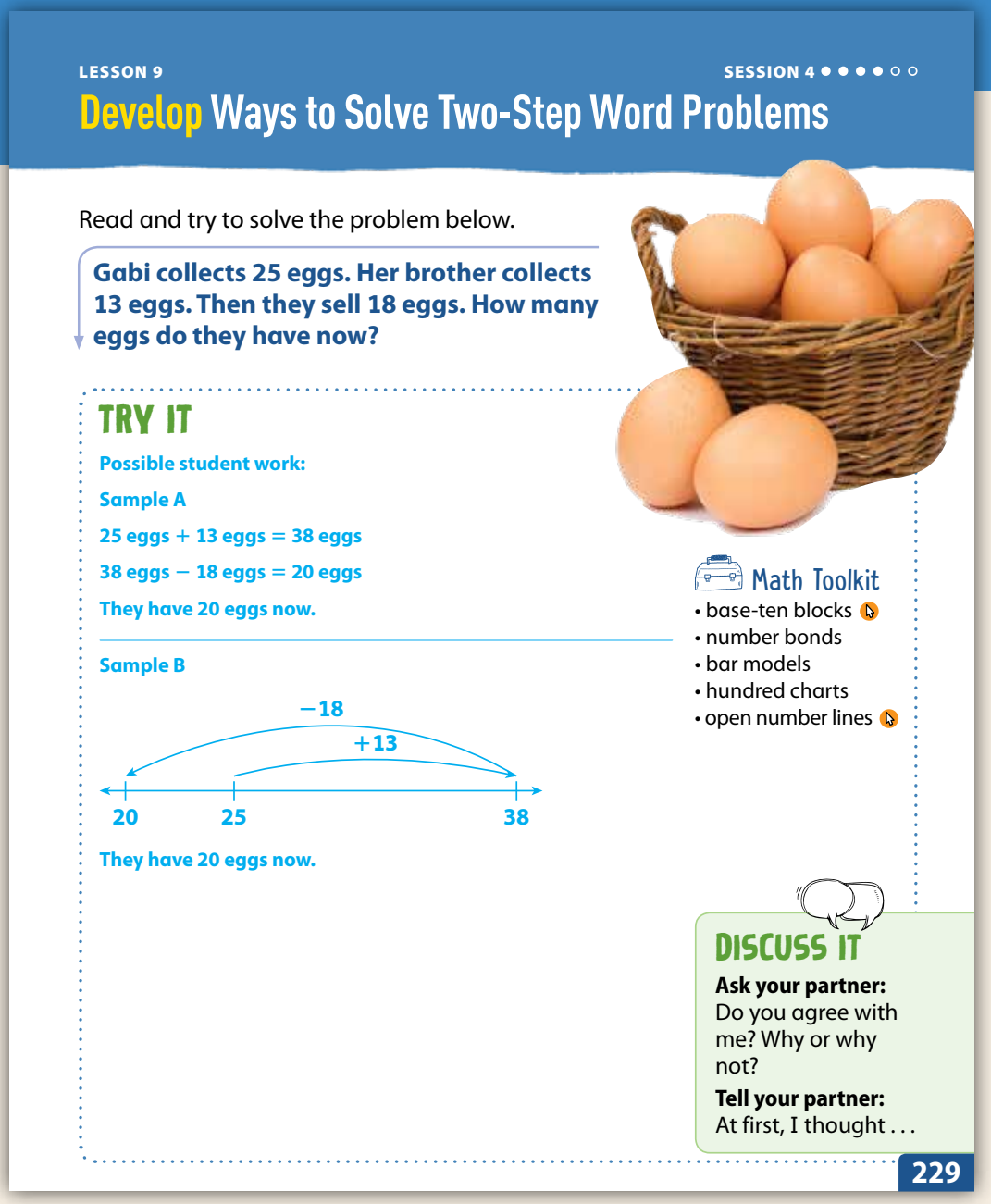
How Read the *Try It* problem. Ask students to identify the words that tell what Gabi and her brother do with the eggs (*collect* and *sell*). Explain that the word *collects* in the problem is a signal for addition. The siblings take eggs and put them together. Ask: *What happens to the original amount when they sell eggs?* Tell students that the word *sell* is a signal for subtraction.

TRY IT

Make Sense of the Problem

To support students in making sense of the problem, have them identify that Gabi started with 25 eggs, 13 more eggs were collected, and then 18 eggs were sold.

Ask *What are you trying to find out?*



LESSON 9 SESSION 4 ● ● ● ● ○ ○

Develop Ways to Solve Two-Step Word Problems

Read and try to solve the problem below.

Gabi collects 25 eggs. Her brother collects 13 eggs. Then they sell 18 eggs. How many eggs do they have now?

TRY IT

Possible student work:

Sample A

25 eggs + 13 eggs = 38 eggs

38 eggs − 18 eggs = 20 eggs

They have 20 eggs now.

Sample B

They have 20 eggs now.

Math Toolkit

- base-ten blocks
- number bonds
- bar models
- hundred charts
- open number lines

DISCUSS IT

Ask your partner: Do you agree with me? Why or why not?

Tell your partner: At first, I thought . . .

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DISCUSS IT

Support Partner Discussion

As students talk to each other, encourage them to identify the two steps required for finding the solution to the problem. Support as needed with questions such as:

- *What will you need to do first to solve the problem? Why?*
- *How will you show selling 18 eggs?*

Common Misconception Look for students who correctly find the sum of 25 and 13 for the first step but then incorrectly identify the operation for the second step as addition and add 18 to 38. As students share solutions, be sure to have them specify how they knew which operation to use for each step in solving the problem.

Select and Sequence Student Solutions

One possible order for whole class discussion:

- quick drawings to represent each step in the problem
- bar models to show how the numbers relate in each step of the problem
- an open number line to model each step of the problem
- an addition equation to represent the first step of the problem and a subtraction equation to represent the second step

Support Whole Class Discussion

Compare and connect the numbers in the word problem and how they are shown on student representations of the problem.

Ask *How does each model show the number of eggs Gabi collects? The number of eggs her brother collects? The number of eggs that they sell? The number of eggs that they have now?*

Listen for The number of eggs that Gabi and her brother each collect are the parts of the whole in the first step. The number of eggs they sell is the number being subtracted in the second step. The number of eggs they have now is the difference of the numbers of eggs they collected and sold.

PICTURE IT & MODEL IT

If no student presented these models, connect them to the student models by pointing out the ways they each represent:

- a start of 25
- an addition of 13
- a difference of 38 and 18

Ask *What does 38 represent in the problem?*

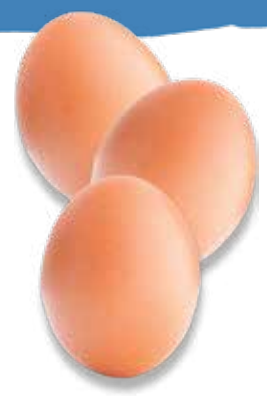
Listen for 38 is the sum of 25 and 13, the total number of eggs Gabi and her brother collected.

For drawing a picture of each step, prompt students to identify how the known information is shown in the picture.

- *What do the words and symbols above the pictures mean?*
- *What do the lines across the eggs in Step 2 mean?*

For making a bar model of each step, prompt students to identify how each model is labeled.

- *How does each bar model show which operation you will use to find the unknown number?*



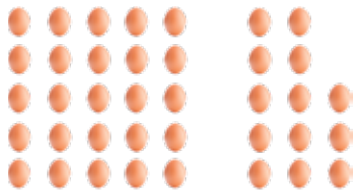
Explore different ways to understand how to solve two-step word problems.

Gabi collects 25 eggs. Her brother collects 13 eggs. Then they sell 18 eggs. How many eggs do they have now?

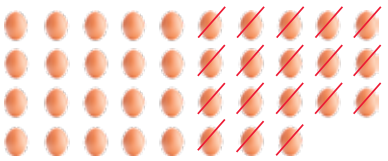
PICTURE IT

You can draw a picture of each step.

Step 1: 25 eggs + 13 eggs



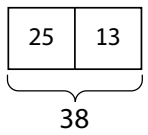
Step 2: 38 eggs **− 18 eggs sold**



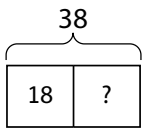
MODEL IT

You can make a model of each step.

Step 1:



Step 2:



Deepen Understanding

Using Bar Models

SMP 4 Model with mathematics.

Prompt students to consider how bar models are used for each step of the problem.

Ask *In Step 1 of the* Model It, *which part of the word problem is shown? What does the ? represent? In Step 2, which part of the word problem is shown? What does 38 represent? What do 18 and ? represent? How can you use the bar model to find how many eggs Gabi and her brother have now?*

Listen for Step 1 shows 25, the eggs Gabi collected, and 13, the eggs that her brother collected, as parts of a whole. The ? represents the sum, $25 + 13$, or the total eggs collected. Step 2 shows 38, the total number of eggs collected. 18 and ? show two parts of 38. I know 18 eggs were sold, but I do not know how many eggs they have now, so there is a ? for the unknown number. The bar model shows that I can find $38 - 18 = ?$.

Generalize *Explain if you can use bar models to solve any two-step word problem.* Listen for understanding that a two-step word problem requires solving for an unknown part or whole in each step in order to find the final solution. So, a bar model could be used twice to solve any two-step problem.

CONNECT IT

- Remind students that one thing that is alike about all the representations is the numbers.
- Explain that on this page, students will use those numbers to write equations for each step of the problem shown in those representations.

Monitor and Confirm

1–3 Check for understanding that:

- the first step of the problem is to find the sum of 25 and 13 as 38
- the second step of the problem is to find the difference of 38 and 18 as 20
- the solution for the number of eggs Gabi and her brother have now is 20

Support Whole Class Discussion

4 Be sure students understand that the problem is asking them how to identify when a problem is a two-step problem.

Ask *When is a second step needed to solve a word problem?*

Listen for When you need to add or subtract first to get the numbers you need to find the final solution to the problem, there will be two steps. The answer to the first step is used to solve the problem in the second step.

Look for the idea that the numbers given in the word problem cannot be used in one calculation to solve the problem.

5 REFLECT Have all students focus on the strategies used to solve this problem. If time allows, have students share their preferences with a partner.

CONNECT IT

Now you will use the problem from the previous page to help you understand how to solve two-step word problems using equations.

1 Look at **Picture It**. Write an equation for Step 1.

25 + 13 = 38

2 Look at **Model It**. Write an equation for Step 2.

38 − 18 = 20

3 How many eggs do Gabi and her brother have now? 20

4 How can you tell if a problem needs two steps to solve?

Possible answer: When you need the answer to one problem to solve another problem, two steps are needed. The first step gives an answer that is used in the second step to answer the question.

5 REFLECT

Look back at your **Try It**, strategies by classmates, and **Picture It** and **Model It**. Which models or strategies do you like best for solving two-step word problems? Explain.

Possible explanation: I like drawing a picture because I can see each part of the word problem. Then I can count to find the answer.

Visual Model

Use a number line to solve a two-step problem.

If . . . *students are unsure about how to solve a two-step problem,*

Then . . . *use the activity below to provide another strategy.*

- Project an open number line or draw one on the board. Ask: *What is an addition equation that could be used to solve the first step?* [25 + 13 = ?] *What is a subtraction equation that could be used to solve the second step?* [38 − 18 = ?]
- Prompt students to explain how the open number line could be used to solve these equations. Ask: *What number would you start with on the number line for the addition equation? Why? What jumps would you make on the number line? How do you know when you have reached the number that shows the number of eggs that Gabi and her brother collected together?*
- For the second step, guide students to connect the answer to the first step with the start of the second step. Ask: *What number would you start with for the subtraction equation? What jump would you make? How do you know when you have reached the number for how many eggs Gabi and her brother have now?*
- As students answer each question, show the jumps on the number line and reinforce their connection to each step in solving the problem.

APPLY IT

For all problems, encourage students to draw a picture or model to support their thinking.

6 Finn has 64 markers now; Students also could show a jump of 7 from 57 to 50 and then a jump of 8 from 50 to 42 on one number line. Then they could show a jump of 20 from 42 to 62 and then a jump of 2 from 62 to 64 on a second number line.
DOK 2

7 There are 16 fluid ounces of juice left. See Student Worktext page.
DOK 2

Close: Exit Ticket

8 **A** (Yes);
D (No);
F (No);
G (Yes)
DOK 3

Error Alert **If** students chose **C** or **E**, **then** remind students that 65 is the number of tickets that Anton has to sell and that he sells some tickets on Monday and more tickets on Tuesday. So, the number of tickets left to sell starts at 65 and is decreasing in both steps of the problem.

APPLY IT

Use what you just learned to solve these problems.

6 Finn has 57 markers. He gives 15 markers to his brother. Then he gets 22 new markers. How many markers does Finn have now? Show your work.

64 markers. Possible student work:

Step 1: 57 − 15 = 42

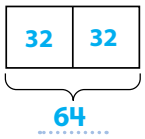
Step 2: 42 + 22 = 64

Finn has 64 markers now.

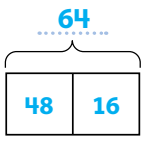
7 There are two bottles of juice that each hold 32 fluid ounces. Julia's family drinks 48 fluid ounces of juice. How many fluid ounces are left? Complete the bar models.

There are 16 fluid ounces of juice left.

Step 1:



Step 2:



8 Anton sells 65 tickets to the play. He sells 32 on Monday and 26 on Tuesday. Choose *Yes* or *No* to tell which equations can be used in a step to find how many tickets Anton sells on Wednesday.

	Yes	No
33 − 26 = 7	Ⓐ	Ⓑ
65 + 32 = 97	Ⓒ	Ⓓ
97 − 26 = 71	Ⓔ	Ⓕ
65 − 32 = 33	Ⓖ	Ⓗ

Solutions

1 Gabe has 22 building blocks left. See Student Worktext page.
Medium

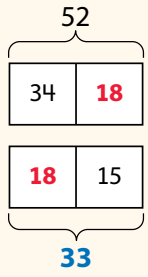
Name: _____ LESSON 9 SESSION 4

Practice Ways to Solve Two-Step Word Problems

Study the Example showing one way to solve a two-step word problem. Then solve problems 1–4.

EXAMPLE

Mariel makes 52 fruit cups for field day. She hands out 34 fruit cups. Then she makes 15 more fruit cups. How many fruit cups does Mariel have now?



Step 1: 52 fruit cups − 34 fruit cups = **18** fruit cups

Step 2: **18** fruit cups + 15 fruit cups = **33** fruit cups

Mariel has 33 fruit cups now.

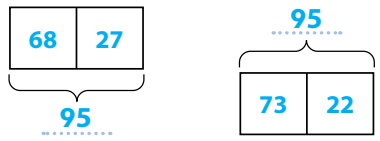
1 Gabe has 68 building blocks. He gets 27 more building blocks. Then he uses 73 building blocks to make a barn. How many building blocks does Gabe have left?

Show your work. Complete the bar models.

Possible work:

68 + 27 = 95

95 − 73 = 22



Gabe has 22 building blocks left.

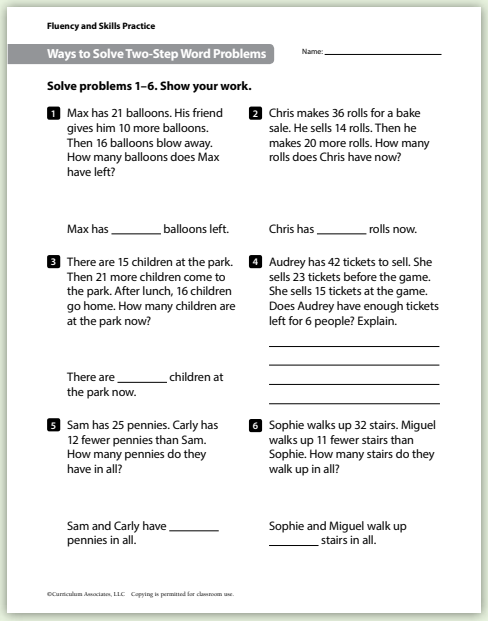
233

Fluency & Skills Practice

Teacher Toolbox

Assign *Ways to Solve Two-Step Word Problems*

In this activity students practice solving two-step word problems involving two-digit numbers. Through this practice students decide on appropriate operations to use and the order in which to add or subtract numbers to match the word problem context. Students will gain further experience deciding on a solution strategy for solving word problems with two steps.



Fluency and Skills Practice

Ways to Solve Two-Step Word Problems Name: _____

Solve problems 1–6. Show your work.

1 Max has 21 balloons. His friend gives him 10 more balloons. Then 16 balloons blow away. How many balloons does Max have left?

Max has _____ balloons left.

2 Chris makes 36 rolls for a bake sale. He sells 14 rolls. Then he makes 20 more rolls. How many rolls does Chris have now?

Chris has _____ rolls now.

3 There are 15 children at the park. Then 21 more children come to the park. After lunch, 16 children go home. How many children are at the park now?

There are _____ children at the park now.

4 Audrey has 42 tickets to sell. She sells 23 tickets before the game. She sells 15 tickets at the game. Does Audrey have enough tickets left for 6 people? Explain.

_____
_____
_____
_____

5 Sam has 25 pennies. Carly has 12 fewer pennies than Sam. How many pennies do they have in all?

Sam and Carly have _____ pennies in all.

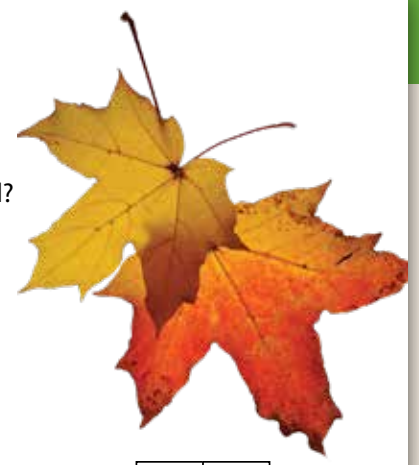
6 Sophie walks up 32 stairs. Miguel walks up 11 fewer stairs than Sophie. How many stairs do they walk up in all?

Sophie and Miguel walk up _____ stairs in all.

2 Amy and Nell have 67 leaves in all; 45 − 23 = 22 and 45 + 22 = 67.
Medium

3 There are 35 students on the bus now. See Student Worktext page.
Medium

4 No; Possible work: Mrs. Ruiz: 75 − 27 = 48 letters left. Mr. Allen: 48 − 25 = 23 letters left. Possible explanation: Mr. King needs 25 more letters but only has 23 left. 23 < 25, so he will not have enough for Mrs. Park's class.
Medium



2 Amy finds 45 leaves. Nell finds 23 fewer leaves than Amy. How many leaves do they find in all?

Complete the equations for each step.

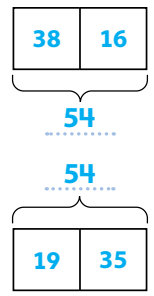
Step 1: 45 **−** 23 = **22**

Step 2: 45 + **22** = **67**

Amy and Nell have **67** leaves in all.

3 There are 38 students on the bus. Then 16 more students get on the bus. At the first stop, 19 students get off the bus. How many students are on the bus now?

Complete the bar models. Show your work.



Possible work:

38 + 16 = 54

54 − 19 = 35

Solution **There are 35 students on the bus now.**

4 Mr. King has 75 copies of the parent letter. He gives 27 letters to Ms. Ruiz for her class to take home. Then he gives 25 letters to Mr. Allen for his class. Are there enough letters left for the 25 children in Mrs. Park's class? Explain. Show your work.

Possible work:

Mrs. Ruiz: 75 − 27 = 48 letters left

Mr. Allen: 48 − 25 = 23 letters left

No. Possible explanation: Mr. King needs 25 more letters but only has 23 left. 23 < 25, so he will not have enough for Mrs. Park's class.

ELL English Language Learners: Differentiated Instruction

Prepare for Session 5
Use with *Apply It*.

Levels 1–3

Listening/Speaking Have students read ***Apply It*** problem 2 aloud. Have them reread the question as it is stated in the problem. Ask them to underline the phrases that the question is asking about in the problem. [red ribbon, blue ribbon]

Explain that the size of the dogs does not matter because the question is asking for colors of ribbons. Have students cross out the words *small* and *big*.

Then have students decide on a model to use to solve the problem. Have them work in pairs to draw a model. Then have them check their answer by orally sharing their work with another pair of students.

Levels 2–4

Listening/Speaking Have students read ***Apply It*** problem 2 aloud. In pairs, have students discuss the following questions: *Is it important to know if the dogs are big or small to find the solution? How do you know?* Ask for volunteers to share their thoughts. Explain that the size of the dogs does not matter. Have students cross out the words *small* and *big*.

Then have them decide on a model to use to find the solution. Have students share aloud the steps to solve the problem using the words *first, next*, and *then*. Then have them check their answer by orally sharing their work with another pair of students.

Levels 3–5

Speaking/Writing In pairs, have students read ***Apply It*** problem 2 aloud. Have them discuss the strategy they plan to use to find the solution. Ask partners to discuss answers to the questions: *Is there any information in the problem that isn't important in order to find the solution? What is it? Why is it not important?*

Have students solve the problem using a model. When complete, have them write sentences to summarize their steps in sequential order using the words *first, next*, and *then*. Then have students share their work with their partner by reading aloud their sentences and checking that they both got the same answer.

LESSON 9

SESSION 5 Refine

Purpose In this session, students use different strategies to solve word problems involving two-digit numbers, first sharing their thinking with a partner and then working independently.

Start

Connect to Prior Knowledge

Why Support students' knowledge of representing comparison problems with addition or subtraction interchangeably.

How Have students work in pairs to write and solve an addition equation and a subtraction equation that could be used to solve a comparison problem.

Write an addition equation and a subtraction equation to solve the problem.

Dave scores 9 points in a video game. Maria scores 13 points. How many more points does Maria score than Dave?

Possible Solutions

4 more points;
Possible equations:
$13 - 9 = ?$;
$9 + ? = 13$

EXAMPLE

82; the number line shown is one way to solve the problem. Students also could solve the problem by using a bar model or a number bond to represent the parts of the problem and then solving the equations $95 - 10 = 85$ and $85 - 3 = 82$.

Look for What is unknown in the problem is the difference of 95 and 13.

APPLY IT

1 29 people get on the train; Students could solve the problem by using a number bond model and equations to solve $22 + ? = 51$. Students also may use a number line to show that $51 - 22 = 29$.
DOK 2

Look for The corresponding subtraction equation for $22 + ? = 51$ is $51 - 22 = ?$.

Refine Solving Word Problems with Two-Digit Numbers

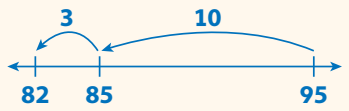
Complete the Example below. Then solve problems 1–3.

EXAMPLE

Keesha's math test score is 95. John's score is 13 points less than Keesha's score. What is John's score?

You can show your work on an open number line.

Keesha's score − 13 = John's score 95 − 13 = ?



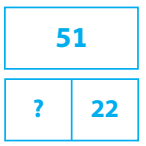
Solution John's score is 82.

APPLY IT

1 There are 22 people on a train. More people get on at the next stop. Now there are 51 people on the train. How many people get on at the stop? Show your work.

Can you make a model to help you think about the problem?

Possible work:



22 + ? = 51
22 + 8 = 30
30 + 21 = 51
8 + 21 = 29

Solution 29 people get on the train at the stop.

2 52 more dogs win a red ribbon than a blue ribbon. Possible work: Step 1 finds the number of dogs winning a red ribbon as $47 + 33 = 80$. Step 2 finds that $80 - 28$ or 52 more dogs win a red ribbon than win a blue ribbon.
DOK 2

Look for The problem requires two steps to solve: finding the total number of dogs winning a red ribbon and then finding the difference between the number of dogs winning a red ribbon and the number of dogs winning a blue ribbon.

3 **B**: 42 − 17 = 25

Explain why the other three answer choices are not correct:

A is not correct because 42 − 17 = 25, not 24.

C is not correct because students should subtract 17 from 41, not 7.

D is not correct because 59 is the sum of 42 and 17, not the difference.

DOK 3

Close: Exit Ticket

Check for Understanding

Materials For remediation: base-ten blocks, Activity Sheet *Number Bond Mat,* Activity Sheet *Hundred Chart*

Have students solve the following problem:

Sue collects 27 cans of food for the food drive. Her goal is to collect 65 cans. How many cans does she still need to collect? [38]

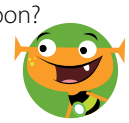
For students who are still struggling, use the table below to guide remediation.

After providing remediation, check students' understanding using the following problem:

There are 79 people sitting in a movie theater. The theater has enough seats for 93 people. How many seats are empty? [14]

2 47 small dogs and 33 big dogs win a red ribbon in the pet show. 28 dogs win a blue ribbon. How many more dogs win a red ribbon than a blue ribbon? Show your work.

How many dogs win a red ribbon?



Possible work:

47 + 33 = 80

80 − 28 = 52

52 more dogs win a red ribbon.

3 Liz makes 42 jumps with a jump rope. Tia makes 17 fewer jumps. How many jumps does Tia make?

Which girl makes more jumps?

Ⓐ 24

Ⓑ 25

Ⓒ 35

Ⓓ 59

Ramin chose Ⓑ as the correct answer. How did Ramin get his answer?

Possible answer: Ramin subtracted 42 − 17. 42 is 3 tens 12 ones. Subtract 1 ten 7 ones. That leaves 2 tens 5 ones, which is 25.

Error Alert

If the error is . . .	*Students may . . .*	*To support understanding . . .*
42	have subtracted 20 from 60 and 5 from 7.	Have students check their work by adding 42 to 27. Once they realize the answer is incorrect, lead them to use a strategy such as counting up to ensure accuracy.
92	have added the numbers instead of subtracting them.	Ask students to tell you the total number of cans Sue wants to collect. Ask if it makes sense that she still needs to collect 92 cans. Then help students organize the information using a number bond or hundred chart.
any other number	have miscalculated.	As students read each sentence, have them describe what the sentence says and model it with base-ten blocks or a drawing. Have students write an equation, solve it, and then check for computational accuracy.

Solutions

1 **A** (Yes);
D (No);
E (Yes);
G (Yes)
Medium

2 **B**; Students could solve the problem by finding 56 beads + 17 beads = 73 beads.
Explain why the other two answer choices are not correct:
A is not correct because 56 + 17 ≠ 79.
D is not correct because the answer should be found by adding 56 and 17.
Challenge

Name: _____ LESSON 9 SESSION 5

Practice Solving Word Problems with Two-Digit Numbers

1 Carlos sells 32 muffins at a bake sale. Jake sells 25 fewer muffins. How many muffins does Jake sell?

Choose *Yes* or *No* to tell if the equation can be used to solve the problem.

	Yes	No
25 + ? = 32	Ⓐ	Ⓑ
25 + 32 = ?	Ⓒ	Ⓓ
32 − ? = 25	Ⓔ	Ⓕ
32 − 25 = ?	Ⓖ	Ⓗ

Who sells more muffins?

2 Some beads are in a box. Anne uses 17 of them. Then there are 56 beads in the box. How many beads are in the box to begin with?

Ⓐ 79
Ⓑ 73
Ⓒ 39
Ⓓ 29

Can you draw a model to help you think about the problem?

Dave chose Ⓒ as the correct answer. How did Dave get his answer?

Possible answer: He subtracted 56 − 17. He should have added 56 + 17.

3 82 red and white roses in all; Students may write the equation $43 - 26 = 17$ for the first step of the problem and $65 + 17 = 82$ for the second step.
Medium

4 **B**; Students could write the equations $43 - ? = 29$ and $29 + ? = 43$. Students may then add up from 29 to 43 by finding $29 + 10 = 39$, $39 + 1 = 40$, and $40 + 3 = 43$. $10 + 1 + 3 = 14$, so Chen bought 14 yellow roses.
Medium

5 **C**; Students may solve the problem by writing the equation $23 + 18 = ?$. Students may then add up 18 from 23 by finding $23 + 10 = 33$, $33 + 7 = 40$, and $40 + 1 = 41$.
Medium

3 The table shows how many roses of each color a store has for sale.

Red roses	65
Yellow roses	43
White roses	?

There are 26 fewer white roses than yellow roses. How many red and white roses does the store have in all? Show your work.

Possible work: 43 − 26 = 17
65 + 17 = 82

Can you write an addition equation? Can you write a subtraction equation?

Solution **82 red and white roses**

4 The store has 43 yellow roses. Chen buys some yellow roses. Then the store has 29 yellow roses left. How many yellow roses does Chen buy?

Ⓐ 12
Ⓑ 14
Ⓒ 36
Ⓓ 72

What do you know? What are you trying to find out?

5 There are 23 solid shirts and 18 striped shirts on a rack. How many shirts are on the rack?

Ⓐ 5
Ⓑ 15
Ⓒ 41
Ⓓ 43

Do you add or subtract to solve the problem?

LESSON 9

SESSION 6 Refine

Purpose In this session, students build fluency with solving one- and two-step word problems involving two-digit numbers with unknown numbers in a variety of positions.

Start

Develop Fluency

Why Support students' facility with solving one-step word problems involving two-digit numbers independently.

How Have students use any strategy, model, or equation they choose to solve a part-part-whole problem.

Use any strategy to solve the problem.

Mr. Gonzales has 35 pens.

12 of the pens are blue and the rest are black. How many black pens does Mr. Gonzales have?

Solution

23 black pens; Students could write the equation, $12 + ? = 35$, and solve as $? = 35 - 12$.

APPLY IT

1 **B**; Ty's pages + additional pages = Meg's pages

C; Meg's pages = Ty's pages + additional pages

D; Meg's pages − additional pages = Ty's pages

DOK 2

2 **C**; Students could write the equation $26 - 8 = 18$.

DOK 2

3 See Student Worktext page.

DOK 1

LESSON 9 SESSION 6 • • • • • • •

Refine Solving Word Problems with Two-Digit Numbers

Solve the problems.

1 Ty reads 47 pages of a book. Meg reads 56 pages. How many more pages does Meg read than Ty?

Which equations can you use to solve this problem?

Ⓐ $56 + ? = 47$

Ⓑ $47 + ? = 56$

Ⓒ $56 = 47 + ?$

Ⓓ $56 - ? = 47$

2 A beagle weighs 26 pounds. A pug weighs 8 pounds less than the beagle. How many pounds does the pug weigh?

Ⓐ 34

Ⓑ 20

Ⓒ 18

Ⓓ 13

3 Sara has 52 pens. She puts them into two cups. Complete each equation to show some of the ways Sara could put all of her pens into the two cups.

Possible student work:

26 + 26 = 52

25 + 27 = 52

29 + 23 = 52

34 + 18 = 52

239

Differentiated Instruction

RETEACH

Hands-On Activity

Solve word problems involving two-digit numbers.

Students struggling with solving word problems involving two-digit numbers

Will benefit from additional work using number bonds to represent problems.

Materials For each student: Activity Sheet *Number Bond Mat,* blank paper squares to fit boxes of number bond mat, sheet of 2–3 word problems

- Ahead of time, write 2–3 word problems involving two-digit numbers, with the unknown in different positions, on a sheet of paper. Copy one sheet per student.
- Have students cut the problems apart. Tell them to write the numbers from one problem on paper squares and arrange them on the mat.
- Have students glue the problem on a sheet of paper, draw the number bond, and write an equation for the problem. Have them solve the problem.
- Repeat the activity for each remaining problem.

4 **A** (Yes);
C (Yes);
F (No);
G (Yes)
DOK 1

5 **D**; Students could write the equations $100 - 40 = 60$ and $60 - 2 = 58$ for the first step of the problem and the equation $58 + 30 = 88$ for the second step of the problem.
DOK 2

Close: Exit Ticket

6 MATH JOURNAL Student responses should indicate understanding of representing and solving word problems involving two-digit numbers with unknowns in varied positions.

Error Alert **If** students are unable to write and solve a word problem using 23 and 59, **then** have them write the two numbers and a ? in a number bond or a bar model. Ask students to identify the whole and the parts shown in the model and suggest a context they could use for a word problem using their model.

SELF CHECK Have students consider whether they feel they are ready to check off any new skills on the Unit 2 Opener.

4 There are 64 balls and 58 bats in the gym. How many more balls are there than bats?

Can the equation be used to solve the problem?

	Yes	No
$58 + ? = 64$	Ⓐ	Ⓑ
$64 - 58 = ?$	Ⓒ	Ⓓ
$64 + 58 = ?$	Ⓔ	Ⓕ
$64 - ? = 58$	Ⓖ	Ⓗ

5 There are 100 people in line for the roller coaster. 42 people get on the roller coaster. Then 30 more people get into the line. How many people are in line now?

Ⓐ 12

Ⓑ 28

Ⓒ 72

Ⓓ 88

6 MATH JOURNAL

Write a word problem using the numbers 23 and 59. Then solve your problem.

Possible answer: Mike has some oranges. He buys 23 more. Now he has 59 oranges. How many oranges does Mike have to start with? $23 + 36 = 59$; Mike has 36 oranges.

SELF CHECK Go back to the Unit 2 Opener and see what you can check off.

EXTEND

Challenge Activity
Write one-step word problems.

Students who have achieved proficiency with solving word problems involving two-digit numbers

Will benefit from deepening understanding by writing word problems and solving problems written by classmates.

Materials For each student: Activity Sheet *Two-Digit Numbers Cards,* cut up

Have each student select a card and do the following:

- Write three word problems in which the number on the card is the solution.
- The unknown number must be in different positions for each problem.
- Each problem must be about a different topic, and any number used in one word problem cannot be used in the other word problems.
- When finished, give each word problem to a different classmate to solve.

PERSONALIZE

i-Ready

Provide students with opportunities to work on their personalized instruction path with *i-Ready* Online Instruction to:

- fill prerequisite gaps
- build up grade-level skills

Lesson Overview

LESSON 15

Mental Addition and Subtraction

Lesson Objectives

Content Objectives

- Skip-count by hundreds within 1,000 to add and subtract.
- Skip-count by fives and tens from two- and three-digit numbers.
- Mentally add 10 or 100 to a given number 100–900.
- Mentally subtract 10 or 100 from a given number 100–900.

Language Objectives

- Tell and write skip-counted numbers in order.
- Explain patterns exhibited in the numerals of skip-counted numbers.
- Describe situations where skip-counting by fives, tens, and hundreds is useful.
- Describe situations where mentally adding or subtracting 10 or 100 is useful.

Prerequisite Skills

- Fluently add and subtract two-digit numbers.
- Identify the place value of each digit in a three-digit number.
- Model three-digit numbers.
- Interpret models for three-digit numbers and write their values.

Standards for Mathematical Practice (SMP)

SMPs 1, 2, 3, 4, 5, and 6 are integrated in every lesson through the *Try-Discuss-Connect* routine.*

In addition, this lesson particularly emphasizes the following SMPs:

5 Use appropriate tools strategically.

7 Look for and make use of structure.

8 Look for and express regularity in repeated reasoning.

*See page 303k to see how every lesson includes these SMPs.

Lesson Vocabulary

There is no new vocabulary. Review the following key terms.

- **difference** the result of subtraction.
- **regroup** to put together or break apart ones, tens, or hundreds. For example, 10 ones can be regrouped as 1 ten, or 1 hundred can be regrouped as 10 tens.
- **skip-count** count by a number other than ones, such as count by twos, fives, tens, or hundreds.
- **sum** the result of addition.

Learning Progression

In Grade 1 students relate counting to addition and subtraction and count by ones, fives, and tens within 20. They mentally find 10 more or 10 less than a given number, and add and subtract two multiples of ten in the range 10–90.

In Grade 2 students are expected to extend their fluency to counting, adding, and subtracting with three-digit numbers. They develop mental math strategies for addition and subtraction, and they recognize number patterns to solve problems.

In this lesson students will apply counting by fives and tens from 0 to 60 to skip-counting by fives, tens, and hundreds within 1,000. They will relate counting by fives, tens, and hundreds to addition and subtraction with two- and three-digit numbers.

In Grade 3 students will expand their use of mental math strategies to gain fluency with multi-digit addition and subtraction. They will apply the concepts of skip-counting to understand the meaning of multiplication, multiplication facts, and the relationship between multiplication and division.

Lesson Pacing Guide

Whole Class Instruction

SESSION 1 Explore *45–60 min*	**Mental Addition and Subtraction** • Start *5 min* • Try It *10 min* • Discuss It *10 min* • Connect It *15 min* • Close: Exit Ticket *5 min*	**Additional Practice** Lesson pages 369–370
SESSION 2 Develop *45–60 min*	**Skip-Counting by Fives, Tens, and Hundreds** • Start *5 min* • Try It *10 min* • Discuss It *10 min* • Model Its *5 min* • Connect It *10 min* • Close: Exit Ticket *5 min*	**Additional Practice** Lesson pages 375–376 **Fluency** Skip-Counting by Fives, Tens, and Hundreds
SESSION 3 Develop *45–60 min*	**Adding and Subtracting 10 and 100** • Start *5 min* • Try It *10 min* • Discuss It *10 min* • Picture It & Model It *5 min* • Connect It *10 min* • Close: Exit Ticket *5 min*	**Additional Practice** Lesson pages 381–382 **Fluency** Adding and Subtracting 10 and 100
SESSION 4 Refine *45–60 min*	**Using Mental Addition and Subtraction** • Start *5 min* • Example *10 min* • Apply It *25 min* • Close: Exit Ticket *5 min*	**Additional Practice** Lesson pages 385–386
SESSION 5 Refine *45–60 min*	**Using Mental Addition and Subtraction** • Start *5 min* • Apply It *15 min* • Small Group Differentiation *20 min* • Close: Exit Ticket *5 min*	**Lesson Quiz** or **Digital Comprehension Check**

Lesson Materials

Lesson *(Required)*	none
Activities	*Per student:* base-ten blocks *Activity Sheets:* Hundred Chart, 200 Chart
Math Toolkit	connecting cubes, hundred charts, open number lines, base-ten blocks, 200 charts, hundreds place-value charts, hundreds place-value mats, three-digit number cards
Digital Math Tools	Base-Ten Blocks, Number Line

*We continually update the Interactive Tutorials. Check the Teacher Toolbox for the most up-to-date offerings for this lesson.

Teacher Toolbox

Small Group Differentiation

PREPARE

Ready Prerequisite Lesson

Grade 1
- Lesson 26 Understand 10 More and 10 Less

RETEACH

Tools for Instruction

Grade 1
- Lesson 26 Finding 10 More and 10 Less

Grade 2
- Lesson 15 Adding and Subtracting 10 or 100

REINFORCE

Math Center Activity

Grade 2
- Lesson 15 3 in a Row

EXTEND

Enrichment Activity

Grade 2
- Lesson 15 Navigating on a Number Chart

i-Ready

Independent Learning

PERSONALIZE

i-Ready Lesson*

Grade 2
- Add or Subtract 10 or 100

Learning Games
- Prerequisite: *Match*
- *Hungry Fish*

LESSON 15

Connect to Family, Community, and Language Development

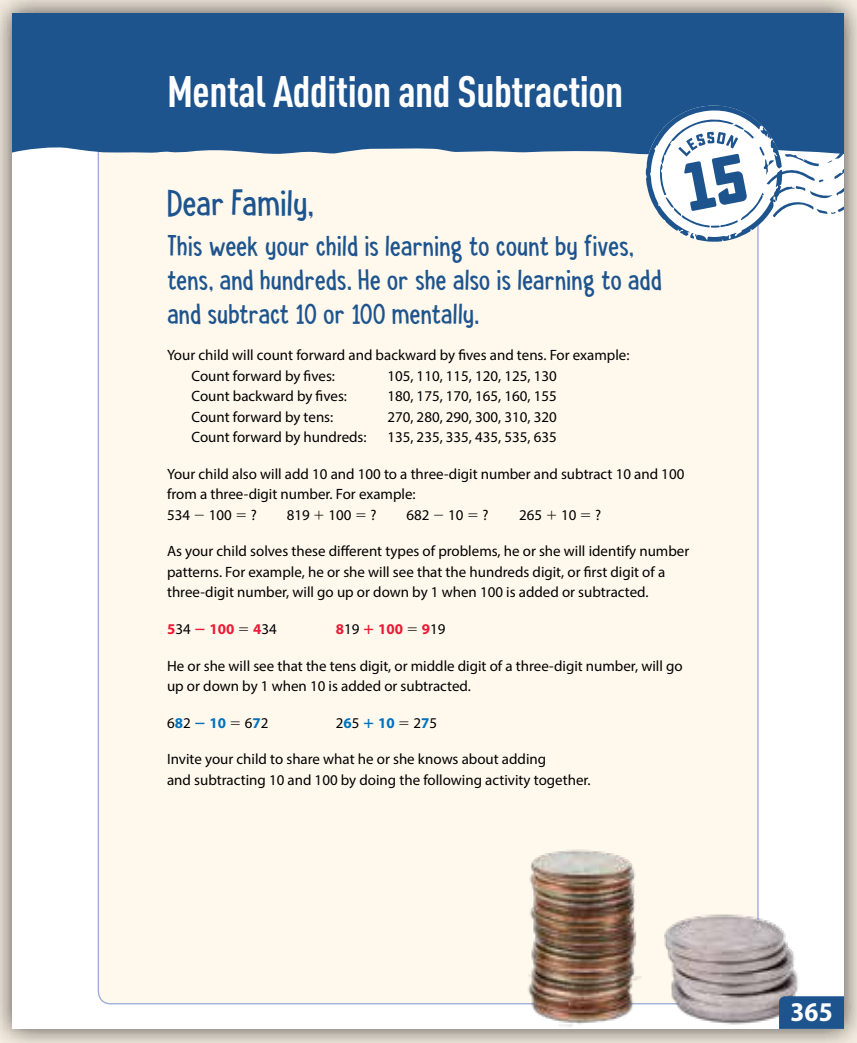
The following activities and instructional supports provide opportunities to foster school, family, and community involvement and partnerships.

Connect to Family

Use the **Family Letter**—which provides background information, math vocabulary, and an activity—to keep families apprised of what their child is learning and to encourage family involvement.

Available in Spanish

Teacher Toolbox



Mental Addition and Subtraction

LESSON 15

Dear Family,

This week your child is learning to count by fives, tens, and hundreds. He or she also is learning to add and subtract 10 or 100 mentally.

Your child will count forward and backward by fives and tens. For example:

Count forward by fives:	105, 110, 115, 120, 125, 130
Count backward by fives:	180, 175, 170, 165, 160, 155
Count forward by tens:	270, 280, 290, 300, 310, 320
Count forward by hundreds:	135, 235, 335, 435, 535, 635

Your child also will add 10 and 100 to a three-digit number and subtract 10 and 100 from a three-digit number. For example:

534 − 100 = ? 819 + 100 = ? 682 − 10 = ? 265 + 10 = ?

As your child solves these different types of problems, he or she will identify number patterns. For example, he or she will see that the hundreds digit, or first digit of a three-digit number, will go up or down by 1 when 100 is added or subtracted.

534 − 100 = 434 819 + 100 = 919

He or she will see that the tens digit, or middle digit of a three-digit number, will go up or down by 1 when 10 is added or subtracted.

682 − 10 = 672 265 + 10 = 275

Invite your child to share what he or she knows about adding and subtracting 10 and 100 by doing the following activity together.

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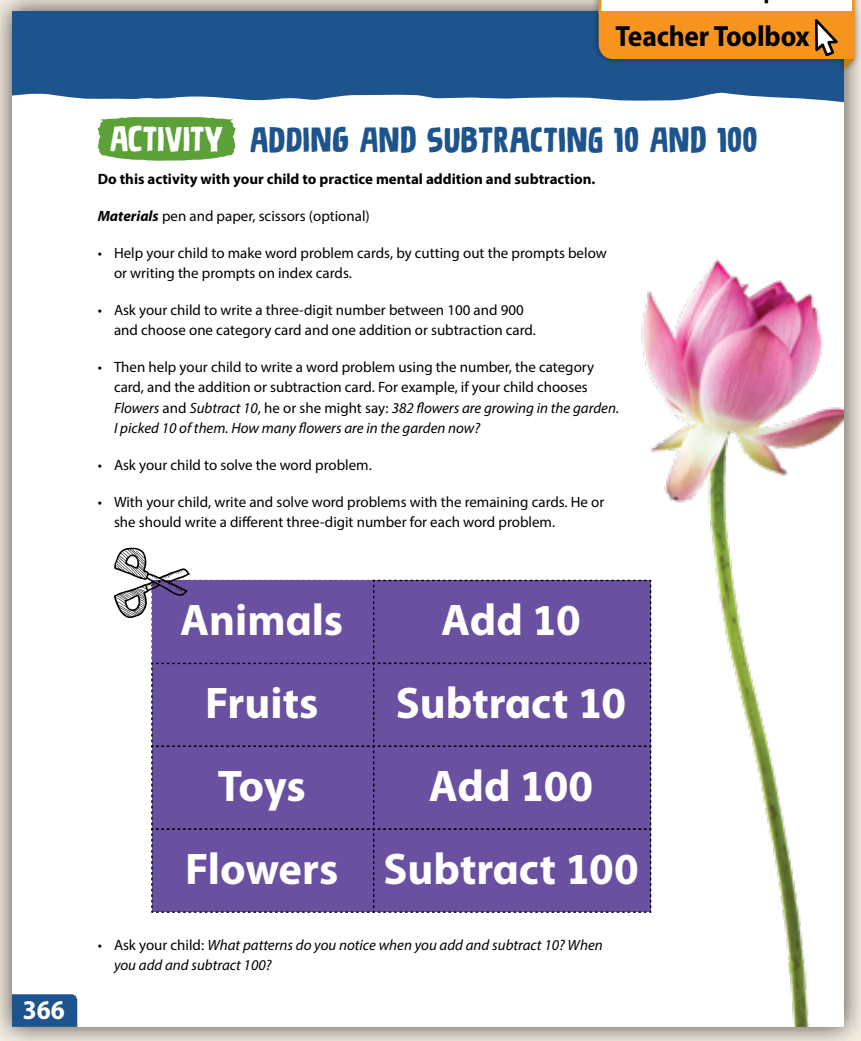

ACTIVITY ADDING AND SUBTRACTING 10 AND 100

Do this activity with your child to practice mental addition and subtraction.

Materials pen and paper, scissors (optional)

- Help your child to make word problem cards, by cutting out the prompts below or writing the prompts on index cards.
- Ask your child to write a three-digit number between 100 and 900 and choose one category card and one addition or subtraction card.
- Then help your child to write a word problem using the number, the category card, and the addition or subtraction card. For example, if your child chooses *Flowers* and *Subtract 10*, he or she might say: *382 flowers are growing in the garden. I picked 10 of them. How many flowers are in the garden now?*
- Ask your child to solve the word problem.
- With your child, write and solve word problems with the remaining cards. He or she should write a different three-digit number for each word problem.

Animals	Add 10
Fruits	Subtract 10
Toys	Add 100
Flowers	Subtract 100

- Ask your child: *What patterns do you notice when you add and subtract 10? When you add and subtract 100?*

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Goal

The goal of the Family Letter is to help students practice skip-counting by fives, tens, and hundreds. Additionally, students will learn how to add and subtract 10 or 100 mentally.

Activity

Understanding how to count by fives, tens, and hundreds as well as add and subtract 10 or 100 mentally will help students increase their mental math skills. Look at the *Adding and Subtracting 10 and 100* activity and adjust it if necessary to connect with your students.

Math Talk at Home

Encourage students to work with their family members to think of personal experiences involving animals, fruits, toys, or flowers to help write word problems focused on adding and subtracting 10 or 100 mentally using the cards in the activity.

Conversation Starters Below are additional conversation starters students can write in their Family Letter or math journal to engage family members:

- *What are some other categories we can use to make word problems that involve adding or subtracting 10 or 100?*
- *Do you have different ways to add and subtract 10? Can you explain them to me?*
- *Do you know another way to add and subtract 100? What is it?*

Connect to Community and Cultural Responsiveness

Use these activities to connect with and leverage the diverse backgrounds and experiences of all students.

Session 1 **Use with *Try It*.**

- Have students generate a list of three packaged school supplies typically needed for the school year (for example: crayons, pens, markers, glue sticks). Have them designate either five or ten items per package. Tell students to pretend each student bought a package of those items. In partners, have students write word problems in which they have to count by fives and tens to find the total number of items purchased by the class.

Session 2 **Use with *Try It*.**

- Provide students with books that have between 100 and 500 pages. Have students flip to a three-digit page number that ends in 0 or 5. Then have students work with partners to skip-count by tens from that number using the strategies they know. Encourage students to think about how else they could use this method in real-world problems (for example: counting dimes or $10 bills, calculating weights, shopping for items that total more than $100).

Session 3 **Use with *Try It*.**

- Have students work with partners to think of other real-world situations that may involve adding 100 to a three-digit number. Possible ideas include reaching a fundraising goal, earning game tokens or tickets, ordering new books for the school library, or math supplies (unit tiles, counters, etc.). Ask students to generate a word problem with which they'll get to practice adding 100 to a three-digit number. As the session progresses, provide an opportunity for students to solve the problem.

Connect to Language Development

For ELLs, use the Differentiated Instruction chart to plan and prepare for specific activities in every session.

ELL English Language Learners: Differentiated Instruction

Prepare for Session 1
Use with *Try It*.

Levels 1–3

Speaking/Writing Have students chorally read the ***Try It*** problem. Encourage them to apply what they know by chorally counting by fives from zero to 45. Direct students to draw representations of pencils grouped by fives. Ask: *How many groups do you need to draw if you start with 45? How do you know? Can you show me?*

Have students work with a partner to complete the problem using this sentence starter:

- *The next six numbers Amy says are* 50, 55, 60, 65, 70, and 75.

Levels 2–4

Reading/Writing Have students chorally read the ***Try It*** problem. Ask them to chorally count by fives from zero to 45. Direct students to write the following sentence frames:

- *First I will use connecting cubes to represent the next* 6 *numbers.*
- *Then I will continue counting by fives* 6 more *times.*

Have students work with a partner to complete the sentence frames by applying what they know.

Levels 3–5

Reading/Writing Have students read the ***Try It*** problem with a partner and discuss their ideas. Encourage them to use the sequence words *first*, *next,* and *then* to write the strategies they applied to determine the numbers Amy says. Ask them to read what they have written to their partner.

LESSON 15

SESSION 1 Explore

Purpose In this session, students draw on their knowledge of counting by fives. They explore and share strategies for skip-counting by fives from 45. They look ahead to skip-counting by tens and hundreds and identifying patterns in the digits as they skip-count.

Start

Connect to Prior Knowledge

Why Support students' knowledge of counting by fives from 0, foreshadowing solving a word problem by counting by fives from 45.

How Have students count by fives to 45.

Count by fives.

Write the missing numbers.

5, ..., ..., ..., 25,

....., ..., ..., 45

Solution

10, 15, 20, 30, 35, 40

TRY IT

Make Sense of the Problem

To support students in making sense of the problem, have them identify that Amy counts by fives to 45.

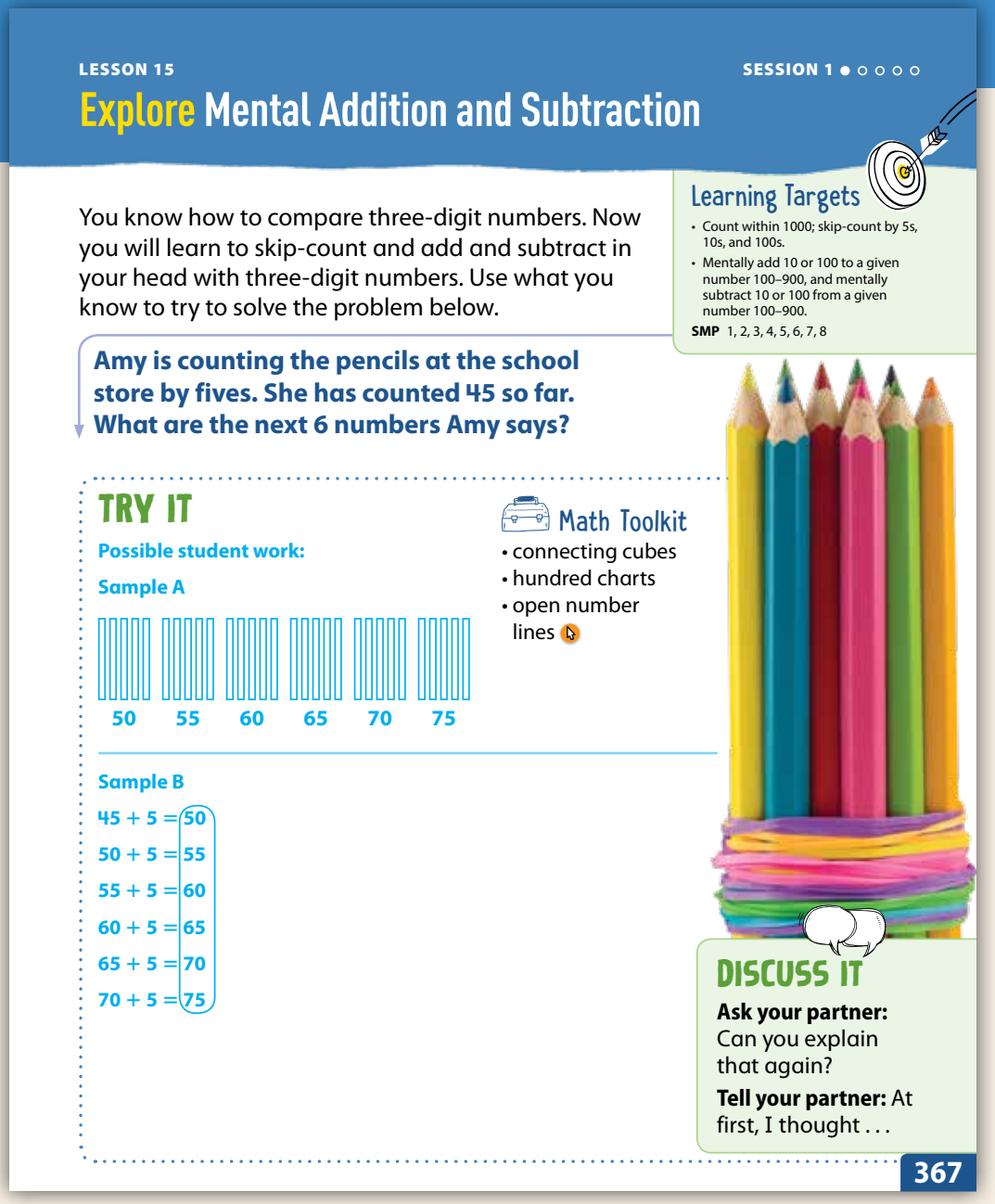
DISCUSS IT

Support Partner Discussion

To reinforce students' understanding of counting by fives, have them use the term *count by fives* as they talk to each other.

Look for, and prompt as necessary, understanding of:

- 5 as the number to count by
- 45 as the number to start from
- 6 as the number of times to count by fives



LESSON 15 SESSION 1 ● ○ ○ ○ ○

Explore Mental Addition and Subtraction

You know how to compare three-digit numbers. Now you will learn to skip-count and add and subtract in your head with three-digit numbers. Use what you know to try to solve the problem below.

Learning Targets

- Count within 1000; skip-count by 5s, 10s, and 100s.
- Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900.

SMP 1, 2, 3, 4, 5, 6, 7, 8

Amy is counting the pencils at the school store by fives. She has counted 45 so far. What are the next 6 numbers Amy says?

TRY IT

Possible student work:

Sample A

Sample B

45 + 5 = 50
50 + 5 = 55
55 + 5 = 60
60 + 5 = 65
65 + 5 = 70
70 + 5 = 75

Math Toolkit

- connecting cubes
- hundred charts
- open number lines

DISCUSS IT

Ask your partner: Can you explain that again?

Tell your partner: At first, I thought . . .

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Common Misconception Look for students who are not comfortable with counting by fives from a number other than zero and may show *5*, *10*, *15*, *20*, *25*, *30* as the six numbers Amy counts. As students present solutions, have them specify how they determined where to start counting the next 6 numbers.

Select and Sequence Student Solutions

One possible order for whole class discussion:

- use connecting cubes or small objects to represent 45, 50, 55, 60, 65, 70, and 75
- use drawings of groups of pencils to show counting on or adding
- use counting by fives to start at 45 and then count 50, 55, 60, 65, 70, 75
- use an addition equation, or consecutive equations, to start at 45 and repeatedly add 5 to the sum

Support Whole Class Discussion

Prompt students to note the relationship between the numbers in each model and the description of the numbers in the problem.

Ask *How do [student name]'s and [student name]'s models show the next 6 numbers that Amy says? How do their models show that Amy is counting the pencils by fives?*

Listen for There are 6 groups of 5. I count by five 6 times from 45. I add 5 six times.

CONNECT IT

1 LOOK BACK

Look for understanding that the next six numbers that Amy says are 50, 55, 60, 65, 70, and 75 because she starts from 45 and counts six more groups of 5 pencils.

Visual Model

Count on by fives with the Hundred Chart.

If . . . *students are unsure about the concept of counting by fives from a number other than zero,*

Then . . . *use the visual model of a hundred chart to have them count on by fives.*

Materials For display: Activity Sheet *Hundred Chart*

- Display the hundred chart. Review the arrangement of the numbers 1–100.
- Draw a square around 45 on the chart. Say: *Let's count on 5 more*. Move your finger 5 spaces to the right as students count each number aloud: *46, 47, 48, 49, 50*. Draw a circle around 50.
- Repeat the process for counting on to 55, 60, 65, 70, and 75, circling each number after counting on 5 more.
- Ask students to read the circled numbers aloud. Ask: *How are the digits of the circled numbers the same? How do the locations of the numbers on the chart compare?* [All of the numbers end with a 5 or 0; all of the numbers are in two columns on the chart.]

2 LOOK AHEAD

Point out that the tens digit increases by 1 as you skip-count by tens because each number that you count is 1 ten more than the previous number. The hundreds digit decreases by 1 as you skip-count backward by hundreds because each number has 1 hundred less than the previous number. Point out similar patterns for counting back by tens and counting on by hundreds.

Students should be able to identify and continue the patterns of increasing or decreasing the digits in the tens and hundreds places when skip-counting forward or backward by tens and hundreds.

Students will spend more time learning about the concept of skip-counting in the Additional Practice.

CONNECT IT

1 LOOK BACK

What are the next 6 numbers Amy says?

50 , 55 , 60 , 65 , 70 , 75

2 LOOK AHEAD

You can skip-count by other numbers, too. You can skip count forward and you can skip-count backward.

a. This pattern shows skip-counting forward by tens. The tens digit changes each time.

Write the missing numbers.

130, 140, 150, 160 , 170 , 180

b. This pattern shows skip-counting backward by hundreds. The hundreds digit changes each time.

Write the missing numbers.

700, 600, 500, 400 , 300 , 200

3 REFLECT

What would be the next number in the skip-counting backward by hundreds pattern above? How do you know?

100; Possible answer: I am counting backward 1 hundred each time, so the hundreds digit goes down by 1. 100 is 1 less hundred than 200.

Close: Exit Ticket

3 REFLECT

Look for understanding of subtracting 1 from the hundreds digit for each skip-count backward by hundreds. Student responses should include references to the last written number in the pattern as 200, and connect it to the hundreds digit decreasing from 2 to 1.

Common Misconception **If** students do not identify 100 as the next number or are unclear in their explanations, **then** have them underline the hundreds digits in each of the numbers of the completed pattern, 700 through 200, to identify the pattern of the hundreds digit decreasing by 1 with each 100 that is skip-counted.

Real-World Connection

Encourage students to think about everyday situations in which people would need to count by fives, tens, and hundreds. Students may suggest examples such as counting the value of a group of nickels or dimes, finding the minutes when telling time on an analog clock, or counting the total number of pennies in a given number of even dollars.

Solutions

Support Vocabulary Development

1 Point to the term *skip-count* in the center of the graphic organizer. Ask students to think about what they know about the word *count*. Have them reflect on what types of items they count (for example, paper clips or pairs of socks). Then have them underline the word *skip*. Ask them to discuss with a partner what they already know about the meaning of the term *skip-count*. Remind students the term *skip-count* in math means to count on forward or backward the same number each time they count.

2 Have students identify how many numbers they would count as they count by ones from 5 to 15. Then ask them to skip-count by fives starting at 5. Have them compare the difference between counting by ones and fives to help them generate a response.

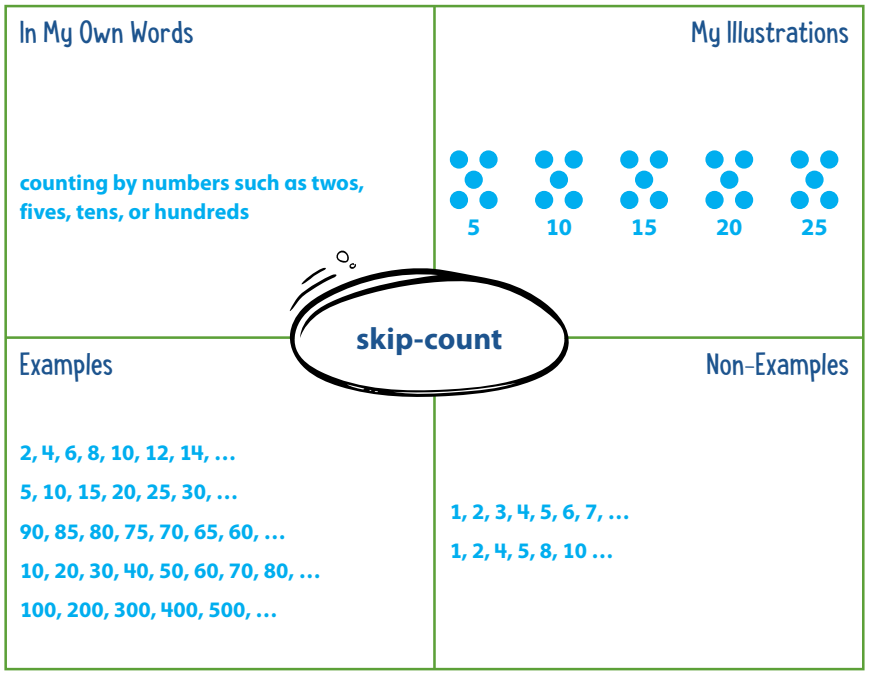
Supplemental Math Vocabulary

- *mental addition*
- *mental subtraction*

Name: _____ LESSON 15 SESSION 1

Prepare for Mental Addition and Subtraction

1 Think about what you know about skip-counting. Fill in each box. Use words, numbers, and pictures. Show as many ideas as you can. **Possible answers:**



2 Carmen is trying to skip-count by fives.
She counts 5, 15, 25, 35, 45, 55, and so on.
Explain Carmen's mistake.

Possible answer: Carmen is skip-counting by tens starting with 5, because each number is ten more than the last number. Skip-counting by fives is counted 5, 10, 15, 20, 25, and so on.

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3 Assign problem 3 to provide another look at skip-counting.

This problem is very similar to the problem about skip-counting pencils at the school store. In both problems, students will continue skip-counting from a given number. This question asks for the next 5 numbers Remy says when skip-counting by tens, starting at 120.

Students may want to use base-ten blocks, connecting cubes, or paper clips.

Suggest that students read the problem three times, asking themselves one of the following questions each time:

- *What is this problem about?*
- *What is the question I am trying to answer?*
- *What information is important?*

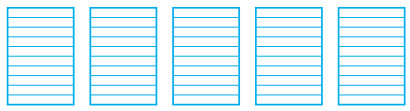
Solution: The next 5 numbers Remy says are 130, 140, 150, 160, and 170.
Medium

4 Have students solve the problem a different way to check their answer.

3 Solve the problem. Show your work.

Remy is counting the notebooks at the school store by tens. He has counted 120 so far. What are the next 5 numbers Remy says?

Possible student work:



Solution 130, 140, 150, 160, 170

4 Check your answer. Show your work.

Possible student work:

120 + 10 = 130
130 + 10 = 140
140 + 10 = 150
150 + 10 = 160
160 + 10 = 170

The next 5 numbers are 130, 140, 150, 160, and 170.

ELL English Language Learners: Differentiated Instruction

Prepare for Session 2
Use with *Try It*.

Levels 1–3

Speaking/Writing Have students chorally read the ***Try It*** problem. Instruct them to draw an open number line. Ask: *How many more numbers do you need to write if you start with 235? How do you know? Can you show me?*

Encourage students to work with their partner to complete the problem using this sentence frame:

- *Luis writes the numbers* 245, 255, 265, 275, 285, and 295.

Levels 2–4

Reading/Writing Have students chorally read the ***Try It*** problem. Instruct them to write the following sentence frames:

- *First, I will use base-ten blocks to represent the next* 6 *numbers.*
- *Then I will count the blocks by tens* six *times.*

Encourage students to work with a partner to complete the sentence frames by applying what they know. Then have them take turns reading the sentences aloud to each other.

Levels 3–5

Reading/Writing Have students read the ***Try It*** problem with their partner and discuss their ideas. Encourage them to use the sequence words *first*, *next*, and *then* to write the strategies they applied to determine the numbers Luis writes. Ask them to read what they have written to their partners.

LESSON 15

SESSION 2 Develop

Purpose In this session, students solve a problem that requires skip-counting by tens from 235. Students model the numbers in the problem on paper or by using manipulatives. The purpose of this problem is to have students develop strategies for skip-counting from a nonzero number.

Start

Connect to Prior Knowledge

Why Support students' knowledge of skip-counting by tens from 0, foreshadowing solving a problem by skip-counting by tens from 235.

How Have students skip-count by tens to 120.

Skip-count by tens.

Write the missing numbers.

10, ..., ..., ..., 50,

....., ..., 80, ..., 100, ..., ...

Solution

20, 30, 40, 60, 70, 90, 110, 120

Develop Language

Why Practice the rhythm and fluency of orally counting by tens using three-digit numbers.

How Have students recognize patterns by identifying which place value changes as they count aloud by tens. Is it the *ones*, *tens*, or *hundreds*? Which place values are verbalized the same way over and over as they count by *tens?* Which place values change? Have students orally practice counting three-digit numbers by tens.

TRY IT

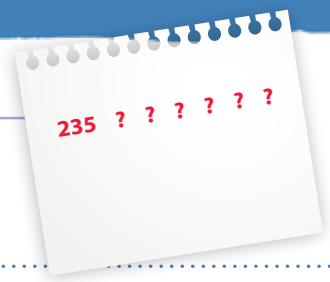
Make Sense of the Problem

To support students in making sense of the problem, have them identify that Luis is counting by tens, starting from 235.

Ask *What number does Luis start counting with? What number will he skip-count by?*

Develop Skip-Counting by Fives, Tens, and Hundreds

Read and try to solve the problem below.



Luis is skip-counting by tens. He starts at 235. What are the next 6 numbers Luis writes?

TRY IT

Possible student work:

Sample A

Each number is 10 more.

245, 255, 265, 275, 285, 295

Sample B

The tens digit goes up by 1 from 3: 4, 5, 6, 7, 8, 9.

245

255

265

275

285

295

Math Toolkit

- base-ten blocks
- 200 number charts
- hundreds place-value charts
- open number lines

DISCUSS IT

Ask your partner: Why did you choose that strategy?

Tell your partner: The strategy I used to find the answer was . . .

DISCUSS IT

Support Partner Discussion

Encourage students to use the term *skip-counting* as they talk to each other.

Support as needed with questions such as:

- *How do you know where to count? How do you know what to count by?*
- *Why do you think counting by tens can also be called skip-counting by tens?*

Common Misconception Look for students who write the next 6 numbers by increasing the ones digit or hundreds digit instead of the tens digit.

Select and Sequence Student Solutions

One possible order for whole class discussion:

- using base-ten blocks to represent 235, 245, 255, 265, 275, 285, and 295
- using a number chart to circle every 10 numbers after 235, up to 295
- using an open number line to start at 235 and make 6 jumps of 10
- starting at 235 and adding 1 to the tens digit six times

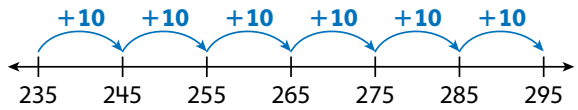
Explore different ways to understand skip-counting by fives, tens, and hundreds.

Luis is skip-counting by tens. He starts at 235. What are the next 6 numbers Luis writes?

MODEL IT

You can use an open number line.

Start at 235. Skip-count by tens.



MODEL IT

You can use a number chart.

Circle **235**.

Then count 10 numbers to the right of 235. When you reach the end of a row, go to the next row. Circle the number where you stop counting.

Continue skip-counting by tens **5** more times.

201	202	203	204	205	206	207	208	209	210
211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230
231	232	233	234	235	236	237	238	239	240
241	242	243	244	245	246	247	248	249	250
251	252	253	254	255	256	257	258	259	260
261	262	263	264	265	266	267	268	269	270
271	272	273	274	275	276	277	278	279	280
281	282	283	284	285	286	287	288	289	290
291	292	293	294	295	296	297	298	299	300

Support Whole Class Discussion

Compare and connect the numbers described in the word problem and how they are shown on student representations of the problem.

Ask *How does each model show the first number that Luis writes? How does each model show the other numbers that Luis writes?*

Listen for The first model shows 10 more than 235 is 245. The second model shows the tens digit in 235 going up 1 to make 245. The other numbers that Luis writes have 1 more ten than the number before.

MODEL ITS

If no student presented these models, connect them to the student models by pointing out the ways they each represent:

- starting from 235
- adding or counting on by tens
- adding or counting on 6 times

Ask *How does each model show the starting number? How does each model show the next 6 numbers that Luis writes?*

Listen for The open number line shows 235 as the first number. The number chart has 235 circled. The open number line shows six jumps of 10. The number chart circles every tenth number after 235.

For using an open number line, prompt students to identify how the number line is used to represent the problem.

- *What does each jump on the number line show?*
- *What do the numbers after 235 show?*

For using a number chart, prompt students to identify how Luis's counting is shown on the chart.

- *What do the line and arrow represent?*
- *Why are the circled numbers in the same column?*

Deepen Understanding

Open Number-Line Model

SMP 7 Look for structure.

When discussing the number-line model, prompt students to consider how the number line is labeled to model skip-counting by tens.

Ask *Why does the number line start at 235? Why is each jump 10? How does each jump relate to the number below the number line? Why are there 6 jumps?*

Listen for The number line starts at 235 because Luis starts skip-counting at 235. Each jump shows +10 because when you skip-count by tens, you add 1 ten to the previous number. The numbers at the end of each jump are the numbers Luis writes. There are 6 jumps on the number line because Luis skip-counts by tens 6 times.

Generalize *Can you use an open number line to skip-count by tens from any number?* Listen for understanding that a number line can be used to skip-count by tens from any number by labeling the starting number first and then showing jumps of 10. The number-line labels at the end of each jump show 10 more than the previous number.

CONNECT IT

- Remind students that one thing that is alike about all the representations is the numbers.
- Explain to students that on this page, they will use those numbers to show skip-counting by tens from 235.

Monitor and Confirm

1 – 2 Check for understanding that:

- skip-counting by tens is the same as adding 10 repeatedly to a number
- the tens digit increases by 1 when counting by tens and the ones and hundreds digits remain the same

Support Whole Class Discussion

3 Look for understanding that when skip-counting by fives from 235, the ones digit alternates between 0 and 5, and the tens digit increases by 1 each time the ones digits changes to 0.

Ask *How did you find the first missing number? The second missing number? The third missing number?*

Listen for For the first missing number, the ones digit changes from 0 to 5. When the ones digit changes to 0 in the second missing number, the tens digit changes from 5 to 6. I found the third missing number by counting on 5 from 260 or by adding 5 to 260 in order to get 265.

4 Prompt students to understand that when they are counting by hundreds, the hundreds digit increases by 1 each time they count, and the tens and ones digits remain the same.

5 REFLECT Have all students focus on the strategies used to solve this problem. If time allows, have students share their preferences with a partner.

CONNECT IT

Now you will use the problem from the previous page to help you understand how to skip-count.

1 Look back at the **Model Its** on the previous page. Complete these equations.

235 + 10 = 245 245 + 10 = 255

255 + 10 = 265 265 + 10 = 275

2 Which digits stayed the same? Which changed?

Possible answer: The tens digit increased by 1 each time. The ones and hundreds digits stayed the same.

3 Write the missing numbers to show how to skip-count from 235 by fives instead of tens.

240, 245, 250, 255, 260, 265

4 Write the missing numbers to skip-count by hundreds.

335, 435, 535, 635, 735, 835

5 REFLECT

Look back at your **Try It**, strategies by classmates, and **Model Its**. Which models or strategies do you like best for skip-counting? Explain.

Possible explanation: I like to use a number chart so I can see that the numbers make a pattern, which helps me think about which number to count next.

373

Visual Model

Count on by 10s with the Hundred Chart.

If . . . *students are unsure about the concept of skip-counting by tens.*

Then . . . *use the visual model of a number chart to have them skip-count by tens.*

Materials For display: Activity Sheet *200 Chart*

- Display the number chart and review the numbers shown and the way they are arranged.
- Draw a square around 125 on the chart. Say: *Let's count on 10 more.* Move your finger 5 spaces to the right and then across the first 5 numbers of the row below as students count each number aloud: *125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135.* Draw a circle around 135.
- Repeat the process for counting by tens to 145. Have students read the circled numbers aloud: *125, 135, 145.* Ask: *What number do you think comes next when you skip-count by tens? Why?* [Possible answer: 155, because the tens digit is increasing by 1 each time and the numbers are going down the same column on the chart.]
- Have students continue skip-counting by tens and circle 165, 175, and 185 on the number chart. Then have students count aloud by tens from 125 to 185.

APPLY IT

For all problems, encourage students to identify the patterns in the digits of the numbers as they skip-count.

6 **a.** 851, 861, 871

b. 649, 749, 849

c. 905, 900, 895

d. 763, 753, 733, 723

7 Yes; Possible explanation: When you count on 10 more from 590 or add 10 to 590, the next number is 600, so both digits have changed to show 6 hundreds, 0 tens, and 0 ones.

Close: Exit Ticket

8 **B**, **C**, **E**; The skip-counting pattern is to count backward by fives, so **B** (260) is the number that comes before 265; **C** (275) is the number that comes after 270; **E** (300) is the number that comes after 295.

Error Alert **If** students chose **A** (255) or **D** (296), **then** ask them to identify the skip-counting pattern by looking at the numbers 280, 285, 290, and 295. After students identify that the pattern is to count by fives, they should count back 5 from 265 to determine that the first missing number is 260, not 255. They also should count on 5 from 295 to determine that the last missing number is 300, not 296.

APPLY IT

Use what you just learned to solve these problems.

6 Complete the forward and backward skip-counting patterns.

a. 821, 831, 841, 851, 861, 871

b. 349, 449, 549, 649, 749, 849

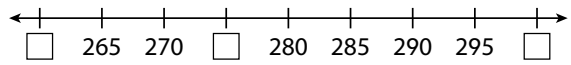
c. 920, 915, 910, 905, 900, 895

d. 783, 773, 763, 753, 743, 733, 723

7 Sadie says when she starts skip-counting forward by tens from 590, both the tens digit and the hundreds digit change. Is Sadie correct? Explain.

Yes; Possible answer: Skip-counting by ten is the same as counting on ten from 590, which ends at 600. The tens digit changes from 9 to 0, and the hundreds digit changes from 5 to 6.

8 Which numbers go in the squares on this number line?



Ⓐ 255

Ⓑ 260

Ⓒ 275

Ⓓ 296

Ⓔ 300

Solutions

1. See student page.
Basic

2. 145, 150, 155, 160, 165
Basic

Name: _____ LESSON 15 SESSION 2

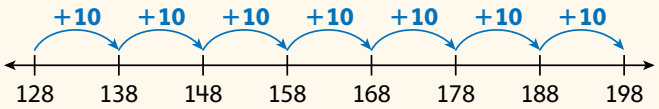
Practice Skip-Counting by Fives, Tens, and Hundreds

Study the Example showing one way to use skip-counting by tens. Then solve problems 1–5.

EXAMPLE

Skip-count by tens from 128. What are the next 7 numbers?

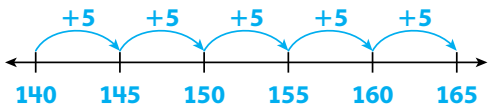
You can use a number line to skip-count by tens.
Start at 128. Count by tens.



The next 7 numbers are 138, 148, 158, 168, 178, 188, and 198.

Skip-count by fives from 140. What are the next 5 numbers?

1. Use the open number line to solve the problem.



2. What are the next 5 numbers? 145, 150, 155, 160, 165

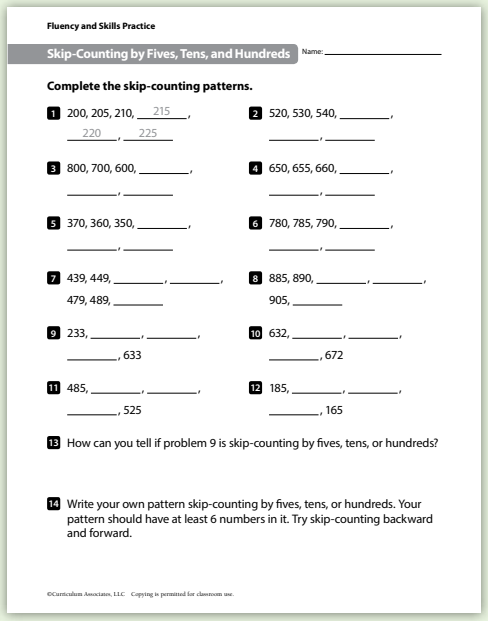
375

Fluency & Skills Practice

Teacher Toolbox

Assign *Skip-counting by Fives, Tens, and Hundreds*

In this activity students practice skip-counting forward and backward by fives, tens, and hundreds. This skill is useful for gaining fluency with mental math strategies for adding and subtracting three-digit numbers.



Fluency and Skills Practice

Skip-Counting by Fives, Tens, and Hundreds Name: _____

Complete the skip-counting patterns.

1. 200, 205, 210, 215, 220, 225
2. 520, 530, 540, _____, _____, _____
3. 800, 700, 600, _____, _____, _____
4. 650, 655, 660, _____, _____, _____
5. 370, 360, 350, _____, _____, _____
6. 780, 785, 790, _____, _____, _____
7. 439, 449, _____, _____, 479, 489, _____
8. 885, 890, _____, _____, 905, _____
9. 233, _____, _____, _____, 633
10. 632, _____, _____, _____, 672
11. 485, _____, _____, _____, 525
12. 185, _____, _____, _____, 165
13. How can you tell if problem 9 is skip-counting by fives, tens, or hundreds?
14. Write your own pattern skip-counting by fives, tens, or hundreds. Your pattern should have at least 6 numbers in it. Try skip-counting backward and forward.

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3 See student page.
Basic

4 **a.** 760, 860, 960

b. 295, 290, 285
Medium

5 **A** (Yes);

D (No);

F (No);

G (Yes)
Challenge

3 Jamal uses this number chart to skip-count by tens. Shade the next 3 numbers.

61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120

4 Complete the skip-counting patterns.

a. 460, 560, 660, 760, 860, 960

b. 310, 305, 300, 295, 290, 285

5 Does each group of numbers show skip-counting by fives, either forward or backward? Choose *Yes* or *No*.

	Yes	No
105, 110, 115, 120, 125, 130	Ⓐ	Ⓑ
355, 365, 375, 385, 395, 405	Ⓒ	Ⓓ
915, 925, 935, 945, 955, 965	Ⓔ	Ⓕ
285, 280, 275, 270, 265, 260	Ⓖ	Ⓗ

ELL English Language Learners: Differentiated Instruction

Prepare for Session 3
Use with *Try It*.

Levels 1–3

Speaking/Writing Have students chorally read the ***Try It*** problem. Ask them to use a place-value chart and write 432 in the chart. Ask: *Which digit will change if you add 100 more sheets? Point to it. What is the name of the place value for that digit?*

Encourage students to work with a partner to complete the problem using the sentence starter:

- *When I skip-count by hundreds, the next number after 432 is* 532 .

Levels 2–4

Reading/Writing Have students chorally read the ***Try It*** problem. Ask them to write the following sentence frames:

- *First, I will draw a place-value chart to write the number* 432 .
- *Then I will change the digit in the* hundreds *place by adding* 1 hundred *to 4 hundred.*
- *The class has* 532 *sheets of paper.*

Encourage students to work with a partner to complete the sentence frames by applying what they know. Then direct them to take turns reading the sentences aloud to each other.

Levels 3–5

Reading/Writing Have students read the ***Try It*** problem with their partner and discuss their ideas. Encourage them to use the sequence words *first*, *next*, and *then* to write the strategies they used in order to determine the number of sheets of paper the class has now. Ask students to read what they have written to their partners.

LESSON 15

SESSION 3 Develop

Purpose In this session, students solve a problem that requires finding 100 more than 432. Students model the numbers on paper or using manipulatives. The purpose of this problem is to have students develop strategies for adding 100 to three-digit numbers.

Start

Connect to Prior Knowledge

Why Support students' knowledge of skip-counting by hundreds from a two-digit number, foreshadowing finding 100 more than a three-digit number.

How Have students skip-count by hundreds from 186.

Skip-count by hundreds.

Write the missing numbers.

186, 286, ..., ..., 586,

....., ..., 886, ...

Solution

386, 486, 686, 786, 986

Develop Language

Why Practice the rhythm and fluency of orally counting by hundreds using three-digit numbers.

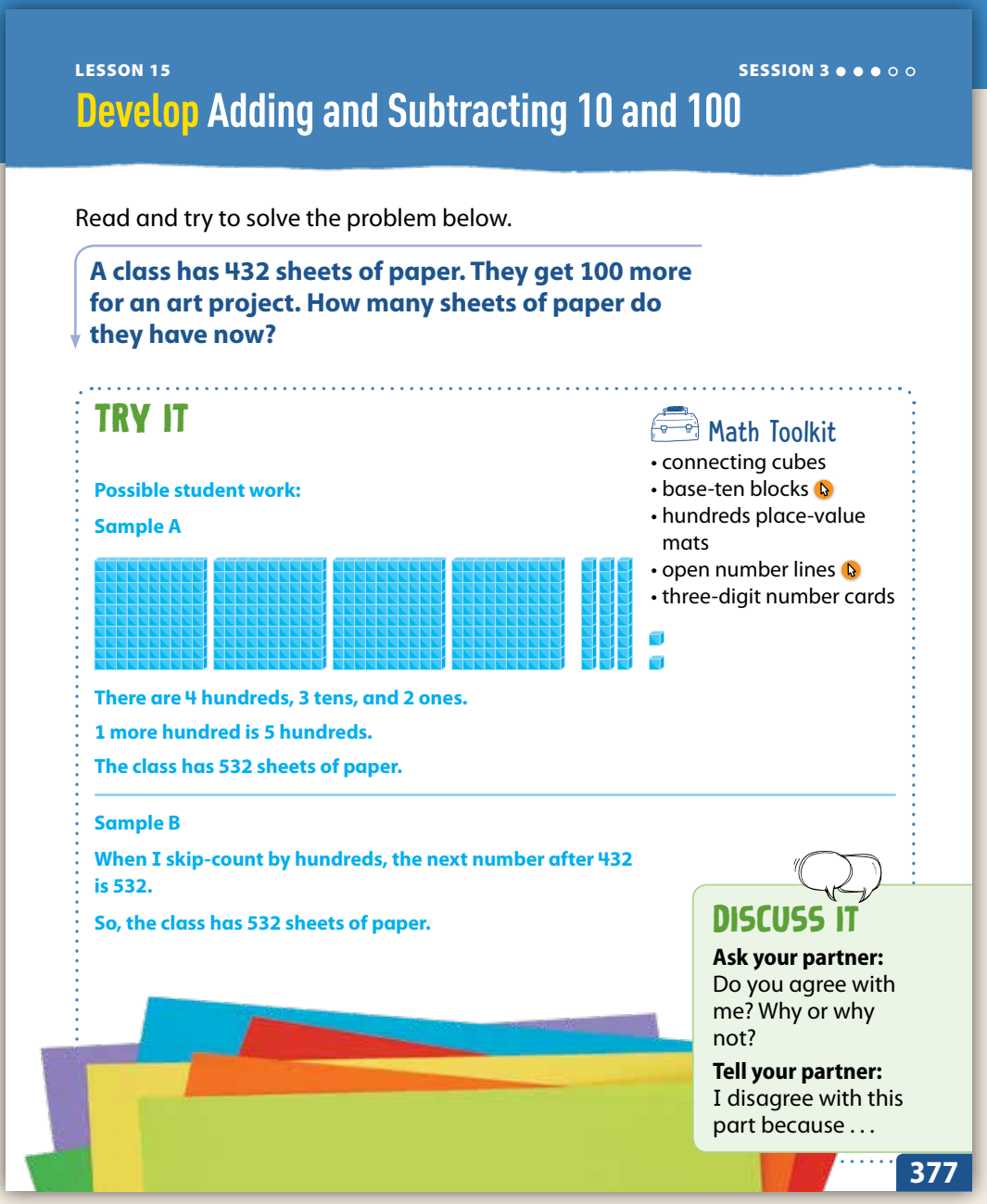
How Have students recognize patterns by identifying which place value changes as they count aloud by hundreds. Is it the *hundreds*, *tens*, or *ones?* Which place values are verbalized the same way as they count by *hundreds?* Have students orally practice counting three-digit numbers by hundreds.

TRY IT

Make Sense of the Problem

To support students in making sense of the problem, have them identify that the class has 432 sheets to start, and they are getting 100 more.

Ask *How many sheets of paper does the class have? How many more sheets of paper does the class get?*



LESSON 15 SESSION 3 ● ● ● ○ ○

Develop Adding and Subtracting 10 and 100

Read and try to solve the problem below.

A class has 432 sheets of paper. They get 100 more for an art project. How many sheets of paper do they have now?

TRY IT

Possible student work:

Sample A

There are 4 hundreds, 3 tens, and 2 ones.

1 more hundred is 5 hundreds.

The class has 532 sheets of paper.

Sample B

When I skip-count by hundreds, the next number after 432 is 532.

So, the class has 532 sheets of paper.

Math Toolkit
- connecting cubes
- base-ten blocks
- hundreds place-value mats
- open number lines
- three-digit number cards

DISCUSS IT

Ask your partner: Do you agree with me? Why or why not?

Tell your partner: I disagree with this part because . . .

377

DISCUSS IT

Support Partner Discussion

Encourage students to use the term *hundreds place* as they talk to each other.

Support as needed with questions such as:

- *How many times would you skip-count to solve the problem?*
- *How do you know which digits will change if you skip-count?*

Common Misconception Look for students who increase the value of the digit in the ones place or the tens place by 1 and say that the class now has 433 or 442 sheets of paper.

Select and Sequence Student Solutions

One possible order for whole class discussion:

- using drawings to find 1 hundred more than 432
- using an open number line to add 100 to 432
- writing an addition equation to show the total
- using reasoning about digits in the hundreds place to find 100 more than 432

Support Whole Class Discussion

Compare and connect the numbers in the word problem and how they are shown on student representations of the problem.

Ask *How does each model show 432 sheets of paper? How does each model show 100 more?*

Listen for 432 sheets of paper is the same as 4 hundreds, 3 tens, and 2 ones; there is one jump of 100 to show 100 more.

PICTURE IT & MODEL IT

If no student presented these models, connect them to the student models by pointing out the ways they each represent:

- 432 at the start
- 100 more
- the total after 100 more have been added

Ask *How are the ways 432 is shown different for each model? How are the ways 100 more is shown the same for both models?*

Listen for The drawing shows 432 as hundreds, tens, and ones, but the second model just writes the number. For both models, 100 more is shown as adding one more hundred to the hundreds in 432.

For drawing a picture, prompt students to identify how the drawings show finding 100 more than 432.

- *How is the second drawing different than the first?*
- *Why do the drawings of tens and ones stay the same?*

For using facts you know, prompt students to connect the addition fact to solving the problem.

- *Why is the fact 4 + 1 = 5 used?*
- *How does 4 hundreds + 1 hundred = 5 hundreds help to find how many sheets of paper the class has now?*

Explore different ways to understand adding and subtracting 10 and 100.

A class has 432 sheets of paper. They get 100 more for an art project. How many sheets of paper do they have now?

PICTURE IT

You can draw a picture to show the number of sheets of paper.

432 is **4 hundreds** and 32 more.

Adding 100 makes **5 hundreds** and 32 more.

MODEL IT

You can use facts you know.

432 and 100 more is 432 + 100.

You know 4 + 1 = 5.

So, you know 4 hundreds + 1 hundred = 5 hundreds.

Deepen Understanding

Using a Known Fact

SMP 8 Use repeated reasoning.

When discussing using a known addition fact, prompt students to consider how adding 4 + 1 is related to adding 432 and 100.

Ask *How is adding 4 + 1 like adding 4 hundreds + 1 hundred? How can you use 4 + 1 to find 400 + 100? How can you use 4 + 1 to find 100 more than 432?*

Listen for The fact 4 + 1 = 5 shows adding ones. 4 hundreds + 1 hundred is adding hundreds, and there are 4 + 1, or 5 of them. I can use 4 + 1 to find 400 + 100 by putting the sum of 5 from the basic fact in the hundreds place, and zeros for the tens and ones places in 500. I can use the sum of 5 to find 100 more than 432 by just increasing the hundreds digit by 1. 100 more is 1 hundred, 0 tens, and 0 ones more, so the tens and ones do not change.

Generalize *Can you use a basic fact to add 100 to any three-digit number?* Listen for understanding that a basic "plus one" fact can be used to add 100 to any three-digit number by adding 1 just to the digit in the hundreds place.

CONNECT IT

- Remind students that one thing that is alike about all the representations is the numbers.
- Explain that on this page they will use those numbers for adding or subtracting 10 or 100.

Monitor and Confirm

1–2 Check for understanding that:

- there are 5 hundreds in the solution to the problem because 4 hundreds + 1 hundred = 5 hundreds
- adding hundreds is like adding ones because 4 ones and 1 one is 5 ones, and 4 hundreds and 1 hundred is 5 hundreds

Support Whole Class Discussion

3 Be sure students understand that when they are adding 10 to a three-digit number, the tens digit can increase by 1, and when they are subtracting 10 from a three-digit number, the tens digit can decrease by 1.

Ask *Why would you increase the tens digit by 1 when you add 10 to a three-digit number? Why would you decrease the tens digit by 1 when you subtract 10 from a three-digit number? What happens to the digit in the ones place when you add or subtract 10 from a three-digit number?*

Listen for I would increase the tens digit by 1 because adding 10 is the same as adding 1 more ten. I would take away 1 from the tens digit because subtracting 10 is the same as taking away 1 ten. The digit in the ones place stays the same because 10 does not have any ones to add or subtract.

4 REFLECT Have all students focus on the strategies used to solve this problem. If time allows, have students share their preferences with a partner.

CONNECT IT

Now you will use the problem from the previous page to help you understand how to add and subtract 10 and 100.

1 Look at **Model It** on the previous page. How is adding hundreds like adding ones?

4 ones and 1 one make 5 ones; 4 hundreds and 1 hundred make 5 hundreds.

2 How many sheets of paper does the class have now?

532

3 Look at your answer for problem 1. How would adding and subtracting tens be like adding and subtracting ones?

Possible answer: To add 10, I would increase the tens digit by 1. To subtract 10, I would decrease the tens digit by 1.

4 REFLECT

Look back at your **Try It**, strategies by classmates, and **Picture It** and **Model It**. Which models or strategies do you like best for adding or subtracting 10 and 100? Explain.

Possible answer: I like to think about how adding hundreds or tens is like adding ones.

Hands-On Activity

Use base-ten blocks to add 100 to a three-digit number.

If . . . *students have difficulty finding 100 more than a three-digit number,*

Then . . . *have them use a concrete representation to model adding 100 to a three-digit number.*

Materials For each student: base-ten blocks

- Write *432 and 100 more* on the board. Have students model 432 with hundreds flats, tens rods, and ones units. Ask: *How many hundreds do you have?* [4] *How many tens?* [3] *How many ones?* [2]
- Ask: *How can you show 100 more with base-ten blocks?* [Show 1 more hundred flat.] Have students add one hundred flat to the group of 4 hundreds flats.
- Ask: *How many hundreds, tens, and ones do you have now?* [5 hundreds, 3 tens, and 2 ones] *What is 100 more than 432?* [532]
- Repeat the activity with other problems, such as 586 + 100 and 100 + 345.

APPLY IT

For all problems, encourage students to identify how digits will or will not change when adding or subtracting 10 or 100.

5 793 granola bars; Possible student work:
8 hundreds − 1 hundred = 7 hundreds, so
893 − 100 = 793

6 See Student Worktext page.

Close: Exit Ticket

7 **B**; Students may write 8 − 1 = 7 and indicate that the tens digit will change from 8 to 7.

Error Alert **If** students chose **A**, **C**, or **D**, **then** ask them to circle the digit that will change in 288 when they subtract 10 and describe how that digit will change. After they have identified that the 8 in the tens place will decrease by 1 to 7, they can recognize that the correct answer is 278 and that 188 = 288 − 100 (**A**), 287 = 288 − 1 (**C**), and 298 = 288 + 10 (**D**).

APPLY IT

Use what you just learned to solve these problems.

5 A store has 893 granola bars. It sells 100 bars. How many granola bars does the store have now? Show your work.

Possible student work:

8 hundreds − 1 hundred = 7 hundreds

893 − 100 = 793

Solution **793 granola bars**

6 Add or subtract 10 or 100.

a. 539 + 10 = **549**

704 + 100 = **804**

699 + 10 = **709**

b. 675 − 100 = **575**

226 − 100 = **126**

491 − 10 = **481**

7 What is 288 − 10?

Ⓐ 188
Ⓑ 278
Ⓒ 287
Ⓓ 298

Solutions

1. See student page.
Basic

2. 328
Basic

Name: _____ LESSON 15 SESSION 3

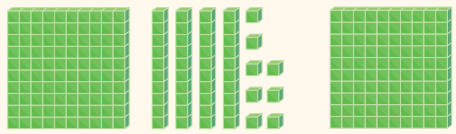
Practice Adding and Subtracting 10 and 100

Study the Example showing one way to add 100. Then solve problems 1–6.

EXAMPLE

The park service has planted 148 trees. They will plant 100 more trees by the end of the week. How many trees will they have planted in all?

You can use base-ten blocks. Then skip-count by hundreds.



148 + 100 = 248

100 more than 148 is 248.

So, 248 trees will be planted in all.

Tim scores 318 points in a game. He plays another level and scores 10 more points. How many points does Tim score in all?

1. Draw base-ten blocks for 318 in one color. Then use a different color to draw more base-ten blocks to show how many points Tim scores in all.

Students should draw 3 hundreds, 1 ten, and 8 ones in one color and 1 ten in a second color.

2. How many points does Tim score in all? 328

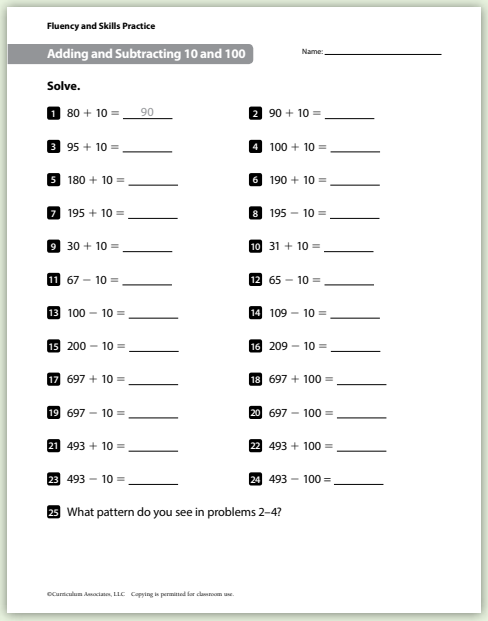
381

Fluency & Skills Practice

Teacher Toolbox

Assign *Adding and Subtracting 10 and 100*

In this activity students practice adding and subtracting 10 and 100. This skill is useful for helping students notice patterns and place-value relationships when adding and subtracting 10 and 100 and improving their fluency with mental math skills.



Fluency and Skills Practice

Adding and Subtracting 10 and 100 Name: _____

Solve.

1. 80 + 10 = 90
2. 90 + 10 = _____
3. 95 + 10 = _____
4. 100 + 10 = _____
5. 180 + 10 = _____
6. 190 + 10 = _____
7. 195 + 10 = _____
8. 195 − 10 = _____
9. 30 + 10 = _____
10. 31 + 10 = _____
11. 67 − 10 = _____
12. 65 − 10 = _____
13. 100 − 10 = _____
14. 109 − 10 = _____
15. 200 − 10 = _____
16. 209 − 10 = _____
17. 697 + 10 = _____
18. 697 + 100 = _____
19. 697 − 10 = _____
20. 697 − 100 = _____
21. 493 + 10 = _____
22. 493 + 100 = _____
23. 493 − 10 = _____
24. 493 − 100 = _____
25. What pattern do you see in problems 2–4?

3 Now Kevin has 352 stamps. Possible explanation: I need to find 452 − 100. I can just subtract 1 from the hundreds digit and leave the other digits the same. So, 452 − 100 = 352.
Medium

4 **D**
Basic

5 **B**
Basic

6 **C**
Basic

3 Kevin has 452 stamps in his collection. Then he gives his sister 100 stamps. How many stamps does Kevin have now?

Solve the problem above. Then explain the strategy that you used. Show your work.

Possible explanation: I need to find 452 − 100. Since I am subtracting 100, I can just subtract 1 from the hundreds digit and leave the other digits the same. So, 452 − 100 = 352.

Solution **Now Kevin has 352 stamps.**

4 What is 873 + 100?

Ⓐ 773
Ⓑ 874
Ⓒ 883
Ⓓ 973

5 What is 547 − 10?

Ⓐ 557
Ⓑ 537
Ⓒ 527
Ⓓ 447

6 What is 10 + 865?

Ⓐ 765
Ⓑ 855
Ⓒ 875
Ⓓ 965

ELL English Language Learners: Differentiated Instruction

Prepare for Session 4
Use with *Apply It*.

Levels 1–3

Speaking/Writing Have students chorally read ***Apply It*** problem 3, draw a place-value chart, and write 426 in the chart. Ask: *Which digit will change if you add or subtract 100? Point to it. What is the place value of that digit?*

Encourage students to work with their partner and complete the problem using these sentence frames:

- *When I skip-count back from 426 to subtract 100, the next number is* **326** .
- *Michael subtracted* **10** *instead of 100.*

Levels 2–4

Reading/Writing Have students read ***Apply It*** problem 3. Have students write the following sentence frames:

- *First, I will draw a place-value chart to write the number* **426** .
- *Then I will change the digit in the* **hundreds** *place value by subtracting* **1 hundred** *from* **4 hundred**, *which is* **326** . *Instead of subtracting 1 hundred, Michael subtracted* **1 ten**.

Then have students complete the frames with partners. Encourage partners to take turns reading the complete sentences.

Levels 3–5

Speaking/Writing Have students read ***Apply It*** problem 3 with their partners and discuss their ideas. Ask them to write their steps, using the sequence words *first* and *then* to explain the strategies they used to determine the correct answer. Encourage them to discuss the reason why Michael chose answer option B. Have them write a sentence about their discussion.

LESSON 15

SESSION 4 Refine

Purpose In this session, students solve problems by skip-counting by fives and tens, adding 10 or 100 to 3-digit numbers, and subtracting 10 or 100 from 3-digit numbers. They begin by sharing their thinking with a partner and then work independently.

Start

Connect to Prior Knowledge

Why Support students' knowledge of skip-counting forward and backward by fives and tens, foreshadowing skip-counting from three-digit numbers.

How Have students skip-count by fives and tens from a two-digit number.

Skip-count by fives. Write the next five numbers.

35, ..., ..., ..., ..., ...

Skip-count backward by tens. Write the next five numbers.

71, ..., ..., ..., ..., ...

Solutions

40, 45, 50, 55, 60

61, 51, 41, 31, 21

EXAMPLE

68, 78, 88, 98, 108, 118; See Student Worktext page for number chart.

Look for Six numbers in the same column, immediately below 58.

APPLY IT

1. 105, 110, 115, 120, 125, 130; Students also could solve the problem by starting at 100 and then adding 5 six times.
DOK 1

   Look for The digit in the ones place alternates between 0 and 5 when skip-counting by fives.

2. Pablo has 442 sports cards now. Students also could write the equation $342 + 100 = 442$.
DOK 1

   Look for The hundreds digit is the only digit that changes when adding 100 to 342.

Refine Using Mental Addition and Subtraction

Complete the Example below. Then solve problems 1–3.

EXAMPLE

Cecilia is skip-counting by tens from 58. What are the next 6 numbers she says?

You can use a number chart to skip-count by tens. Each row has 10 numbers.

Circle 58. Then go down one row to skip-count by ten.

Continue down the row to skip-count by tens 6 times.

51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120

Solution 68, 78, 88, 98, 108, 118

APPLY IT

1. Lily is skip-counting by fives from 100. What are the next 6 numbers she says?

   105, 110, 115, 120, 125, 130

What patterns do you know when skip-counting?

3 **C**; Students could solve the problem by finding 4 hundreds − 1 hundred = 3 hundreds to determine that the value of the hundreds digit is 3 and that the answer is 326.

Explain why the other two answer choices are not correct:

A is not correct because 526 results from adding 100 to 426 instead of subtracting 100 from 426.

D is not correct because 226 is the result of subtracting 2 hundreds from 426 instead of subtracting 1 hundred from 426.

DOK 3

Close: Exit Ticket

Check for Understanding

Materials For remediation: base-ten blocks, blank number line

Ask students to solve the following problem:

Sarah has 281 pennies in a jar. She puts 100 more pennies in the jar. How many pennies are in the jar now? [381]

For students who are still struggling, use the table below to guide remediation.

After providing remediation, check students' understanding using the following problem:

Dave has 185 baseball cards. His sister gives him 10 more. How many baseball cards does Dave have now? [195]

2 Pablo has 342 space cards. Then he buys 100 more cards. How many space cards does Pablo have now? Show your work.

Possible student work:

3 hundreds + 1 hundred = 4 hundreds

Will Pablo have more or fewer space cards now?

Solution **Pablo has 442 space cards now.**

3 What is 426 − 100?

Ⓐ 526

Ⓑ 416

Ⓒ 326

Ⓓ 226

Michael chose Ⓑ as his answer. How did Michael get his answer?

Possible answer: Michael subtracted 10 from 426 instead of subtracting 100.

Which digit changes when you subtract 100 from a number?

384

Error Alert

If the error is . . .	*Students may . . .*	*To support understanding . . .*
291	have failed to correctly identify the hundreds digit in 281 and increased the tens digit by 1.	Provide students with base-ten blocks to model the problem. Make sure they recognize that a hundred flat needs to be added to a group of 2 hundreds flats in order to show 100 more than 281.
282	have failed to correctly identify the hundreds digit in 281 and increased the ones digit by 1.	Provide students with base-ten blocks to model the problem. Make sure they recognize that a hundred flat needs to be added to a group of 2 hundreds flats in order to show 100 more than 281.
181	have subtracted instead of added.	Model the problem on an open number line. Point out that when you want to find "100 more" than a number, you are adding 100 to that number. So, the solution to the problem is 281 + 100, and the sum will be greater than 281.

Solutions

1. See student page. Students may explain that a jump from 250 to 245 or from 225 to 220 represents skip-counting backward by fives. So, I can skip-count backward by fives from the number just after a missing number to find the number that I need to write in the box.
Medium

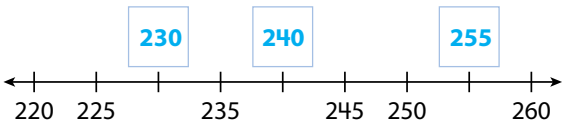
2. See student page.
Basic

Name: _____ LESSON 15 SESSION 4

Practice Using Mental Addition and Subtraction

1. You are skip-counting backward on this number line. What number are you skip-counting by? Write the missing numbers. Explain how you found your answers.

How do the digits in the numbers change?



Possible explanation: From 250 to 245 and from 225 to 220 are jumps of 5, so I know to count backward by fives. I can skip-count backward by fives from 260 to find the missing numbers. I can check my answers by starting at 220 and skip-counting forward by fives.

2. Greg uses this number chart to skip-count by tens from 314. Shade the next 6 numbers.

How do numbers change when you skip-count by tens?

301	302	303	304	305	306	307	308	309	310
311	312	313	314	315	316	317	318	319	320
321	322	323	324	325	326	327	328	329	330
331	332	333	334	335	336	337	338	339	340
341	342	343	344	345	346	347	348	349	350
351	352	353	354	355	356	357	358	359	360
361	362	363	364	365	366	367	368	369	370
371	372	373	374	375	376	377	378	379	380

385

3 **B**; Students could write 6 − 1 = 5.
Basic

4 100 miles; Students could recognize that the ones digits and tens digits of 171 and 271 are the same, but the hundreds digit has increased from 1 to 2. The difference between 2 hundreds and 1 hundred is 1 hundred, or 100.
Medium

5 **C**; The hundreds digit of the number of buttons decreases by 1, so Liam uses 100 buttons.

Explain why the other two answer choices are not correct:

B is not correct because if Liam uses 50 buttons, the tens digit decreases by 5. So, Liam will have 308 buttons left, not 258.

D is not correct because if Liam uses 200 buttons, then the hundreds digit decreases by 2. So, Liam will have 158 buttons left, not 258.
Challenge

3 What is 863 − 10?

Ⓐ 763
Ⓑ 853
Ⓒ 873
Ⓓ 963

Which digit changes when you subtract 10 from a number?

4 Sasha and her family drive 171 miles on the first day of their vacation. After the second day of their vacation, they have driven 271 miles. How many miles do Sasha and her family drive on the second day?

What is the same about the numbers? What is different?

Solution **100 miles**

5 Liam has 358 buttons. He uses some of them for an art project. Now Liam has 258 buttons left. How many buttons does Liam use for the art project?

Ⓐ 10
Ⓑ 50
Ⓒ 100
Ⓓ 200

Would you add or subtract to solve this problem?

Pam chose Ⓐ as the answer. How did Pam get her answer?

Possible answer: Pam sees a difference between the digits 3 (in 358) and 2 (in 258). She thinks the difference is 10, but the 3 and 2 are in the hundreds place, not in the tens place. When the hundreds digit decreases by 1, it means the number has decreased by 100.

SESSION 5 Refine

Purpose In this session, students further refine their skills for skip-counting by fives and tens, adding 10 and 100 to a three-digit number, and subtracting 10 and 100 from a three-digit number.

Start

Develop Fluency

Why Support students' facility with counting on by fives, tens, and hundreds from a three-digit number.

How Have students count on by fives, tens, and hundreds from 105.

Skip-count by fives.
105, ..., ..., ..., ..., ...

Skip-count by tens.
105, ..., ..., ..., ..., ...

Skip-count by hundreds.
105, ..., ..., ..., ..., ...

Solutions

110, 115, 120, 125, 130

115, 125, 135, 145, 155

205, 305, 405, 505, 605

APPLY IT

1 **C**; Students may write the equation $190 + 10 = 200$.
DOK 1

2 **D**; Students may write the equation $384 - 284 = 100$.
DOK 1

3 **A**, **C**, **D**; Students may write differences between pairs of numbers in each set to find that the differences for the sets in answer choices **A**, **C**, and **D** are all 5, the differences for the set in answer choice **B** are 10, and the differences for the set in answer choice **E** are 100.
DOK 1

4 449 stickers; Students may explain that 1 more hundred than 3 hundreds is 4 hundreds, so 100 more than 349 is 449.
DOK 1

5 **B**; Students may underline digits that change in the set of numbers for each answer choice: hundreds in answer choice **A**, tens in answer choice **B**, tens and ones in answer choice **C**, and hundreds and tens in answer choice **D**. So, only answer choice **B** shows skip-counting by tens.
DOK 1

Refine Using Mental Addition and Subtraction

APPLY IT

Solve the problems.

1 Teresa has a box of raisins. She eats 10 of them. Now there are 190 raisins in the box. How many raisins were in the box at the start?

Ⓐ 90
Ⓑ 180
Ⓒ 200
Ⓓ 290

2 Carlos counts aloud and says these numbers. What number is Carlos skip-counting by?

284, 384, 484, 584, 684, 784, 884

Ⓐ twos
Ⓑ fives
Ⓒ tens
Ⓓ hundreds

3 Which sets of numbers show skip-counting forward or backward by fives?

Ⓐ 590, 595, 600, 605, 610, 615
Ⓑ 845, 855, 865, 875, 885, 895
Ⓒ 80, 75, 70, 65, 60, 55
Ⓓ 390, 395, 400, 405, 410, 415
Ⓔ 455, 555, 655, 755, 855, 955

Differentiated Instruction

RETEACH

Hands-On Activity

Use base-ten blocks to skip-count by tens from a three-digit number.

Students struggling with skip-counting by tens from a three-digit number

Will benefit from additional work with using a concrete model to skip-count.

Materials For each student: base-ten blocks

- Have students model 210 with blocks and say the number. Then have them add a ten rod. Ask: *What number do the blocks show now? How do you know?* [220; I put 1 more ten with the blocks. There are 2 hundreds and 2 tens, or 220.]
- Have students continue adding tens rods to the blocks one at a time and counting aloud. After they reach 290, ask: *What number comes next when you count by tens? Why?* [300; 10 more than 290 is 300; I have 2 hundreds flats and 10 tens rods. 10 tens rods are equal to 100, so the blocks show 300.
- Repeat the activity by having students skip-count by tens from other numbers.

6 898; Students may write the equation $9 - 1 = 8$.
DOK 1

Close: Exit Ticket

7 MATH JOURNAL

Student responses should indicate understanding that when skip-counting forward by tens, each number counted is ten more than the previous number. Finding "ten more" also describes adding ten, and adding ten repeatedly will give sums that are the same as the numbers said while skip-counting.

Error Alert **If** students are unable to describe how skip-counting forward by tens and adding tens are alike, **then** have students show 246 with base-ten blocks and skip-count by tens aloud, as they add 5 tens rods to 246 one at a time. Have them repeat adding the tens rods to 246 and write a corresponding equation for each addition of 10.

SELF CHECK Have students consider whether they feel they are ready to check off any new skills on the Unit 3 Opener.

4 Ellen counts 349 stickers. Joseph counts 100 more stickers than Ellen.

How many stickers does Joseph count? Explain how you know.

449 stickers; Possible answer: There are 3 hundreds and 49 more in 349. 100 more makes 4 hundreds and 49 more, which is 449.

5 Which shows skip-counting by tens?

Ⓐ 210, 310, 410, 510, 610, 710

Ⓑ 829, 839, 849, 859, 869, 879

Ⓒ 440, 445, 450, 455, 460, 465

Ⓓ 320, 430, 540, 650, 760, 870

6 What is 998 − 100? **898**

7 MATH JOURNAL

Explain how skip-counting forward by tens and adding tens are alike.

Possible explanation: When I skip-count forward by tens and add tens, each number is 10 more than the number before. Whether I skip-count forward or add tens, I get the same numbers.

SELF CHECK Go back to the Unit 3 Opener and see what you can check off.

EXTEND

Challenge Activity
Skip-count by twenties.

Students who have achieved proficiency with adding and subtracting 10 mentally

Will benefit from deepening understanding of mental addition and subtraction.

- Write *608 + 10 = ?* and *618 + 10 = ?* on the board and have students solve the equations.
- Ask: *What is 608 + 20?* [628] *What is 628 + 20?* [648]
- Discuss patterns in the tens digits when adding 20s.
- Challenge students to write the next 5 numbers when skip-counting by twenties from 608. [628, 648, 668, 688, 708]
- Repeat the activity with other three-digit numbers, such as 117 and 450.

PERSONALIZE

i-Ready

Provide students with opportunities to work on their personalized instruction path with *i-Ready* Online Instruction to:

- fill prerequisite gaps
- build up grade-level skills

Lesson Overview

LESSON 18

Use Addition and Subtraction Strategies with Three-Digit Numbers

Lesson Objectives

Content Objectives

- Fluently break apart three-digit numbers as a strategy for addition and subtraction.
- Fluently determine when regrouping ones or tens is necessary and carry out the regrouping to find a sum.
- Fluently determine when decomposing tens or hundreds is necessary and carry out the decomposition to find a difference.
- Subtract from three-digit numbers with zeros in the ones and/or tens places.
- Use addition to check the solution to a subtraction problem.

Language Objectives

- Record sums and differences found by using models.
- Draw an open number line to model adding and subtracting three-digit numbers.
- Write addition and subtraction equations to represent word problems.
- Explain how to solve addition and subtraction problems with three-digit numbers.
- Explain why and how addition and subtraction strategies work.

Prerequisite Skills

- Identify place-value in three-digit numbers.
- Model three-digit numbers.
- Perform two-digit addition with and without regrouping.
- Perform two-digit subtraction with and without regrouping.

Standards for Mathematical Practice (SMP)

SMPs 1, 2, 3, 4, 5, and 6 are integrated in every lesson through the *Try-Discuss-Connect* routine.*

In addition, this lesson particularly emphasizes the following SMPs:

4 Model with mathematics.

5 Use appropriate tools strategically.

7 Look for and make use of structure.

*See page 303k to see how every lesson includes these SMPs.

Lesson Vocabulary

There is no new vocabulary. Review the following key terms:

- **difference** the result of subtraction.
- **regroup** to put together or break apart ones, tens, or hundreds. For example, 10 ones can be regrouped as 1 ten, or 1 hundred can be regrouped as 10 tens.
- **sum** the result of addition.

Learning Progression

In Grade 1 students add and subtract with two-digit numbers within 20, with and without regrouping. They mentally find ten more or ten less than a given number, and use addition to solve subtraction problems.

In Grade 2 students begin working with three-digit numbers. They use break-apart strategies, count by tens and hundreds, and apply place-value concepts to find sums and differences within 1,000.

In this lesson students continue to explore addition and subtraction using three-digit numbers. They use place value understanding to subtract from three-digit numbers with zeroes. They use and explain strategies for solving three-digit addition and subtraction problems and use addition to check the solution to a subtraction problem.

In Grade 3 students fluently add and subtract numbers within 1,000. They rely less on models and pictures, focusing on numerical representations in preparation for learning standard algorithms in the following year. In later years, students will draw on their understanding of place value to multiply and divide multi-digit numbers and apply place-value concepts to decimal numbers.

Lesson Pacing Guide

Whole Class Instruction

SESSION 1 **Explore** *45–60 min*	**Using Addition and Subtraction Strategies with Three-Digit Numbers** • Start *5 min* • Try It *10 min* • Discuss It *10 min* • Connect It *15 min* • Close: Exit Ticket *5 min*	**Additional Practice** Lesson pages 441–442
SESSION 2 **Develop** *45–60 min*	**Using Addition Strategies with Three-Digit Numbers** • Start *5 min* • Try It *10 min* • Discuss It *10 min* • Model Its *5 min* • Connect It *10 min* • Close: Exit Ticket *5 min*	**Additional Practice** Lesson pages 447–448 **Fluency** Using Addition Strategies with Three-Digit Numbers
SESSION 3 **Develop** *45–60 min*	**Using Subtraction Strategies with Three-Digit Numbers** • Start *5 min* • Try It *10 min* • Discuss It *10 min* • Model Its *5 min* • Connect It *10 min* • Close: Exit Ticket *5 min*	**Additional Practice** Lesson pages 453–454 **Fluency** Using Subtraction Strategies with Three-Digit Numbers
SESSION 4 **Refine** *45–60 min*	**Using Addition and Subtraction Strategies with Three-Digit Numbers** • Start *5 min* • Example *10 min* • Apply It *25 min* • Close: Exit Ticket *5 min*	**Additional Practice** Lesson pages 457–458
SESSION 5 **Refine** *45–60 min*	**Using Addition and Subtraction Strategies with Three-Digit Numbers** • Start *5 min* • Apply It *15 min* • Small Group Differentiation *20 min* • Close: Exit Ticket *5 min*	**Lesson Quiz** or **Digital Comprehension Check**

Lesson Materials

Lesson	none
Activities	*Per student:* base-ten blocks (5 hundreds flats, 20 tens rods, 20 ones units) *Activity Sheet:* Three-Digit Number Cards
Math Toolkit	base-ten blocks, hundreds place-value mats, number charts, open number lines, connecting cubes
Digital Math Tools	Base-Ten Blocks, Number Line

*We continually update the Interactive Tutorials. Check the Teacher Toolbox for the most up-to-date offerings for this lesson.

Teacher Toolbox

Small Group Differentiation

PREPARE

Ready Prerequisite Lessons

Grade 1
- Lesson 10 Use Subtraction Strategies for Addition and Subtraction Facts
- Lesson 29 Add Two-Digit Numbers

RETEACH

Tools for Instruction

Grade 1
- Lesson 10 Addition and Subtraction Facts
- Lesson 29 Two-Digit Addition with Regrouping

Grade 2
- Lesson 18 Add and Subtract Three-Digit Numbers

REINFORCE

Math Center Activity

Grade 2
- Lesson 18 3-Digit Slam

EXTEND

Enrichment Activity

Grade 2
- Lesson 18 Least Difference

i-Ready

Independent Learning

PERSONALIZE

i-Ready Lessons*

Grade 2
- Add Within 1,000 on Number Lines
- Practice: Add Within 1,000 on Number Lines
- Subtract Within 1,000 on Number Lines
- Practice: Subtract Within 1,000 on Number Lines
- Practice: Add Within 100 on Number Lines
- Practice: Subtract Within 100 on Number Lines

Learning Games

- Prerequisite: *Hungry Fish*
- Prerequisite: *Match*

Connect to Family, Community, and Language Development

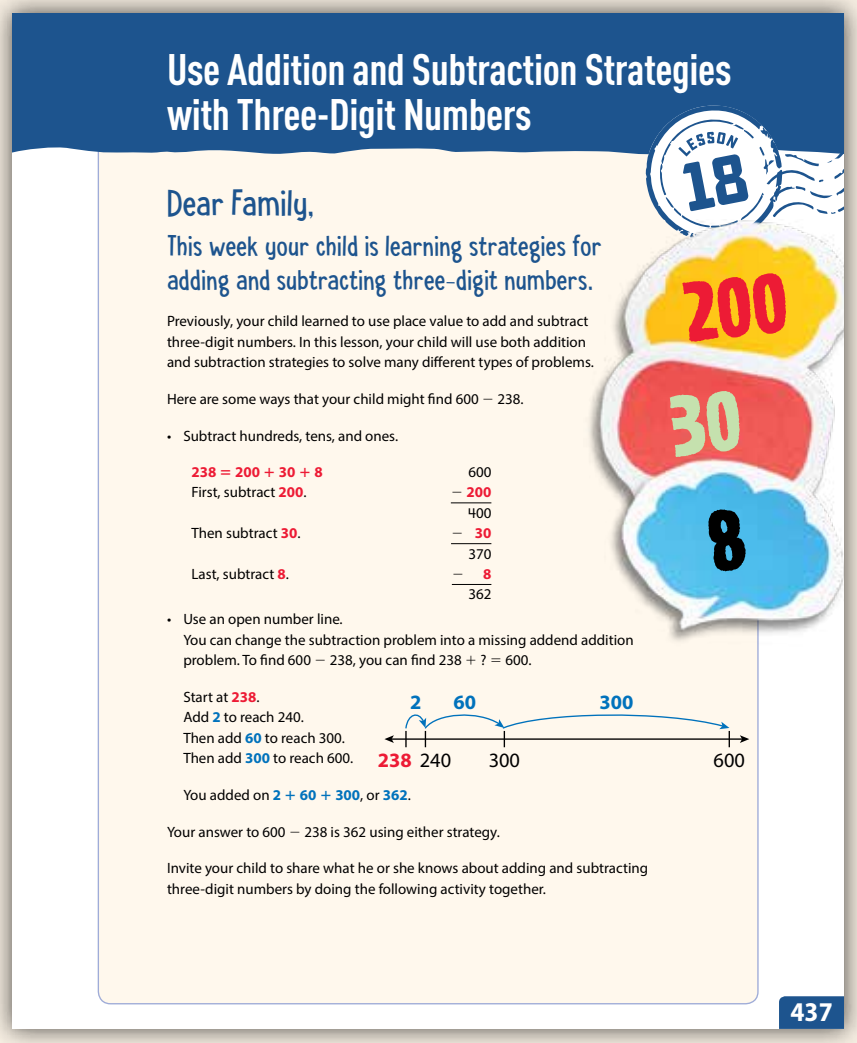
The following activities and instructional supports provide opportunities to foster school, family, and community involvement and partnerships.

Connect to Family

Use the **Family Letter**—which provides background information, math vocabulary, and an activity—to keep families apprised of what their child is learning and to encourage family involvement.

Available in Spanish

Teacher Toolbox



Use Addition and Subtraction Strategies with Three-Digit Numbers

LESSON 18

Dear Family,

This week your child is learning strategies for adding and subtracting three-digit numbers.

Previously, your child learned to use place value to add and subtract three-digit numbers. In this lesson, your child will use both addition and subtraction strategies to solve many different types of problems.

Here are some ways that your child might find 600 − 238.

- Subtract hundreds, tens, and ones.

238 = 200 + 30 + 8
First, subtract 200. 600 − 200 = 400
Then subtract 30. 400 − 30 = 370
Last, subtract 8. 370 − 8 = 362

- Use an open number line.
You can change the subtraction problem into a missing addend addition problem. To find 600 − 238, you can find 238 + ? = 600.

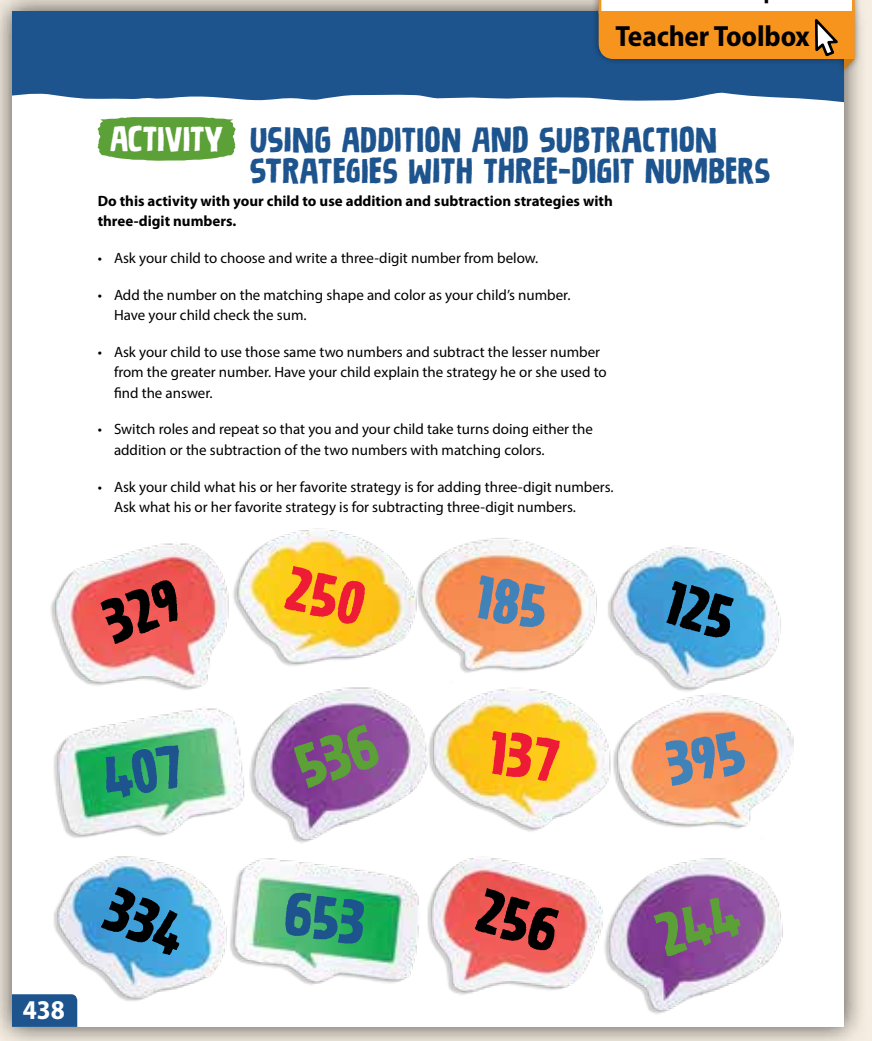
Start at 238.
Add 2 to reach 240.
Then add 60 to reach 300.
Then add 300 to reach 600.

You added on 2 + 60 + 300, or 362.

Your answer to 600 − 238 is 362 using either strategy.

Invite your child to share what he or she knows about adding and subtracting three-digit numbers by doing the following activity together.

437



ACTIVITY USING ADDITION AND SUBTRACTION STRATEGIES WITH THREE-DIGIT NUMBERS

Do this activity with your child to use addition and subtraction strategies with three-digit numbers.

- Ask your child to choose and write a three-digit number from below.
- Add the number on the matching shape and color as your child's number. Have your child check the sum.
- Ask your child to use those same two numbers and subtract the lesser number from the greater number. Have your child explain the strategy he or she used to find the answer.
- Switch roles and repeat so that you and your child take turns doing either the addition or the subtraction of the two numbers with matching colors.
- Ask your child what his or her favorite strategy is for adding three-digit numbers. Ask what his or her favorite strategy is for subtracting three-digit numbers.

438

Goal

The goal of the Family Letter is to help students practice strategies for adding and subtracting three-digit numbers.

Activity

Understanding how to apply a variety of strategies to add and subtract three-digit numbers will help students build fluency in breaking numbers apart. Look at the *Using Addition and Subtraction Strategies with Three-Digit Numbers* activity and adjust it if necessary to connect with your students.

Math Talk at Home

Encourage students to work with family members to choose various three-digit numbers to practice adding and subtracting, using a variety of strategies.

Conversation Starters Below are additional conversation starters students can write in their Family Letter or math journal to engage family members.

- *What strategy can you use to find the answer?*
- *Why did you choose that strategy?*
- *What other strategy could you use?*
- *How do you know you have the right answer?*

Connect to Community and Cultural Responsiveness

Use these activities to connect with and leverage the diverse backgrounds and experiences of all students.

Session 1 Use with *Try It*.

- Have students look for objects at school that can be represented using a three-digit number, such as: sheets in a ream of paper, numbers of books and magazines in a library, and pages in a book. Have students make comparisons between objects of the same type using three-digit numbers. Have them come up with problems to determine how much larger or smaller an object is compared to another object based on size, units, or weight.

Session 2 Use with *Try It*.

- Remind students that pennies and nickels are types of coins used in the United States, and that a penny is worth one cent and a nickel is worth five cents. Have students share other coins that they may be familiar with. Encourage students to customize the problem by using names of coins from other currencies they know.

Session 3 Use with *Try It*.

- Ask students to think of school or community fundraisers where they might have had the opportunity to sell tickets, coupons, or snacks. Encourage them to develop their own subtraction word problems using three-digit numbers based on those experiences.

Connect to Language Development

For ELLs, use the Differentiated Instruction chart to plan and prepare for specific activities in every session.

ELL English Language Learners: Differentiated Instruction

Prepare for Session 1
Use with *Try It*.

Levels 1–3	Levels 2–4	Levels 3–5
Reading/Speaking Have students chorally read the ***Try It*** problem and ask them to select a strategy to use to solve the problem. Then instruct them to talk about the steps they would use to solve the problem. Have students work in pairs to compare their strategies. Ask: *Which strategy is easier to use? Why?* Provide this sentence frame: • *I think _____ is easier because _____.*	**Reading/Speaking** Have students chorally read the ***Try It*** problem. Ask students to work with a partner to discuss and select a strategy to use to solve the problem. After they solve the problem, have each pair compare their work with another set of partners. Say: *Think about the strategy each pair used to solve the problem. Which one did you like best? Explain your reason.*	**Reading/Writing** Have students read the ***Try It*** problem with a partner. Then let them discuss strategies they can use to take the word problem apart. Have each partner select a different strategy and then proceed to solve the problem. Have them write on an index card the steps they took to solve the problem. When finished, encourage students to trade cards and write a response explaining another way to solve the problem.

LESSON 18

SESSION 1 Explore

Purpose In this session, students draw on strategies for adding and subtracting three-digit numbers. They explore and share solution strategies to find the unknown change to a start of 243 that results in an ending quantity of 372. They look ahead to using a place-value chart and writing an equation to subtract three-digit numbers with regrouping across zeros.

Start

Connect to Prior Knowledge

Why Support students' knowledge of solving addition problems with a missing addend, foreshadowing solving for an unknown change in an addition problem with three-digit numbers.

How Have students solve two-digit addition equations for missing addends.

Find the unknown numbers.

32 + ? = 89

55 + ? = 92

Solutions
57; 37

TRY IT

Make Sense of the Problem

To support students in making sense of the problem, have them identify that there are 243 storybooks at the start and 372 storybooks after the class gets some new storybooks.

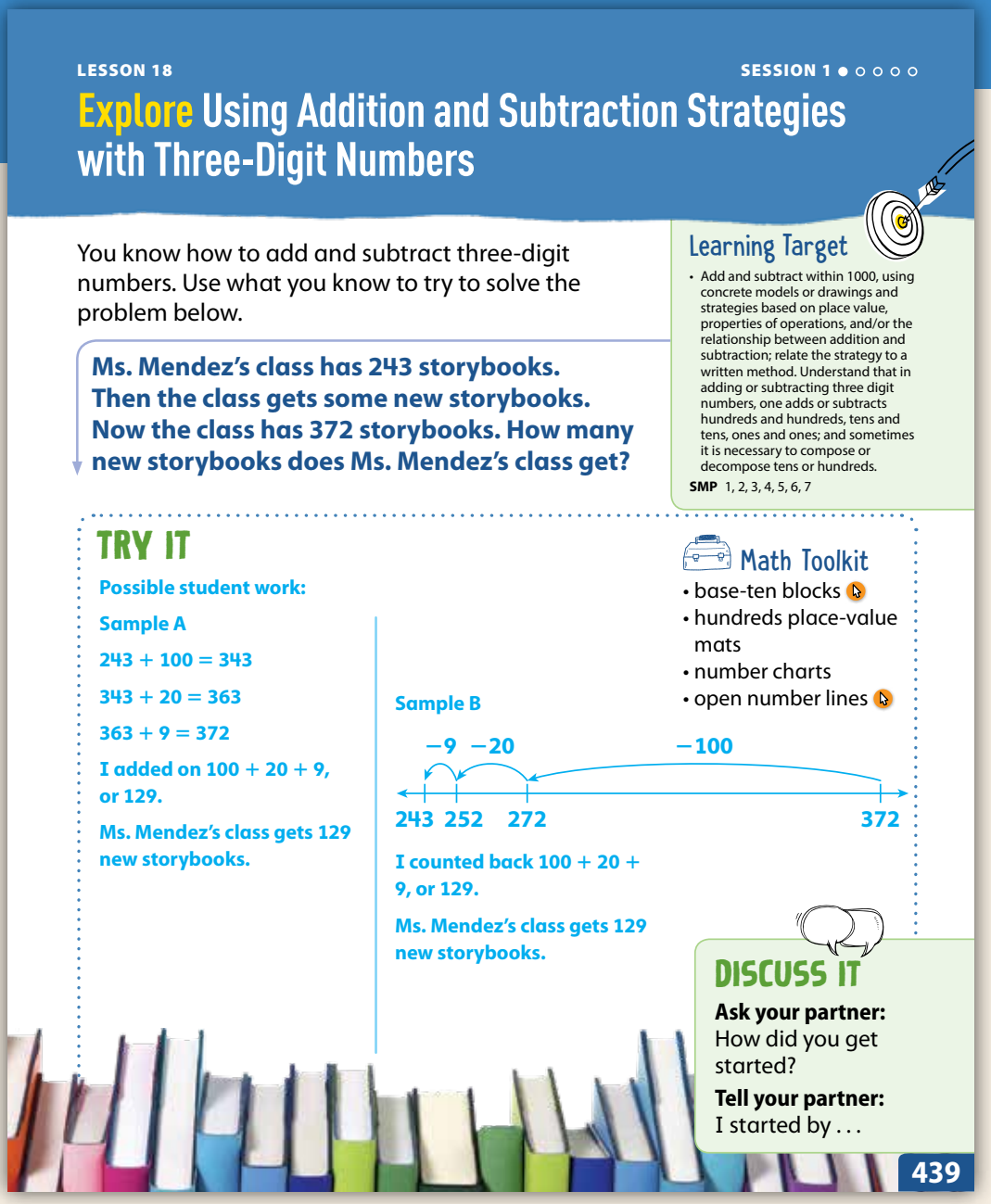
DISCUSS IT

Support Partner Discussion

Encourage students to name or model the strategy they used to solve the problem.

Look for, and prompt as necessary, understanding of:

- 243 as the start of the problem
- an unknown change
- a total of 372 storybooks at the end



LESSON 18 SESSION 1 ● ○ ○ ○ ○

Explore Using Addition and Subtraction Strategies with Three-Digit Numbers

You know how to add and subtract three-digit numbers. Use what you know to try to solve the problem below.

Ms. Mendez's class has 243 storybooks. Then the class gets some new storybooks. Now the class has 372 storybooks. How many new storybooks does Ms. Mendez's class get?

Learning Target

- 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.

SMP 1, 2, 3, 4, 5, 6, 7

TRY IT

Possible student work:

Sample A

243 + 100 = 343

343 + 20 = 363

363 + 9 = 372

I added on 100 + 20 + 9, or 129.

Ms. Mendez's class gets 129 new storybooks.

Sample B

I counted back 100 + 20 + 9, or 129.

Ms. Mendez's class gets 129 new storybooks.

Math Toolkit

- base-ten blocks
- hundreds place-value mats
- number charts
- open number lines

DISCUSS IT

Ask your partner: How did you get started?

Tell your partner: I started by . . .

439

Common Misconception Look for students who do not recognize the problem situation as having an unknown change, and add 243 and 372.

Select and Sequence Student Solutions

One possible order for whole class discussion:

- using base-ten blocks or quick drawings to model 243 and then draw hundreds, tens, and ones to reach 372
- using a place-value chart to represent 243 and then adding hundreds, tens, and ones
- using an open number line starting at 372 with jumps back of 100, 20, and 9
- writing equations to model adding up from 243 to 372

Support Whole Class Discussion

Prompt students to identify the relationship between the numbers in each model and the numbers in the problem.

Ask *How do [student name]'s and [student name]'s models each show the number of books at the start? The number of books that the class gets?*

Listen for The number of books at the start is the same as the starting number on the number line. The unknown change is the result of 372 − 243 when the place-value chart is used to regroup and subtract.

CONNECT IT

1 LOOK BACK

How many new storybooks does Ms. Mendez's class get?

Solution 129 storybooks

2 LOOK AHEAD

Mr. Lumell's class gets 300 new storybooks. How many more new storybooks does Mr. Lumell's class get than Ms. Mendez's class?

a. Write an equation that you could use to solve the problem. Possible answer: 300 − 129 = ?

b. How many hundreds, tens, and ones will be subtracted from 300?

1 hundred 2 tens 9 ones

c. How many more new storybooks does Mr. Lumell's class get than Ms. Mendez's class? 171

3 REFLECT

How could you count up to find 300 − 129?

Sample answer: I could start at 129 on an open number line and jump to the next tens number, then jump to the next hundreds number, and then jump to 300. I would add the values of those jumps to find out the difference between 129 and 300.

440

CONNECT IT

1 LOOK BACK

Look for understanding that 129 new storybooks added to a start of 243 gives a total of 372 storybooks at the end.

Hands-On Activity

Use base-ten blocks to solve for a missing addend.

If . . . *students are unsure about the concept of finding a missing three-digit addend,*

Then. . . *use this activity to have them model a similar problem.*

Materials For each student: base-ten blocks (5 hundreds flats, 20 tens rods, 20 ones units)

- Write 165 + ? = 379 on the board. Have students show 165 using base-ten blocks. Ask: *How many hundreds do you have?* [1] *How many tens?* [6] *How many ones?* [5]
- Ask: *How many hundreds can you add to 165 and still have less than 379?* [2] Have students put 2 hundreds flats in a separate group. Ask: *What number do all the base-ten blocks show now?* [365]
- Ask: *How many tens can you add to 365 and still have less than 379?* [1] Have students put 1 ten rod with the 2 hundreds flats. Ask: *What number do all the base-ten blocks show now?* [375]
- Ask: *How many ones can you add to 375 to get 379?* [4] Have students put 4 ones units with the 2 hundreds flats and the 1 ten rod.
- Ask: *What is the total added to 165 to get 379?* [214] Guide students to count the base-ten blocks in their second group. *What is the missing addend in 165 + ? = 379?* [214]
- As needed, repeat the activity with other problems such as 221 + ? = 589.

2 LOOK AHEAD

Point out that when subtracting from a three-digit number that has two zeroes, subtracting a number of hundreds and then a number of tens can be done mentally.

Students should be able to break apart 129 and subtract it in three steps from 300.

Close: Exit Ticket

3 REFLECT

Look for understanding that when counting up to solve a subtraction problem ending with a multiple of one hundred, the easiest jumps are sequenced as ones, tens, and hundreds. Note whether students understand why addition can be used to solve a subtraction problem.

Common Misconception **If** students are unclear in their explanations about how to find the difference by adding up, **then** prompt them to identify and mark benchmark numbers on an open number line (such as 30 and 200) and then use strategies for making ten to determine the distance of each jump before totaling all of the jumps.

Real-World Connection

Encourage students to think about everyday places or situations where people might need to subtract from a hundreds number. Have volunteers share their ideas. Examples: finding out how many points are needed to get to the next level of a game, finding the number of miles left to go in a 500-mile car race that has already started, and finding how many more pages will be read to finish a 300-page book.

Solutions

Support Vocabulary Development

1 Ask students to think of the relationship between addition and subtraction. Write: $22 - 14 = 8$ and $14 + 8 = 22$. Point to the first equation and ask: *What is the answer to the subtraction problem? What happens when you add that difference to the number you subtracted?* Have students write similar examples with three-digit numbers.

2 Have students compare the numbers and ask: *Who has more pennies?* Then have them work with partners and decide on the operation they want to use first. Have them write the equation and discuss what each number and symbol represents. Then have them write the second equation.

Supplemental Math Vocabulary

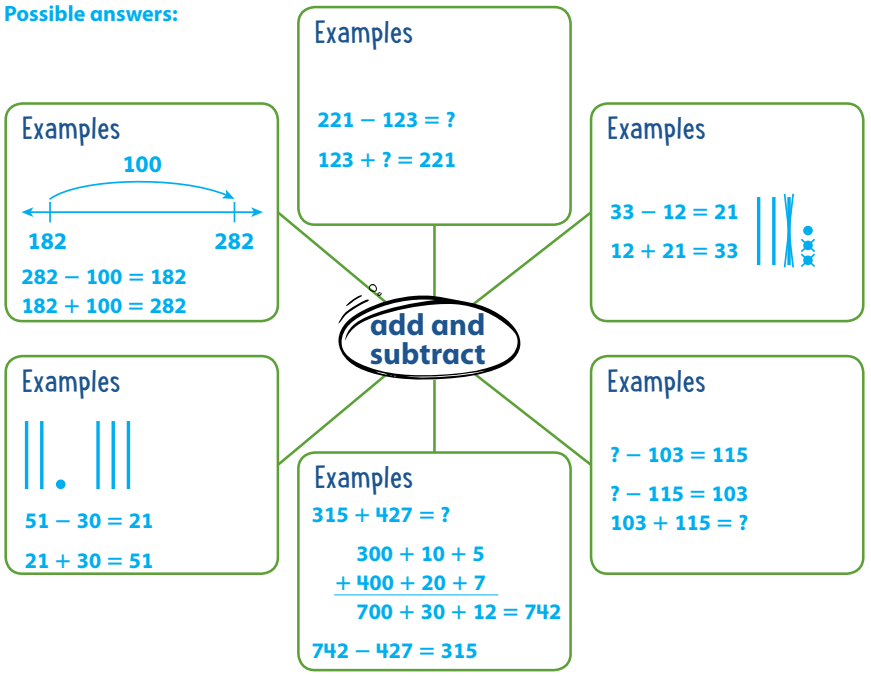
- *add*
- *subtract*

Name: _____ LESSON 18 SESSION 1

Prepare for Using Strategies to Add and Subtract Three-Digit Numbers

1 Think about what you know about adding and subtracting. Fill in each box. Use words, numbers, and pictures. Show as many ideas as you can.

Possible answers:



2 Shen has 200 pennies. Diana has 137 pennies. Write addition and subtraction equations that can be solved to find how many more pennies Shen has than Diana.

Possible answers:

137 + ? = 200 200 − 137 = ?

441

3 Assign problem 3 to provide another look at using subtraction strategies with three-digit numbers.

This problem is very similar to the problem about Ms. Mendez's class getting new storybooks. In both problems, students are given a word problem where they must subtract three-digit numbers to find the answer. This question asks how many new coloring books Lakeview Elementary School gets.

Students may want to use base-ten blocks or draw diagrams with pencil and paper.

Suggest that students read the problem three times, asking themselves one of the following questions each time:

- *What is this problem about?*
- *What is the question I am trying to answer?*
- *What information is important?*

Solution: Students will use various strategies to solve the problem. The school gets 119 new coloring books.
Medium

4 Have students solve the problem a different way to check their answer.

3 Solve the problem. Show your work.

Lakeview Elementary School has 238 coloring books. Then the school gets some new coloring books. Now the school has 357 coloring books. How many new coloring books does the school get?

Possible student work using equations:

238 + 100 = 338

338 + 10 = 348

348 + 9 = 357

I added on 100 + 10 + 9, or 119.

Solution **The school gets 119 new coloring books.**

4 Check your answer. Show your work.

Possible student work:

I counted back 100 + 10 + 9, or 119.

The school gets 119 new coloring books.

ELL English Language Learners: Differentiated Instruction

Prepare for Session 2
Use with *Try It*.

Levels 1–3

Listening/Speaking Read the ***Try It*** problem as students follow along. Have them work with partners to talk about the strategy they will use to solve the problem. Ask: *Do you prefer to draw a model or use numbers?* Provide the following sentence frames:

- *I prefer to _____.*
- *First, I will _____.*
- *Next, I _____.*
- *Finally, I will _____.*

Have partners follow the steps and solve the problem.

Levels 2–4

Listening/Speaking Have students chorally read the ***Try It*** problem and decide on a strategy to use to solve the problem. Provide the following sentence starters:

- *My first step will be _____.*
- *Next, I can _____.*
- *Finally, I _____.*

In pairs, have students take turns explaining their steps to solve the problem using the above sentence starters.

Then have the pairs work together to solve the problem.

Levels 3–5

Reading/Writing Have students read the ***Try It*** problem with a partner and decide on a strategy to use to solve the problem. Have students take turns with their partner completing the sentence starters below to explain their steps for solving the problem:

- *My first step will be _____.*
- *Next, I can _____.*
- *Finally, I _____.*

Once completed, encourage students to read aloud their writing. Then ask them to work individually to solve the problem.

LESSON 18

SESSION 2 Develop

Purpose In this session, students solve a problem that requires adding 263 and 137. Students model the numbers in the word problem either on paper or with manipulatives to represent the sum. The purpose of this problem is to reinforce three-digit addition strategies, such as using a place-value chart or an open number line.

Start

Connect to Prior Knowledge

Why Support students' knowledge of adding two-digit numbers with regrouping, foreshadowing adding three-digit numbers with regrouping ones as tens and tens as hundreds.

How Have students use any strategy to add 2 two-digit numbers where ones and tens must be regrouped.

Solve each problem.

48 + 65 = ?

56 + 78 = ?

Solutions
113; 134

Develop Language

Why Practice using the phrase *is the same as* to show the relationship between addition and subtraction.

How Have students write an addition equation based on the information in the problem: *263 + 137 = ?* Then have them write the phrase *is the same as*. Remind them that the equation they write after the phrase has to be an addition problem that is equal to 263 + 137 = ?; for example, ? = 137 + 263. Once they write the second addition equation, have students solve it.

TRY IT

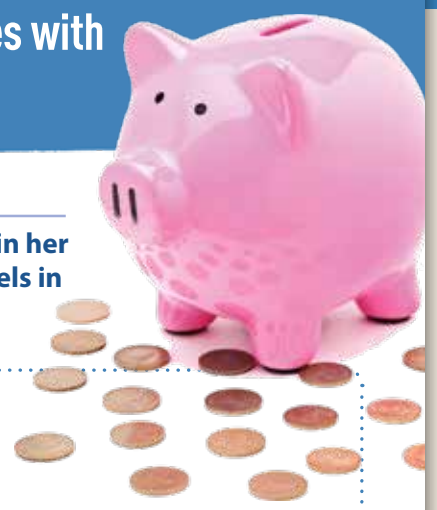
Make Sense of the Problem

To support students in making sense of the problem, have them identify that there are 263 pennies and 137 nickels in the piggy bank.

Ask *How many pennies does Janelle have? How many nickels does she have?*

LESSON 18 SESSION 2 ● ● ○ ○ ○

Develop Using Addition Strategies with Three-Digit Numbers



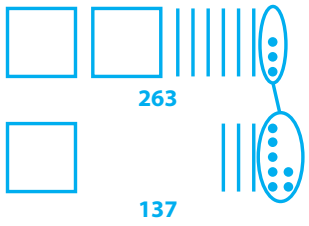
Read and try to solve the problem below.

Janelle has 263 pennies and 137 nickels in her piggy bank. How many pennies and nickels in all does she have in her piggy bank?

TRY IT

Possible student work:

Sample A



3 hundreds + 10 tens + 0 ones

10 tens = 1 hundred

4 hundreds + 0 tens + 0 ones

Janelle has 400 pennies and nickels in her piggy bank.

Sample B

7 + 3 = 10

60 + 30 = 90

200 + 100 = 300

300 + 90 + 10 = 400

Janelle has 400 pennies and nickels in her piggy bank.

Math Toolkit
- connecting cubes
- base-ten blocks
- hundreds place-value mats
- number charts
- open number lines

DISCUSS IT

Ask your partner: Why did you choose that strategy?

Tell your partner: The strategy I used to find the answer was . . .

443

DISCUSS IT

Support Partner Discussion

Encourage students to use the *Discuss It* questions and sentence starters on the Student Worktext page as they talk to each other.

Support as needed with questions such as:

- *How will you use the numbers to solve the problem?*
- *How is your strategy like your partner's? How is it different?*

Common Misconception Look for students who do not add 1 to the tens or hundreds when they regroup, and find a sum of 390 or 300.

Explore different ways to understand addition strategies with three-digit numbers.

Janelle has 263 pennies and 137 nickels in her piggy bank. How many pennies and nickels in all does she have in her piggy bank?

MODEL IT

You can use a place-value chart.

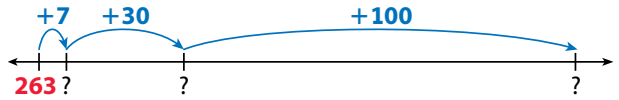
Write the numbers in the chart.
Regroup ones and tens.

	Hundreds	Tens	Ones
	2	6	3
+	1	3	7
Add hundreds, add tens, add ones. →	3	9	10
Regroup 10 ones as 1 ten. →	3	10	0
Regroup 10 tens as 1 hundred. →	?	?	?

MODEL IT

You can use an open number line.

Start at **263**. Add the ones, tens, and hundreds in **137**.



263 + 137 = ?

Select and Sequence Student Solutions

One possible order for whole class discussion:

- using base-ten blocks or quick drawings to model 263 and 137 and then combine hundreds, tens, and ones
- using an open number line that starts at 263 with jumps of 7, 30, and 100 to 400
- using a place-value chart to represent 263 and 137 and then add ones, tens, and hundreds
- breaking addends into hundreds, tens, and ones and then adding each place value

Support Whole Class Discussion

Compare and connect the numbers in the problem and how they are shown on student representations of the problem.

Ask *How does each of the models show 263? 137?*

Listen for 263 can be shown as 2 hundreds + 6 tens + 3 ones. The jumps on the number line start at 263 and have a total value of 137. There are 1 square, 3 lines, and 7 dots to show 137.

MODEL ITS

If no student presented these models, connect them to the student models by pointing out the ways they each represent:

- 263 and 137 as addends
- a way to combine 263 and 137 to find the total

Ask *How does each model show how 137 is added to 263?*

Listen for Each of the numbers is lined up by place value on the chart. Then ones, tens, and hundreds are added together. 263 is shown as the start on the number line, and then jumps of 7, 30, and 100 are made to add 137.

For using a place-value chart, prompt students to identify how regrouping is shown.

- *How many ones are left when you regroup the sum of the ones digits?*
- *Why do you need to regroup tens?*

For using an open number line, prompt students to identify how the jumps show that 137 is being added to 263.

- *Why do the jumps start from 263 on the number line?*
- *How can you tell from the model that you have added 137?*

Deepen Understanding

Number Line Model

SMP 7 Look for structure.

Prompt students to consider how the number line shows 263 + 137.

Ask *Why is 263 the first number labeled on the number line? Why is the first jump a jump of 7? Why are the other jumps 30 and 100?*

Listen for 263 is one of the addends. The jump of 7 is the ones in 137 and makes a ten. The other jumps are 30 and 100 because 137 = 7 + 30 + 100.

Ask *How could you show adding 137 + 263 instead of 263 + 137 on the number line? Why are the sums the same?*

Listen for I could start at 137 and make jumps of 3, 60, and 200. The sum will still be 400, because the order of the addends does not change the sum.

Generalize *How can you use a number line to add any three-digit numbers? How would you decide the values of the jumps?* Listen for understanding that one of the addends would be labeled and then the other addend could be broken into hundreds, tens, and ones for the jumps. The ending number is the sum.

CONNECT IT

- Remind students that one thing that is alike about all the representations is the numbers.
- Explain that on this page, they will use the place-value chart and the open number line to find the sum of 263 and 137.

Monitor and Confirm

1 – 3 Check for understanding that:

- 10 ones is the same as 1 ten and 0 ones
- 10 tens is the same as 1 hundred and 0 tens
- The sum of 263 and 137 is 400

Support Whole Class Discussion

4 Be sure students understand that the problem is asking them how the models result in the sum of 263 and 137.

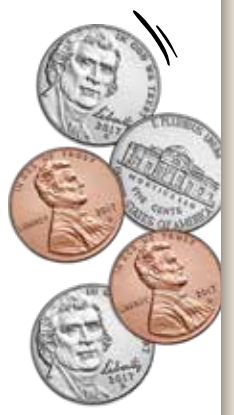
Ask *How do you know when you are finished adding in the place-value chart? How do you know when you are finished making jumps on the open number line?*

Listen for I have found the sum when I have added all of the ones, all of the tens, and all of the hundreds. I know I have found the sum on the number line when the value of the jumps from one addend total the value of the other addend.

5 REFLECT Have all students focus on the strategies used to solve this problem. If time allows, have students share their preferences with a partner.

CONNECT IT

Now you will use the problem from the previous page to help you understand how to use addition strategies with three-digit numbers.



1 Look at the first **Model It** on the previous page.

How many hundreds, tens, and ones should be in the last row of the place-value chart?

4 hundreds 0 tens 0 ones

2 What number does the last row show? 400

3 Look at the second **Model It** on the previous page.

What is 263 + 7? 270

What is 270 + 30? 300

What is 300 + 100? 400

4 Janelle has 400 pennies and nickels in all.

5 REFLECT

Look back at your **Try It**, strategies by classmates, and **Model Its**. Which models or strategies do you like best for adding three-digit numbers? Explain.

Possible answer: I like to use an open number line because I can see the total after I add on each time.

Hands-On Activity

Use base-ten blocks to model adding three-digit numbers on a place-value chart.

If . . . *students are unsure about using a place-value chart to add,*

Then . . . *use the activity below to connect a concrete model to the chart.*

Materials For each student: base-ten blocks (5 hundreds flats, 20 tens rods, 20 ones units)

- Have students model 263 and 137 with separate groups of base-ten blocks and then combine the two groups. Ask: *How many hundreds, tens, and ones do you have in all?* [3 hundreds, 9 tens, and 10 ones] Point to the hundreds, tens, and ones written in the third row of the place-value chart in the first *Model It*.
- Ask: *Can you regroup ones?* [Yes] *How would you show this with base-ten blocks?* [I would trade 10 ones units for 1 ten rod.] Have students make the trade. Ask: *How many hundreds, tens, and ones do you have now?* [3 hundreds, 10 tens, and 0 ones] Ask: *How is this shown in the place-value chart?* [The fourth row shows 3 in the Hundreds column, 10 in the Tens column, and 0 in the Ones column.]
- Do a similar process for regrouping 10 tens as 1 hundred.

APPLY IT

For all problems, encourage students to use a drawing, a model, or equations to support their thinking.

6 Lennie needs 161 more pictures. Students could solve the problem by adding up from 251 to 412 and finding 251 + 100 = 351, 351 + 60 = 411, and 411 + 1 = 412; 100 + 60 + 1 = 161.

7 524 + 278 = 802; Students could solve the problem by adding ones, then tens, and then hundreds: 8 + 4 = 12, 20 + 70 = 90, and 500 + 200 = 700. 700 + 90 + 12 is the same as 700 + 100 + 2; 700 + 100 + 2 = 802.

Close: Exit Ticket

8 **A**, **E**, **F**; Students could add the hundreds, tens, and ones in 481 and 295 by using a place-value chart.

Error Alert **If** students chose **B**, **C**, or **D**, **then** use base-ten blocks to model adding 481 and 295. After students find that there are 6 hundreds, 17 tens, and 6 ones in all, make sure they understand that 17 tens regroups as 1 hundred and 7 tens, and that the base-ten blocks would then show the sum of 7 hundreds, 7 tens, and 6 ones, or 776.

APPLY IT

Use what you just learned to solve these problems.

6 Grace has 412 pictures on her phone. Lennie has 251 pictures on his phone. How many more pictures does Lennie need to have the same number as Grace? Show your work.

Possible student work:

I know that 251 + ? = 412. I can add up from 251 to 412.
251 + 100 = 351
351 + 60 = 411
411 + 1 = 412
100 + 60 + 1 = 161

Solution Lennie needs 161 more pictures.

7 What is 524 + 278? Show your work.

Possible student work:

I will add ones, then tens, and then hundreds.
8 + 4 = 12
20 + 70 = 90
500 + 200 = 700
700 + 90 + 12 is the same as 700 + 100 + 2.
700 + 100 + 2 = 802

Solution 524 + 278 = 802

8 Which addition problems could you use to find 481 + 295?

Ⓐ 600 + 170 + 6
Ⓑ 700 + 17 + 6
Ⓒ 600 + 70 + 6
Ⓓ 6 ones + 7 tens + 6 hundreds
Ⓔ 6 + 70 + 700
Ⓕ 6 hundreds + 17 tens + 6 ones

Solutions

1. See student page.
Basic

2. 130 = 1 hundred + 3 tens
Basic

3. $437
Basic

Name: _____ LESSON 18 SESSION 2

Practice Addition Strategies with Three-Digit Numbers

Study the Example showing one way to add three-digit numbers. Then solve problems 1–6.

EXAMPLE

At Elm School, 176 students are in the first grade, and 139 students are in the second grade. How many students are in both grades?

Find 176 + 139.

You can break apart the addends.

$$\begin{array}{rrrrrr} 176 \longrightarrow & 100 & + & 70 & + & 6 \\ + \ 139 \longrightarrow & 100 & + & 30 & + & 9 \\ \hline & 200 & + & 100 & + & 15 = 300 + 15 = 315 \end{array}$$

So, there are 315 students in both grades.

Luis saves $285. Then he saves $152 more. How much money does Luis save?

1. Break apart the numbers. Find the total.

$$\begin{array}{rrrrrr} 285 \longrightarrow & 200 & + & \boxed{80} & + & \boxed{5} \\ + \ 152 \longrightarrow & 100 & + & \boxed{50} & + & \boxed{2} \\ \hline & \boxed{300} & + & 130 & + & \boxed{7} \end{array}$$

2. 130 = 1 hundred + 3 tens

3. How much money does Luis save? $ 437

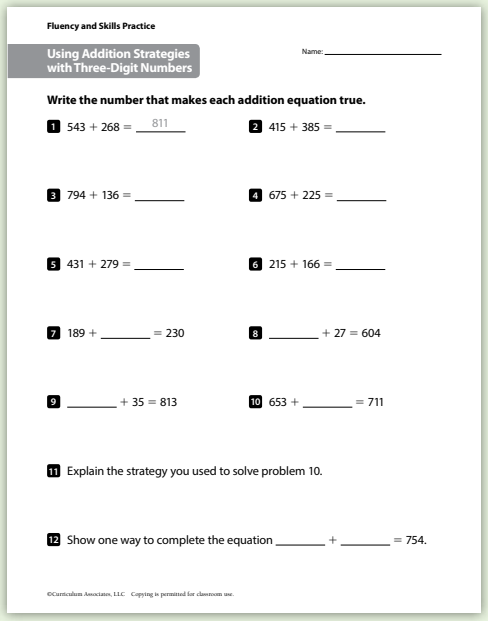
447

Fluency & Skills Practice

Teacher Toolbox

Assign *Using Addition Strategies with Three-Digit Numbers*

In this activity students practice using addition strategies to find sums and missing addends with two- and three-digit addends. It is helpful for students to practice different strategies as one strategy may be more efficient or easier for students to use in different real-world situations.



Fluency and Skills Practice

Using Addition Strategies with Three-Digit Numbers

Name: _____

Write the number that makes each addition equation true.

1. 543 + 268 = 811
2. 415 + 385 = _____
3. 794 + 136 = _____
4. 675 + 225 = _____
5. 431 + 279 = _____
6. 215 + 166 = _____
7. 189 + _____ = 230
8. _____ + 27 = 604
9. _____ + 35 = 813
10. 653 + _____ = 711
11. Explain the strategy you used to solve problem 10.
12. Show one way to complete the equation _____ + _____ = 754.

4 Kim's family drives 226 miles on Monday; Possible work: ? + 258 = 484 is the same as 258 + ? = 484. I can add hundreds, tens, and ones to 258 until I reach 484: 258 + 200 = 458; 458 + 20 = 478; and 478 + 6 = 484; 200 + 20 + 6 = 226.
Medium

5 247 + 426 = 673; See student page for examples of solving the problem using quick drawings or an open number line.
Challenge

6 **A**
Basic

4 On Monday, Kim's family starts driving on their vacation. On Tuesday, they drive 258 miles. Kim's family drives 484 miles during both days. How many miles do they drive on Monday? Show your work.

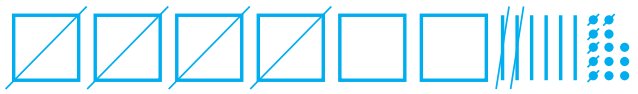
Possible work: ? + 258 = 484 is the same as 258 + ? = 484.
I can add hundreds, tens, and ones to 258 until I reach 484.
258 + 200 = 458
458 + 20 = 478
478 + 6 = 484
I added 200 + 20 + 6, or 226.

Solution **Kim's family drives 226 miles on Monday.**

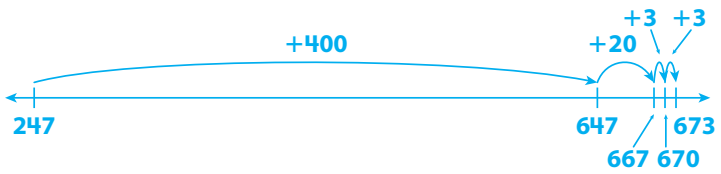
5 Use two different ways to solve this equation. Show your work.

247 + ? = 673

Possible work: I can start with 673 and cross out hundreds, tens, and ones until I have 247 left. I need to regroup a ten to have enough ones to subtract.



I can add the jumps to go from 247 to 673 on a number line.



I add 400 + 20 + 3 + 3 = 426. So, ? = 426.

Solution **247 + 426 = 673**

6 What is 518 + 384?

Ⓐ 902 Ⓑ 892 Ⓒ 872 Ⓓ 802

ELL English Language Learners: Differentiated Instruction

Prepare for Session 3
Use with *Try It*.

Levels 1–3

Listening/Speaking Have students chorally read the ***Try It*** problem. Instruct them to work with a partner to identify a strategy they will use to solve the problem.

Encourage partners to discuss their choice with another set of partners using the questions:

- *Why did you choose that strategy?*
- *What other strategy could you use?*
- *How will you know if your answer is right?*

Have partners solve the problem using the strategy they chose together.

Levels 2–4

Speaking/Reading Have students chorally read the ***Try It*** problem. Ask students to retell the problem to a partner using their own words. Instruct them to select a strategy they can use to solve the problem. Ask: *What steps do you need to use to solve the problem?* Have each student write out the steps using sketches and complete sentences and the sequence words: *first*, *next*, and *then*. Once complete, encourage them to read their sentences aloud to their partner.

Levels 3–5

Reading/Writing Have students read the ***Try It*** problem with a partner. Instruct them to draw their own models, such as an equation or an open number line, and write a complete sentence to support their answer.

When completed, direct students to trade their work and describe a different way to solve the problem. Have partners write a sentence using the sentence frame:

- *Another way to solve the problem is* _____.

Give students time to share their work by explaining their steps and rationale.

LESSON 18

SESSION 3 Develop

Purpose In this session, students solve a problem that requires them to subtract 278 from 500. Students model the numbers in the word problem either on paper or with manipulatives to represent the difference. The purpose of this problem is to reinforce strategies for three-digit addition and subtraction with regrouping in order to build fluency.

Start

Connect to Prior Knowledge

Why Support students' knowledge of subtraction of two-digit numbers with regrouping, foreshadowing subtracting three-digit numbers that involves regrouping tens as ones and hundreds as tens.

How Have students use any strategy to find the difference of 2 two-digit numbers that requires regrouping a ten as ones.

Find each difference.

$86 - 59 = ?$

$92 - 46 = ?$

Solutions

27; 46

Develop Language

Why Develop understanding of the multiple meaning word *left*.

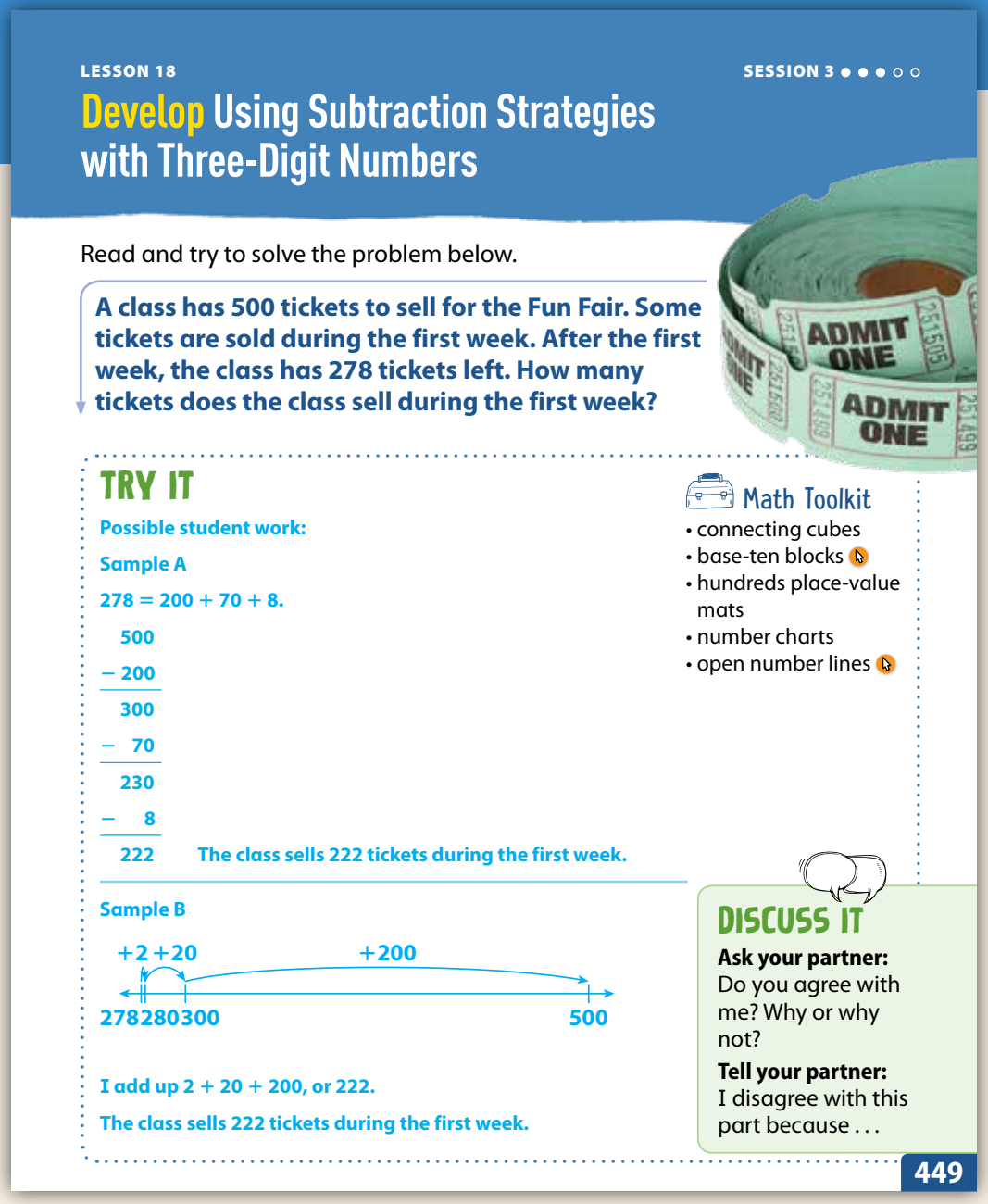
How Explain that the word *left* has more than one meaning. It can refer to a side or a direction. Hold up your left hand. Say: *This is my left hand.* Encourage students to hold up their left hand. Then explain that *left* can also refer to the number of something that remains when a quantity has been taken away. Provide the problem $5 - 2$. Ask students how much is left when 2 is subtracted from 5. Confirm that 3 is left.

TRY IT

Make Sense of the Problem

To support students in making sense of the problem, have them identify that there are 500 tickets to be sold, and that there are 278 tickets left to sell after the first week.

Ask *How many tickets does the class have to sell? How many tickets does the class have left after the first week?*



LESSON 18 SESSION 3 ● ● ● ○ ○

Develop Using Subtraction Strategies with Three-Digit Numbers

Read and try to solve the problem below.

A class has 500 tickets to sell for the Fun Fair. Some tickets are sold during the first week. After the first week, the class has 278 tickets left. How many tickets does the class sell during the first week?

TRY IT

Possible student work:

Sample A

278 = 200 + 70 + 8.

```
  500
− 200
  300
−  70
  230
−   8
  222
```

The class sells 222 tickets during the first week.

Sample B

I add up 2 + 20 + 200, or 222.

The class sells 222 tickets during the first week.

Math Toolkit
- connecting cubes
- base-ten blocks
- hundreds place-value mats
- number charts
- open number lines

DISCUSS IT

Ask your partner: Do you agree with me? Why or why not?

Tell your partner: I disagree with this part because . . .

449

DISCUSS IT

Support Partner Discussion

Encourage students to share what did not work for them as well as what did as they talk to each other. Support as needed with questions such as:

- *What do you know? What are you trying to find out?*
- *How could you solve the problem using a different strategy than the one that either of you chose?*

Common Misconception Look for students who do not change the number of hundreds from 5 to 4 when they regroup 1 hundred as 10 tens, and find a difference of 322 instead of 222.

Select and Sequence Student Solutions

One possible order for whole class discussion:

- using base-ten blocks or quick drawings to model 500 and then moving or crossing out 2 hundreds, 7 tens, and 8 ones
- using a place-value chart to represent 500 and 278 and then subtract ones, tens, and hundreds
- using an open number line that starts at 278 with jumps of 2, 20, and 200 to get to 500
- using addition to subtract by adding 200 to 278, then 20 to 498, and then 2 to 498

Support Whole Class Discussion

Compare and connect the numbers in the problem and how they are shown on student representations of the problem.

Ask *How do both of the models represent 278?*

Listen for 278 is broken apart to subtract 200, then 70, then 8. On the open number line, 278 is the first number labeled.

MODEL ITS

If no student presented these models, connect them to the student models by pointing out the ways they each represent:

- a total of 500
- one addend of 278
- an unknown addend

Ask *How do each of the* Model Its *use the number 278?*

Listen for In the first model It shows 278 being subtracted in three parts from 500. In the second model 278 is the starting number for adding up to 500.

For using repeated subtraction, prompt students to identify why it helps to subtract in parts.

- *Why does it make sense to subtract the hundreds first?*
- *Which subtraction steps are the easiest to do in your head? Why?*

For using addition to subtract, prompt students to describe why it may be easier to add than subtract when finding the solution.

- *Why can you use 278 + ? = 500 to find 500 − ? = 278?*
- *Why is the solution equal to 200 + 20 + 2?*

Explore different ways to understand subtraction strategies for three-digit numbers.

A class has 500 tickets to sell for the Fun Fair. Some tickets are sold during the first week. After the first week, the class has 278 tickets left. How many tickets does the class sell during the first week?

MODEL IT

You can subtract hundreds, tens, and ones.

Think: 278 = **200** + **70** + **8**

$$\begin{array}{r} 500 \\ -\ 200 \\ \hline 300 \\ -\ 70 \\ \hline 230 \\ -\ 8 \\ \hline ? \end{array}$$

MODEL IT

You can use addition to subtract.

500 − ? = 278 is the same as 278 + ? = 500.

Start with 278 and add 200 to get to 478.

Then add 20 to get to 498.

Then add 2 to get to 500.

200 + 20 + 2 = ?

Deepen Understanding

Subtraction Equations

SMP 4 Model with mathematics.

When discussing equations to represent the word problem, prompt students to consider how the addition and subtraction equations are connected.

Ask *Why can you use the equation 278 + ? = 500 to solve this problem? Why is solving the equation 278 + ? = 500 the same as solving 500 − ? = 278?*

Listen for 500 represents the whole. Two parts make up 500: the tickets that were sold on Monday and the tickets that are left. Subtracting the part you know from the whole to find the unknown part is the same as finding the number that can be added to the part you know to get the whole. The difference between 500 and 278 is the same as the number that would be added to 278 to get 500.

Generalize *Could you always use an addition equation to solve a subtraction equation?* Listen for understanding that subtraction or addition can be used to relate the two parts and the whole in any put-together problem. The same numbers are used, but they are related in a different way.

CONNECT IT

- Remind students that one thing that is alike about all the representations is the numbers.
- Explain that on this page they will use subtracting in parts and adding up to find 500 − 278.

Monitor and Confirm

1–3 Check for understanding that:

- 2 hundreds, 7 tens, 8 ones are subtracted from 500
- 500 − 200 = 300
- 300 − 70 = 230
- 230 − 8 = 222
- The sum of the hundreds, tens, and ones used to add on from 278 to 500 is 222

Support Whole Class Discussion

4 Be sure students understand that the problem is asking them to explain how the two models give the same solution in different ways.

Ask *How do the two models lead to the same solution for the problem?*

Listen for The repeated subtraction shows the difference after 278 is subtracted from 500. The addition problem shows the total value of the numbers added on to 278 to get to 500: 2 hundreds + 2 tens + 2 ones = 200 + 20 + 2.

5 REFLECT Have all students focus on the strategies used to solve this problem. If time allows, have students share their preferences with a partner.

CONNECT IT

Now you will use the problem from the previous page to help you understand how to use subtraction strategies for three-digit numbers.

1 Look at the first **Model It** on the previous page.

How many hundreds, tens, and ones were subtracted from 500?

2 hundreds 7 tens 8 ones

2 What is the difference after subtracting 230 − 8?

222

3 Look at the second **Model It** on the previous page.

What is 200 + 20 + 2? 222

4 Why are your answers the same for problems 2 and 3?

Possible answer: The answers are the same because the Model Its use two different strategies to solve the same problem.

5 REFLECT

Look back at your **Try It**, strategies by classmates, and **Model Its**. Which models or strategies do you like best for subtracting three-digit numbers? Explain.

Possible answer: I like subtracting hundreds, then tens, and then ones. I can subtract each part in my head and keep track of how much is being subtracted by writing it in steps.

451

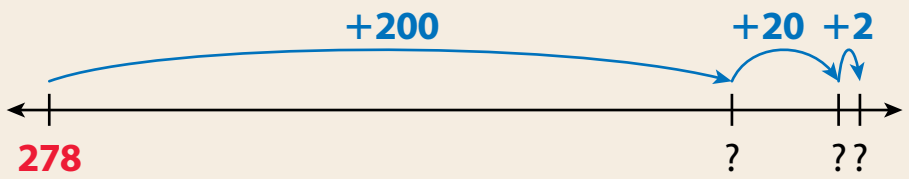
Visual Model

Use a number line for using addition to subtract three-digit numbers.

If . . . *students are unsure about how to use addition to subtract three-digit numbers,*

Then . . . *have them use a number line to show the addition described in the second* Model It.

- Draw a number line. Say: The number line will help you find 278 + ? = 500.



- Ask: *How will you subtract 8 ones?* [By regrouping 1 hundred as 10 tens and then 1 ten as 10 ones.] Have a volunteer complete the second row of the chart to show 4 hundreds, 10 tens, and 0 ones. Have another volunteer complete the third row to show 4 hundreds, 9 tens, and 10 ones.
- Ask: *What is 500 − 278?* Have a volunteer complete the bottom row to show the difference of 222.

APPLY IT

For all problems, encourage students to use a variety of strategies for finding the solution.

6 There are 237 empty seats; Possible work:
463 = 400 + 60 + 3; 700 − 400 = 300;
300 − 60 = 240; 240 − 3 = 237.

I can add up from 463 to 700. 463 + 7 = 470;
470 + 30 = 500; 500 + 200 = 700

200 + 30 + 7 = 237

463 + 237 = 700

7 781; Students could solve the problem by recognizing that ? − 524 = 257 is the same as 257 + 524 = ?, and then show jumps totaling 257 from 524 to 781 on an open number line.

Close: Exit Ticket

8 414; Possible explanation: After I find the difference of 414, I can add it to 395 to see if I get 809. Since this sum is the same as the number that I started with in the subtraction problem, the answer for the subtraction problem is correct.

Students' solutions should indicate understanding of:

- different strategies for subtracting three-digit numbers
- the relationship between subtraction and addition in solving problems

Error Alert **If** students do not understand how to use addition to check their solution to the subtraction problem, **then** have them represent the problem as a subtraction equation, and circle the number being subtracted and the difference. Connect the circled numbers to the addends of the related addition equation, and the sum to the starting number in the subtraction equation.

APPLY IT

Use what you just learned to solve these problems.

6 There are 700 seats. There are people sitting in 463 seats. The rest of the seats are empty. How many seats are empty?

Use two different strategies to solve this problem. Show your work.

Possible student work:
I can subtract hundreds, tens, and ones. 463 = 400 + 60 + 3
700 − 400 = 300; 300 − 60 = 240; 240 − 3 = 237

I can add up from 463 to 700.

463 + 7 = 470; 470 + 30 = 500; 500 + 200 = 700

I added 7 + 30 + 200 which is 237.

So, 463 + 237 = 700.

Solution **There are 237 empty seats.**

7 What is the unknown number in this equation?

? − 524 = 257

781

8 Solve the subtraction problem. Then explain how you would use addition to check your answer.

$$\begin{array}{r} 809 \\ -\ 395 \\ \hline \end{array}$$

414

Possible explanation: If 414 is the correct difference, I will get 809 when I add 414 and 395.
400 + 300 = 700; 10 + 90 = 100; 4 + 5 = 9.

700 + 100 + 9 = 809, so 414 is the correct difference.

Solutions

1. See student page.
Basic

2. 109
Basic

Name: _____ LESSON 18 SESSION 3

Practice Using Subtraction Strategies with Three-Digit Numbers

Study the Example showing one way to subtract three-digit numbers. Then solve problems 1–5.

EXAMPLE

Grant School has 408 students. 146 of the students play an instrument. The rest of the students do not play an instrument. How many students do not play an instrument?

Find 408 − 146.

Look at the tens: 0 tens < 4 tens.

Regroup a hundred in 408 as 10 tens.

$$\begin{array}{rl} 408 \longrightarrow & 300 + 100 + 8 \\ -\ 146 \longrightarrow & 100 + \ \ 40 + 6 \\ \hline & 200 + \ \ 60 + 2 = 262 \end{array}$$

So, 262 students do not play an instrument.

Max scores 372 points in a computer game. Abby scores 481 points in the same game. How many fewer points does Max score than Abby?

1. Find 481 − 372. First regroup 1 ten as 10 ones in 481. Then subtract.

$$\begin{array}{rl} 481 \longrightarrow & 400 + \boxed{70} + \boxed{11} \\ -\ 372 \longrightarrow & 300 + \boxed{70} + \boxed{2} \\ \hline & \boxed{100} + 0 + \boxed{9} \end{array}$$

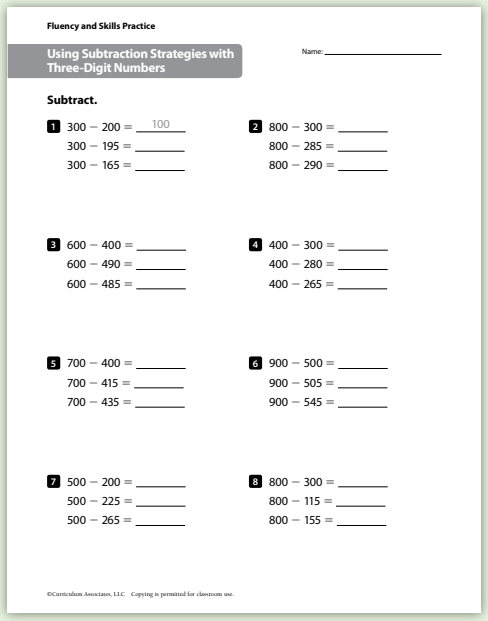
2. How many fewer points does Max score than Abby? 109

Fluency & Skills Practice

Teacher Toolbox

Assign *Using Subtraction Strategies with Three-Digit Numbers*

In this activity students practice subtracting 3 different three-digit numbers from the same multiple of 100. This activity is useful in developing skills of mental math and using place-value strategies to subtract.



Fluency and Skills Practice

Using Subtraction Strategies with Three-Digit Numbers

Name: _____

Subtract.

1. 300 − 200 = 100
300 − 195 = _____
300 − 165 = _____

2. 800 − 300 = _____
800 − 285 = _____
800 − 290 = _____

3. 600 − 400 = _____
600 − 490 = _____
600 − 485 = _____

4. 400 − 300 = _____
400 − 280 = _____
400 − 265 = _____

5. 700 − 400 = _____
700 − 415 = _____
700 − 435 = _____

6. 900 − 500 = _____
900 − 505 = _____
900 − 545 = _____

7. 500 − 200 = _____
500 − 225 = _____
500 − 265 = _____

8. 800 − 300 = _____
800 − 115 = _____
800 − 155 = _____

3 **A, C, D**
Challenge

4 Check students' number lines. Students may use a number line to show jumps of 2, 200, and 4 which total 206, from 398 to 604. Students may show jumps back of 4, 300, 90, and 4 from 604 to 206.
Challenge

5 **D**
Basic

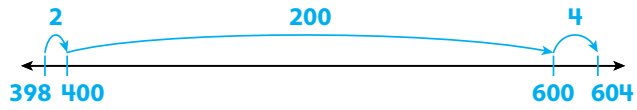
3 Which equations could you use to check if this subtraction equation is correct?

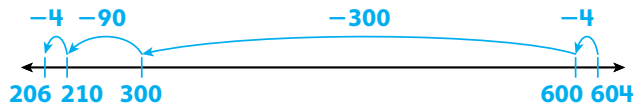
473 − 187 = 286

Ⓐ 286 + 187 = 473
Ⓑ 286 + 286 = 572
Ⓒ 187 + 286 = 473
Ⓓ 473 − 286 = 187
Ⓔ 473 + 286 = 759
Ⓕ 759 − 286 = 473

4 Show two different ways that you could use a number line to find 604 − 398.

Possible answers:





604 − 398 = 206

5 What is 800 − 426?

Ⓐ 484
Ⓑ 474
Ⓒ 384
Ⓓ 374

ELL English Language Learners: Differentiated Instruction

Prepare for Session 4
Use with *Apply It*.

Levels 1–3

Speaking/Reading Have students chorally read ***Apply It*** problem 2. Then instruct them to break apart each addend. Ask:

- *What will you add first? The ones, tens or hundreds?*
- *What happens if you add the tens first?*

Direct students to work with a partner to solve the problem and complete the sentence frame:

There are __847__ *bags of peanuts and walnuts.*

Encourage students to take turns reading their sentence aloud.

Levels 2–4

Reading/Writing Have students chorally read ***Apply It*** problem 2. Instruct students to write the following sentence frames:

- *First, I will* __break apart each addend__.
- *Then I will add* __each place value__ *starting with* __ones__.
- *Next, I will regroup* __17__ *ones as* __1__ *ten and* __7__ *ones.*
- *Last, I will add* __8__ *hundreds +* __4__ *tens +* __7__ *ones.*
- *There are* __847__ *bags of peanuts and walnuts.*

Direct them to work with a partner to complete the sentences by applying what they know. Then encourage them to take turns reading the sentences aloud to each other.

Levels 3–5

Reading/Writing Have students read ***Apply It*** problem 2 with a partner. Instruct students to discuss their ideas and select their own strategy to solve the problem. Tell them to construct a model showing their steps to solve the problem. Then ask them to write sentences explaining their steps using the sequence words *first*, *next*, and *then*. Encourage them to read what they have written to their partners.

LESSON 18

SESSION 4 Refine

Purpose In this session, students use different strategies to add and subtract three-digit numbers, sharing their thinking with a partner, and then working independently.

Start

Connect to Prior Knowledge

Why Support students' knowledge of related addition and subtraction equations, foreshadowing using addition to check subtraction.

How Have students write a related addition equation for a given subtraction equation.

Write a related addition equation for each subtraction equation.

382 − 179 = 203

915 − 578 = 337

Solutions

203 + 179 = 382

578 + 337 = 915

Addends may be in reverse order.

EXAMPLE

Possible answer: The pairs of numbers could be 100 and 200, 150 and 150, and 124 and 176.

Look for Choosing the first three-digit addend will determine the only possible value for the other addend.

APPLY IT

1. Any pair of three-digit numbers totaling 250, correctly related in a subtraction equation, is correct. See Student Worktext page for examples.
DOK 2

   Look for Students recognize that there are many possible combinations of three-digit addends with a sum of 250.

LESSON 18 SESSION 4 ● ● ● ● ○

Refine Using Addition and Subtraction Strategies with Three-Digit Numbers

Complete the Example below. Then solve problems 1–3.

EXAMPLE

Two numbers have a sum of 300. What could the two numbers be? Write addition equations to show three possible pairs of numbers.

You can use any two numbers that have a sum of 300.

100 + 200 = 300
300 = 150 + 150
124 + 176 = 300

Solution Possible answer: The pairs of numbers could be 100 and 200, 150 and 150, and 124 and 176.

APPLY IT

1. Tina has 250 shapes. Some are triangles, and the rest are circles. How many of each shape could Tina have? Complete three different equations to show the number of each shape Tina could have.
Answers will vary. Possible answers:

250 − 125 = 125

250 − 100 = 150

123 = 250 − 127

Solution Tina could have 125 triangles and 125 circles, 100 triangles and 150 circles, or 123 triangles and 127 circles.

How are the missing numbers in each equation related to 250?

455

2. The store has 847 bags of peanuts and walnuts; See Student Worktext page for possible work.
DOK 2

   Look for Students can break apart 328 and 519 into hundreds, tens, and ones and then add the values of each place, regrouping as needed.

3 **A**; Students could write the equation, $436 - 219 = ?$ to find the solution.

Explain why the other two answer choices are not correct:

C is not correct because it represents an incorrect calculation of the sum of 436 and 219. The problem requires finding the difference of the numbers.

D is not correct because it represents the sum of 436 and 219 instead of the difference.
DOK 3

Close: Exit Ticket

Check for Understanding

Have students solve the following problem:

600 tickets were sold for the school play on Friday and Saturday. 315 tickets were sold for Saturday. How many tickets were sold for Friday? [285]

For students who are still struggling, use the table below to guide remediation.

After providing remediation, check students' understanding using the following problem:

Sally collected 348 stamps last year and more stamps this year. She collected a total of 500 stamps. How many stamps did she collect this year? [152]

2 A store has 328 bags of peanuts and 519 bags of walnuts for sale. How many bags of peanuts and walnuts does the store have in all? Show your work.

What are some strategies you could use to solve this problem?

Possible student work:

I need to find 328 + 519.

I will break apart each addend.

328 ⟶ 3 hundreds + 2 tens + 8 ones

+ 519 ⟶ 5 hundreds + 1 ten + 9 ones

8 hundreds + 3 tens + 17 ones =
8 hundreds + 4 tens + 7 ones = 847

Solution **The store has 847 bags of peanuts and walnuts.**

3 Devon builds a toy car with 436 pieces. Gus builds a toy car with 219 fewer pieces than Devon. How many pieces does Gus use?

If Gus's car has fewer pieces than Devon's car, whose car has more pieces?

Ⓐ 217

Ⓑ 227

Ⓒ 645

Ⓓ 655

Nadia chose Ⓑ as an answer. How did Nadia get her answer?

Possible answer: After Nadia regrouped a ten to subtract 9 ones, she should have subtracted 1 ten from 2 tens. She did not change 3 tens to 2 tens when she regrouped the ten.

456

Error Alert

If the error is . . .	*Students may . . .*	*To support understanding . . .*
315	have subtracted 0 from 5 and 0 from 1	Write 600 and have students use 3 different colors to show subtracting 315 in steps: first the 300, then the 10, and then the 5. Have students pause after each step to say how much is left at each step.
385	have miscalculated the number of hundreds while counting up from 315 to 600.	Have students draw an open number line and label 315 and 600 with space between. Ask them how they can make jumps that are easy to add to get from 315 to 600. Monitor their choice of numbers and watch for accuracy in labeling their jumps and finding the sum of the jumps.
915	have added 600 and 315.	Model the problem in a part-part-whole diagram or a number bond. Have students identify which part of the model represents tickets sold only on Friday, only on Saturday, and the total number of tickets sold both days. Ask which operation and strategy they could use to find the difference between the numbers instead of the sum.

Solutions

1 Dave has 175 stamps in his collection. Students should represent the subtraction problem $400 - 225 = ?$ and the addition problem $? + 225 = 400$. See student page for examples of student work.
Medium

2 **B** (No);
C (Yes);
F (No);
G (Yes)
Challenge

Name: _____ LESSON 18 SESSION 4

Practice Addition and Subtraction Strategies with Three-Digit Numbers

1 Tammy has 400 stamps. She has 225 more stamps than Dave has. How many stamps does Dave have?

Solve the problem using addition. Then solve the problem using subtraction. Show your work.

Will your answer be the same whether you use addition or subtraction to solve the problem?

Possible student work:
I can add up from 225 to 400.
225 + 100 = 325
325 + 75 = 400
I added 100 + 75, or 175.

I can subtract 400 − 225.
225 is 200 + 20 + 5.

$$\begin{array}{r} 400 \\ -\ 200 \\ \hline 200 \\ -\ 20 \\ \hline 180 \\ -\ 5 \\ \hline 175 \end{array}$$

Solution Dave has 175 stamps in his collection.

2 Tell if you can use the equations to solve the problem below. Choose *Yes* or *No* for each equation.

How are the numbers in each equation related?

$? - 382 = 417$

	Yes	No
$417 - ? = 382$	Ⓐ	Ⓑ
$382 + 417 = ?$	Ⓒ	Ⓓ
$417 - 382 = ?$	Ⓔ	Ⓕ
$417 + 382 = ?$	Ⓖ	Ⓗ

457

3 Possible explanation: The sum of the correct answer and 354 should equal 700.
Medium

4 Caitlin's answer is correct. Kevin's answer is incorrect. Kevin's answer of 446 added to 354 equals 800. It does not match 700, which was the total being subtracted from. See student page for possible explanations.
Challenge

5 **A**, **C**, **E**, **F**; Possible explanation: Darius chose an equation representing the sum of the two numbers in the problem. The problem asks for an unknown number that is added to 180 for a total of 355 roses.

The remaining answer choice, **D**, is not correct because the unknown number would need to be greater than 355 to give a difference of 180 after subtracting. The total number of roses in the flower store is 355.
Challenge

3 Kevin and Caitlin solve the same subtraction problem. How can you use addition to check their answers?

Kevin	Caitlin
700	700
− 354	− 354
446	346

Possible answer: When I add their answer to 354, the sum should be 700.

What addition problems can you solve to check these answers?

4 In problem 3, whose answer is correct? Whose answer is incorrect? How do you know?

Possible answer: For Kevin's problem, 446 + 354 = 800, so Kevin's answer is incorrect. For Caitlin's problem, 346 + 354 = 700, so Caitlin's answer is correct.

Could both answers be correct?

5 A flower store has 355 roses. There are 180 white roses. The rest are red. Which equations could you use to find how many roses are red?

Ⓐ 355 − ? = 180
Ⓑ 180 + 355 = ?
Ⓒ ? + 180 = 355
Ⓓ ? − 355 = 180
Ⓔ 355 − 180 = ?
Ⓕ 180 + ? = 355

Darius chose Ⓑ as the answer. How did Darius get his answer?

Possible answer: Darius chose an equation that gives a sum of 535. This is incorrect, because the total number of roses is 355.

Is there more than one answer for this problem?

LESSON 18

SESSION 5 Refine

Purpose In this session, students gain fluency with strategies for adding and subtracting three-digit numbers.

Start

Develop Fluency

Why Support students' knowledge of strategies to represent and solve problems involving the addition and subtraction of three-digit numbers.

How Have students solve a word problem by writing an addition equation and a subtraction equation.

Write two equations to solve the problem.

The school cafeteria sells 364 slices of pizza. 193 slices are cheese, and the rest are sausage. How many slices of sausage pizza are sold?

Possible Solutions

171 slices of sausage pizza are sold.

Possible equations:

$364 - 193 = 171$

$193 + 171 = 364$

APPLY IT

1. **D**
   DOK 2

2. **A** (Yes);
   D (No);
   E (Yes);
   G (Yes)
   DOK 2

3. Possible explanation: Juan could add 601 and 289. If he gets 900, his subtraction is correct. If he gets any other number, his subtraction is not correct. $601 + 289 = 890$, so Juan's subtraction is not correct.
   DOK 3

Refine Using Addition and Subtraction Strategies with Three-Digit Numbers

APPLY IT

Solve the problems.

1. Mrs. Cruz takes some money to the store. She spends $235 on a small TV. When she leaves the store, she has $457. How much money does Mrs. Cruz take to the store?

   Ⓐ $212 Ⓑ $222 Ⓒ $682 Ⓓ $692

2. There are 250 adults watching a parade. The rest of the people watching are children. There are 569 people watching the parade in all. How many children are watching the parade?

   Choose *Yes* or *No* to tell if each equation could be used to solve the problem.

	Yes	No
$250 + ? = 569$	Ⓐ	Ⓑ
$250 + 569 = ?$	Ⓒ	Ⓓ
$569 = ? + 250$	Ⓔ	Ⓕ
$569 - 250 = ?$	Ⓖ	Ⓗ

3. Juan solves this subtraction problem. Explain how Juan could use addition to find out if his subtraction is correct.

$$\begin{array}{r} 900 \\ -\ 289 \\ \hline 601 \end{array}$$

Possible explanation: Juan could add 601 and 289. If he gets 900, his subtraction is correct. If he gets any other number, his subtraction is not correct. $601 + 289 = 890$. So, Juan's subtraction is not correct.

Differentiated Instruction

RETEACH

Hands-On Activity

Use base-ten blocks to check subtraction with addition.

Students struggling with checking their subtraction solution with addition

Will benefit from using base-ten blocks to show the relationship between subtraction and addition.

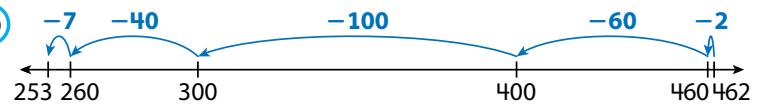
Materials For each student: 4 hundreds flats, 10 tens rods, 10 ones units

- Write *258 − 135 = ?* on the board. Have each student show 258 using blocks. Ask: *How could you show subtracting 135?* [I could take away 1 hundred flat, 3 tens rods, and 5 ones units.] Have students move the base-ten blocks for 135 aside. Ask: *How many cubes are left?* [123]
- Replace the *?* with *123*. Ask: *How will putting the groups back together check that 258 − 135 = 123?* [There should be 258 cubes.] Have students rejoin the groups. Connect rejoining the groups with *123 + 135 = 258*.
- Repeat for other problems such as 368 − 122 and 485 − 272.

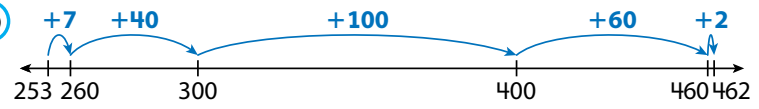
4 Debbie has 253 buttons in a jar. Then she puts more buttons in the jar. Now she has 462 buttons in the jar. How many more buttons does Debbie put in the jar?

Which could you use to solve this problem?

Ⓐ 253 + 462 = ?

Ⓑ 

Ⓒ 253 + ? = 462

Ⓓ 

Ⓔ ? = 462 − 253

Ⓕ ? = 253 + 462

5 In problem 4, Marcus chose Ⓐ as the answer. How did Marcus get his answer?

Possible answer: Marcus added the number of buttons in the jar at the start to the total number of buttons. He should have subtracted the number of buttons at the start from the total number of buttons in the jar.

6 MATH JOURNAL

Choose any number between 701 and 799. Tell how you could subtract your number from 900.

Possible answer: My number is 723. 900 − 723 = ?; I can add up from 723 to subtract: 723 + 7 = 730; 730 + 70 = 800; 800 + 100 = 900. I added on 7 + 70 + 100, or 177. 900 − 723 = 177.

☑ SELF CHECK Go back to the Unit 3 Opener and see what you can check off.

4 **B, C, D, E**
DOK 2

5 Possible explanation: Marcus added the number of buttons in the jar at the start to the total number of buttons. He should have subtracted the number of buttons at the start from the total number of buttons in the jar.
DOK 3

Close: Exit Ticket

6 MATH JOURNAL

Student responses should demonstrate understanding that problems involving three-digit numbers may be solved using a variety of strategies and models representing addition and subtraction.

Error Alert **If** students subtract incorrectly, **then** have them choose a different strategy to solve the same problem.

☑ SELF CHECK Have students consider whether they feel they are ready to check off any new skills on the Unit 3 Opener page.

EXTEND

Challenge Activity

Write addition problems for a given sum.

Students who have achieved proficiency with adding three-digit numbers

Will benefit from deepening understanding of adding three-digit numbers by writing possible addend pairs for a given sum.

Materials For each student: one card from Activity Sheet *Three-Digit Number Cards*

- Give each student a card showing a three-digit number. Make sure each student has a different number.
- Challenge students to write as many addition problems as they can think of for which their number is the sum. Challenge them to include at least one example which shows regrouping in one or more places.
- Have them record the equations and see if they notice any patterns or consistencies. Have them describe what they notice.
- Extend the activity by having students write two related subtraction equations for each of their addition equations.

PERSONALIZE

i-Ready

Provide students with opportunities to work on their personalized instruction path with *i-Ready* Online Instruction to:

- fill prerequisite gaps
- build up grade-level skills