

CCSS Focus



Domain

Number and Operations in Base Ten

Cluster

B. Use place value understanding and properties of operations to add and subtract.

Standards

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

2.NBT.B.9 Explain why addition and subtraction strategies work, using place value and the properties of operations.

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.

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

Lesson Objectives

Content Objectives

- Break apart two-digit numbers into tens and ones as a place-value strategy for adding.
- Recognize that in adding, tens are added to tens and ones to ones.
- Determine when grouping a ten is necessary and carry out the regrouping to find a sum.

Language Objectives

- Record sums by modeling addition with base-ten blocks.
- Draw an open number line to model adding two-digit numbers.
- Make a quick drawing to model adding two-digit numbers.
- Write an addition equation to solve a word problem involving two-digit addition.

Learning Progression

In Grade 1 students explore the concept of place value by bundling groups of ten ones into one group of ten and then use that knowledge to understand teen numbers as 1 ten and some ones. They add two-digit numbers with and without composing a ten and mentally find 10 more or 10 less than a given number.

In Grade 2 students are expected to become fluent in two-digit addition and subtraction. They model two-digit numbers and write them in expanded form. Students fluently count by tens, applying that skill to the counting on strategy for adding numbers.

Prerequisite Skills

- Identify place value in two-digit numbers.
- Model two-digit numbers.
- Fluently add within 20.

Lesson Vocabulary

- **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 ones.

Review the following key term.

- **sum** the result of addition.

Lesson Pacing Guide

Teacher Toolbox 

Whole Class Instruction

SESSION 1

Explore

45–60 min

Adding Two-Digit Numbers

- Start 5 min
- Try It 10 min
- Discuss It 10 min
- Connect It 15 min
- Close 5 min

Additional Practice

Lesson pages 143–144

SESSION 2

Develop

45–60 min

Different Ways to Show Addition

- Start 5 min
- Try It 5 min
- Discuss It 10 min
- Picture It & Model Its 5 min
- Connect It 10 min
- Close 5 min

Additional Practice

Lesson pages 149–150

Fluency

Different Ways to Show Addition

SESSION 3

Develop

45–60 min

More Ways to Show Addition

- Start 5 min
- Try It 5 min
- Discuss It 10 min
- Picture It & Model It 5 min
- Connect It 10 min
- Close 5 min

Additional Practice

Lesson pages 155–156

Fluency

More Ways to Show Addition

SESSION 4

Refine

45–60 min

Adding Two-Digit Numbers

- Start 5 min
- Example 15 min
- Apply It 20 min
- Close 5 min

Additional Practice

Lesson pages 159–160

SESSION 5

Refine

45–60 min

Adding Two-Digit Numbers

- Start 5 min
- Apply It 15 min
- Small Group Differentiation 20 min
- Close 5 min

Lesson Quiz

or **Digital Comprehension Check**

Small Group Differentiation

PREPARE

Ready Prerequisite Lessons

Grade 1

- Lesson 26 Understand 10 More and 10 Less
- Lesson 28 Add Two-Digit and One-Digit Numbers
- Lesson 29 Add Two-Digit Numbers

RETEACH

Tools for Instruction

Grade 1

- Lesson 26 Finding 10 More and 10 Less
- Lesson 28 Add Two-Digit and One-Digit Numbers
- Lesson 29 Two-Digit Addition with Regrouping

Grade 2

- Lesson 6 Two-Digit Addition

REINFORCE

Math Center Activity

Grade 2

- Lesson 6 100 or Not!

EXTEND

Enrichment Activity

Grade 2

- Lesson 6 Ways to Make 83

Lesson Materials

Lesson (Required) *Per student:* base-ten blocks (9 tens rods, 20 ones units)

Activities *Per student:* base-ten blocks (10 tens rods, 15 ones units), 1 counter
Per pair: 60 connecting cubes
Activity Sheet:  Hundred Chart

Math Toolkit base-ten blocks (tens and ones), hundreds place-value mats, 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.



Independent Learning

PERSONALIZE

i-Ready Lessons*

Grade 2

- Add by Breaking Apart Two-Digit Numbers
- Practice: Add by Breaking Apart Two-Digit Numbers
- Add Within 100 on Number Lines, Parts 1 and 2
- Practice: Add Within 100 on Number Lines, Parts 1 and 2

Learning Games

- Hungry Fish
- Cupcake
- Match
- Pizza

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

Add Two-Digit Numbers

LESSON 6

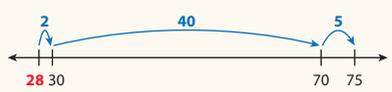
Dear Family,
This week your child is learning to use different strategies to add two-digit numbers.

Here are some ways to find the sum $28 + 47$.

- Use base-ten blocks.
 

2 tens + 8 ones + 4 tens + 7 ones = 6 tens + 15 ones
7 tens + 5 ones, or 75
- Add tens and ones.

$$\begin{array}{r} 28 = 20 + 8 \\ 47 = 40 + 7 \\ \hline 60 + 15 = 75 \end{array}$$
- Go to the next 10. It is easier to add when one number has no ones. To simplify adding, go to the next ten.

$$\begin{array}{r} 28 + 2 = 30 \\ 30 + 40 = 70 \\ 70 + 5 = 75 \\ 28 + 47 = 75 \end{array}$$


Invite your child to share what he or she knows about addition strategies by doing the following activity together.

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Goal

The goal of the Family Letter is to help students learn different strategies to add two-digit numbers. Strategies such as using what they know about base-ten blocks and counting to ten will be useful throughout this lesson.

Activity

Understanding how to add two-digit numbers is an important life skill needed for many daily tasks, such as finding the total cost of two items that each have a two-digit dollar price. Look at the *Addition Strategies* activity and adjust it to connect with students.

ACTIVITY ADDITION STRATEGIES

Do this activity with your child to explore adding two-digit numbers.

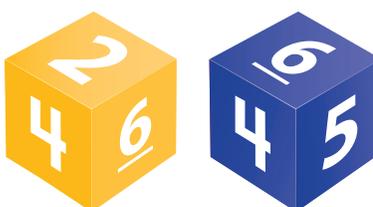
Materials 2 number cubes, pencil, and paper

Explain to your child that the point of the game is to get a sum greater than 75.

- Have your child roll two number cubes.
- Ask your child to form a two-digit number from the number cubes (For example, if you roll a 2 and a 6, you can make 26 or 62.) Write the number down.
- Ask your child to add 25 to the number, using one of the addition strategies shown on the other side of this paper.
- If the sum is greater than 75, then he or she wins the round. Repeat the game three more times.

During the game, ask your child questions such as:

- Does it matter which number you make with the two number cubes? Will you get the same sum either way?
- How can you pick the numbers to make sure your sum is as great as possible?
- What happens to my two-digit number if I use the greater digit in the tens place? In the ones place?



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Math Talk at Home

Encourage students to discuss with family members the strategies they use to add two-digit numbers. Encourage students to find objects at home that they can use to add two-digit numbers.

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

Encourage students to discuss with family members the steps they take to add two-digit numbers and verify the correct answer.

- When I add two-digit numbers, I usually _____.
- Another way I add two-digit numbers is by _____.
- I can check my answer by _____.

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 think about household items their family currently recycles or could start to recycle. What are those items? What are some of the advantages of recycling household items? If there is a recycling initiative at school, incorporate it into the discussion. Encourage students to think of a scenario where there is a set number of items stored away for recycling. When would more be added? How many items could be added? Then have students craft a word problem tied to that scenario. This problem can be solved by the class throughout the session.

Session 2 Use with *Try It*.

- Ask students to think of a time when they did something independently that they enjoyed at home. What was it? How much time did they dedicate to it each time? Have students think of how many minutes they spent doing that task over the course of two days. Based on responses, encourage students to create a word problem similar to the one in *Try It*.

Session 3 Use with *Try It*.

- Have students think of a time when they traveled with a large group, such as a school field trip. What did they travel in? Was it a bus, large van, train, airplane, or boat? How many people were able to fit? Encourage students to create their own problem based on their experiences, by combining their answer with one from another classmate.

Connect to Language Development

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



English Language Learners:
Differentiated Instruction

Prepare for Session 1
Use with *Try It*.

Levels 1–3

Listening/Speaking Read the *Try It* problem. With partners, have students discuss what they have learned about two-digit numbers and the relationship of these numbers to tens and ones. Students can use these sentence starters:

The number 15 means _____.

The number 27 means _____.

Provide students with base-ten blocks to make connections as needed.

With partners, have students think aloud their steps to solve the problem by using the sentence starters:

First I _____.

Then I _____.

Levels 2–4

Reading/Writing Choral read the *Try It* problem. Have students draw a representation of the numbers 27 and 15. They can choose to draw tens and ones, to use an open number line, or to use another strategy.

Then have students write their steps for solving the problem using the sentence frames: *My first step is _____.* *My next step is _____.* *Then I _____.*

Once complete, have students read aloud their written work with their partner. Then have them show their work using an equation, a drawing, an open number line, or another strategy.

Levels 3–5

Speaking/Writing Have students read the *Try It* problem with their partner. Have partners think of how they can solve it using what they already know about adding tens and one-digit numbers. Have each student write step-by-step instructions explaining how they plan to solve the problem. Provide sentence frames: *When adding a two-digit number, I can _____.* *The numbers in the problem can be separated into _____.* *My first step will be _____.* *Then, my second step will be _____.* When complete, have them share their step-by-step instructions with their partners. Have partners give feedback to each other by using this sentence starter: *I think your instructions are complete/incomplete because _____.*

Purpose In this session, students draw on their knowledge of place value and adding one-digit numbers to add two-digit numbers. They examine a model of two-digit numbers and explore strategies to add those numbers. They look ahead to adding two-digit numbers using base-ten blocks, going to the next ten, and adding tens and then ones.

Start

Connect to Prior Knowledge

Materials For each student: base-ten blocks (9 tens rods, 9 ones units)

Why Prepare students to add two-digit numbers by combining tens and ones to add.

How Model and solve a two-digit addition problem without regrouping.

Show 57.
57 is tens and ones.

Show 32.
32 is tens and ones.

$57 + 32 =$ tens and ones
=

Solutions
5 tens 7 ones
3 tens 2 ones
8 tens 9 ones
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Look for Students combine tens and ones to add.

TRY IT

Make Sense of the Problem

Present the problem and guide students as needed to understand that 27 is the number of cans at the start and 15 is the change in the number of cans.

Students may want to use base-ten blocks (tens and ones), connecting cubes, number bonds, bar models, or open number lines.

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:

- two groups being joined to form a larger group
- regrouping 10 ones as 1 ten
- making a ten to add

Explore Adding Two-Digit Numbers

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

**One day, Jack finds 27 cans to recycle.
The next day, he finds 15 cans to recycle.
How many cans does Jack find altogether?**

Learning Target

- Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
- SMP 1, 2, 3, 4, 5, 6, 7

TRY IT

Possible student work:

Sample A

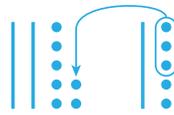
15 is 10 and 5.

$27 + 10 = 37$

$37 + 5 = 42$

Jack finds 42 cans.

Sample B



$27 + 3 = 30$

$30 + 12 = 42$

Jack finds 42 cans.

Math Toolkit

- base-ten blocks
- open number lines
- tens place-value mats



DISCUSS IT

Ask your partner:
Why did you choose that strategy?

Tell your partner:
I started by ...

Common Misconception Look for students who say that adding $2 + 7 + 1 + 5$ will give the total because those are the digits in the numbers. When students present solutions, have them specify the value of the tens and ones in each group.

Select and Sequence Student Solutions

One possible order for whole class discussion:

- visual models for 27 and 15 using base-ten blocks
- visual models for 27 and 15 using a quick draw model
- 27 and 15 written in expanded form with the tens and ones regrouped
- 27 and 15 decomposed to make a ten to add

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 models show the addition?

Listen for Both show a group of 27 and a group of 15 or the numbers 27 and 15 broken into parts. 42 is shown as 3 tens and 12 ones, $30 + 12$, $27 + 3 + 10 + 2$, or $37 + 5$.

CONNECT IT

1 LOOK BACK

Look for understanding of decomposing numbers to add.



Hands-On Activity

Use connecting cubes to add two-digit numbers.

If . . . students are unsure about the concept of adding two-digit numbers with regrouping,

Then . . . use this activity to have them model two-digit addition with connecting cubes.

Materials For each pair: 60 connecting cubes

- Tell students they are going to use connecting cubes to find $27 + 15$.
- One partner counts 27 cubes and locks together groups of 10. The other partner counts 15 cubes and locks together one group of 10.
- Ask students to combine the groups of ten, to make a new 10 if they have enough cubes to do so, and then count the tens and ones and name the total. [42]
- Repeat with other sums, such as $17 + 15$ and $37 + 15$.

2 LOOK AHEAD

Point out that the models shown on the Student Worktext page are all ways of representing the same addition problem. Students should recognize that using base-ten blocks, going to the next ten, and adding tens and then ones are all strategies for adding two-digit numbers.

Ask How is 30 shown in each method?

Listen for 30 is shown as 3 tens, the sum of $27 + 3$, and the sum of $20 + 10$.

Ask Which of the models helps you add in your head?

Listen for Different students will find different strategies helpful. Some will be more comfortable adding tens and then adding ones and combining the two results. Others will prefer counting to the next ten.

CONNECT IT

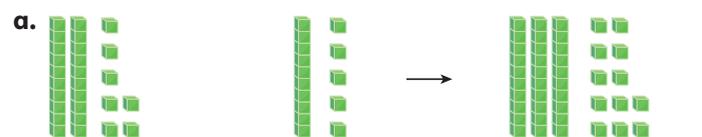
1 LOOK BACK

How many cans does Jack find altogether? 42

2 LOOK AHEAD

Here are some ways to find $27 + 15$.

Use base-ten blocks.

a. 

2 tens and 7 ones 1 ten and 5 ones 3 tens and 12 ones

Go to the next ten.

b. $27 + 3 = \underline{30}$
 $30 + 10 = \underline{40}$
 $40 + 2 = \underline{42}$

Add tens, then ones.

c.
$$\begin{array}{r} 20 \quad 7 \\ + 10 \quad + 5 \\ \hline \end{array}$$

$$\underline{30} + \underline{12} = 42$$

3 REFLECT

Why is adding 3, 10, and 2 the same as adding 15?

Possible answer: $3 + 10 + 2 = 15$, so you are adding 15 but

in different parts.

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Close: Exit Ticket

3 REFLECT

Look for understanding that a number can be broken into parts without changing the total value of the number. Student responses should include adding $3 + 10 + 2$ to show that the sum is 15, and drawing the conclusion that adding parts with the total value of 15 is the same as adding 15.

Common Misconception If students are unclear in their explanations that adding a number in 3 parts is the same as adding the number all at once, then have students use counters to show that $3 + 10 = 13$ and that $13 + 2 = 15$.



Real-World Connection

Encourage students to think about everyday places or situations where people might need to add two-digit numbers. Have volunteers share their ideas. Examples: number of students in two different classes, number of cans and bottles in a recycling drive, number of trading cards in two friends' collections.

Solutions

Support Vocabulary Development

1 Ask students to circle the *group* in the word *regroup*. Share with students that *group* can mean to put together. Ask students to think of examples where objects or people were grouped together. Explain that a *group* is made up of smaller units, or *parts*. Use student responses to scaffold possible answers for the boxes in the graphic organizer. Have students underline the prefix *re-* in the word *regroup*. Tell students to practice saying the prefix *re-*. Explain that a prefix changes the meaning of a word. The prefix *re-* means “again” or “once more.” Encourage students to think of other words with the prefix *re-* such as *reread*, *remake*, *reorganize*, and *resend*.

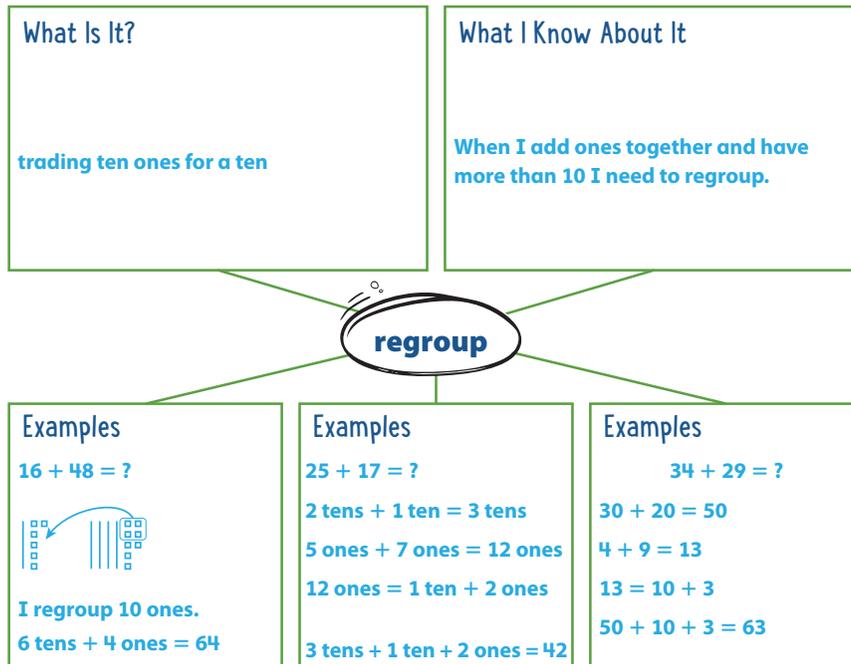
2 Ask students to use the words *equal to* to state their answers. [Possible answer: 6 plus 10 plus 5 is equal to 21.]

Supplemental Math Vocabulary

- *equation*
- *solution*

Prepare for Adding Two-Digit Numbers

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



- 2 Why is adding 6, 10, and 5 to a number the same as adding 21 to that number?
Possible answer: $6 + 10 + 5 = 21$, so you are still adding 21 but are adding it in parts.

3 Assign problem 3 to provide another look at subtracting in word problems.

This problem is very similar to the problem about recycling cans. In both problems, children are given a word problem where they must add to solve. This question asks how many pennies Nabila has now.

Students may want to use counters, paper clips, or 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: Nabila has 55 pennies now.

Medium

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

3 Solve the problem. Show your work.

Nabila has 38 pennies. Her friend Manny gives her 17 pennies. How many pennies does Nabila have now?

Possible student work using equations:

17 is 10 and 7.
 $38 + 10 = 48$
 $48 + 7 = 55$

Solution Nabila has 55 pennies now.

4 Check your answer. Show your work.

Possible student work:



$38 + 2 = 40$
 $40 + 15 = 55$



ELL English Language Learners: Differentiated Instruction Prepare for Session 2 Use with *Apply It*.

Levels 1–3

Speaking/Writing Choral read *Apply It* problem 6. Create an anchor chart showing the use of *base-ten blocks*, *add tens* and *add ones*, and *going to the next ten*.

Have partners choose a strategy to use to solve problem 6. With their partners have students name the steps they will use to solve it using these words: *first*, *then*, and *finally*. Have students show their work by sketching or writing equations. Then have students label each step as *step one*, *step two*, *step three*. When completed, have students share their work with their partners.

Levels 2–4

Speaking/Writing Choral read *Apply It* problem 6. Create an anchor chart showing the use of *base-ten blocks*, *add tens* and *add ones*, and *going to the next ten*.

Put students in pairs. Have each partner select a different strategy to use in order to solve the problem. Each partner will then show the other how to use the chosen strategy to add two-digit numbers. Tell students to write their steps in an organized way as on the anchor chart. When completed, have students take turns presenting their work to their partners using these sentence frames: *My strategy was _____ because _____.* *My first step was _____.* *My next step _____.* *My last step _____.*

Levels 3–5

Speaking/Writing Read *Apply It* problem 6. Have students ask at least four other classmates which strategy they think is the most challenging to use. Based on responses, have students work with their partner to solve the problem using the strategy considered the most challenging. Have partners create an anchor chart on a sheet of paper. Remind them that the anchor chart must have a title, a sketch of the problem, and labels for each step. When complete, partners will reflect on why the strategy is challenging, and what they can do to practice it so it becomes easier to use. Have students share their anchor chart and reflections with another pair.

Purpose In this session, students break apart addends to solve an addition problem involving regrouping. The purpose of this problem is to have students use their knowledge of place value to develop strategies for adding.

Start

Connect to Prior Knowledge

Why Support students' knowledge of breaking a two-digit number into tens and ones, foreshadowing adding two-digit numbers by adding tens and then ones.

How Have students identify the number of tens and ones in two-digit numbers.

How many tens and ones are in each number?

39 is tens and ones.

52 is tens and ones.

74 is tens and ones.

Solutions

3 tens, 9 ones

5 tens, 2 ones

7 tens, 4 ones

Develop Language

Why Clarify the use of *before* and *after* as they relate to time.

How Have students circle the words *before* and *after*. Explain that the word *before* tells when Maria read: She read for 38 minutes *first*, and then she had lunch. The word *after* also tells when Maria read: She had lunch first, *and then* she read another 45 minutes.

TRY IT

Make Sense of the Problem

To support students in making sense of the problem, have them identify the number of minutes Maria reads before and after lunch.

Develop Different Ways to Show Addition

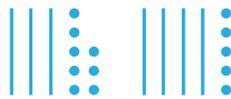
Read and try to solve the problem below.

Before lunch, Maria reads for 38 minutes. After lunch, she reads for 45 minutes. How many total minutes does Maria read?

TRY IT

Possible student work:

Sample A



$$38 + 2 = 40$$

$$40 + 43 = 83$$

83 minutes

Sample B

$$3 \text{ tens} + 4 \text{ tens} = 7 \text{ tens}$$

$$8 \text{ ones} + 5 \text{ ones} = 13 \text{ ones}$$

$$7 \text{ tens} + 13 \text{ ones} = 8 \text{ tens and } 3 \text{ ones}$$

Maria reads for 83 minutes.



Math Toolkit

- base-ten blocks
- open number lines



DISCUSS IT

Ask your partner:
How did you get started?

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

DISCUSS IT

Support Partner Discussion

Encourage students to explain the steps they used to find the sum.

Support as needed with questions such as:

- *Did you draw a diagram or make a sketch to model the problem? Why or why not?*
- *How did you convince your partner that your solution made sense?*

Common Misconception Look for students who understand the value of multi-digit numbers but do not connect the numbers with place value. Such students will be able to count out the correct number of objects to represent 38, but may write the expanded form as $3 + 8$ or state the value as 3 and 8. When students present solutions, have them specify the tens and ones.

Select and Sequence Student Solutions

One possible order for whole class discussion:

- visual models for 38 and 45 grouped into tens and ones using base-ten blocks or quick drawings
- 38 and 45 written in expanded form with the tens and ones added
- using a make a ten strategy to find $38 + 45$

Support Whole Class Discussion

Compare and connect the different representations and prompt students to identify how they are related.

Ask How does each model show 38?

Listen for Students should recognize that accurate representations include decomposing 38 and 45 to add. For example: 38 can be shown as 3 tens and 8 ones or $30 + 8$, and 45 can be shown as 4 tens and 5 ones, $40 + 5$, or $2 + 40 + 3$.

PICTURE IT & MODEL ITS

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

- adding tens and ones
- regrouping ten or more ones into tens and ones
- making a ten to add

Ask How can you tell when you can regroup to add?

Listen for You can regroup to add when there are 10 or more ones.

For the base-ten blocks model, prompt students to identify how the numbers are represented using tens and ones.

- Is 7 tens and 13 ones the same as 3 tens and 8 ones plus 4 tens and 5 ones? How do you know?
- Would it make sense to write the sum of 7 tens and 13 ones as (write on the board) 713? Explain.

For adding tens and ones, prompt students to identify how place value is used to show the sum.

- How are 38 and 45 broken apart into tens and ones? What is the sum of the tens? Of the ones?
- How is the sum shown here like the sum shown in Picture It? How is it different?

For going to the next ten, prompt students to identify how the 45 is decomposed.

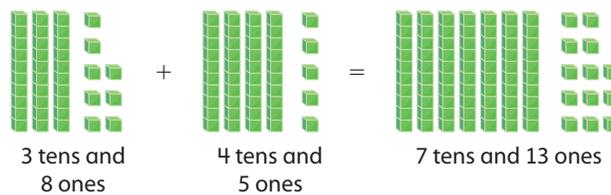
- Is $2 + 40 + 3$ the same as 45? How do you know?
- Can you find a different way to break up 45?

Explore different ways to understand and show adding two-digit numbers.

Before lunch, Maria reads for 38 minutes. After lunch, she reads for 45 minutes. How many total minutes does Maria read?

PICTURE IT

You can use base-ten blocks.



MODEL IT

You can add tens and add ones.

$$\begin{aligned} 38 &= 30 + 8 \\ 45 &= 40 + 5 \\ 70 + 13 & \end{aligned}$$

MODEL IT

You can go to the next ten.

$$\begin{aligned} 38 + 2 &= 40 \\ 40 + 40 &= 80 \\ 80 + 3 &= ? \end{aligned}$$



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Deepen Understanding Adding Two-Digit Numbers

SMP 5 Use appropriate tools strategically.

When discussing the models, prompt students to recognize that there are multiple ways to solve a problem, and that choosing the appropriate visual model as a tool can be helpful as a way to arrive at the correct solution.

Ask Why are base-ten blocks a good model to use for adding two-digit numbers?

Listen for Students should recognize that the tens are already grouped when they use base-ten blocks. When using connecting cubes, beans, or other counters, the tens have to be grouped first to be counted.

Draw the table to the right on the board.

| Tens | Ones |
|------|------|
| 3 | 8 |
| 4 | 5 |

Ask How can a place-value chart help you add two-digit numbers?

Listen for It shows the values of the digits as tens and ones.

Exposing students to a variety of models reinforces the concept of the place-value structure found in our base-ten systems.

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 one of those representations to understand how to add two-digit numbers when regrouping is necessary.

Monitor and Confirm

- 1 – 3 Check for understanding that:
- the total is represented as the sum without regrouping
 - 13 can be represented as tens and ones and in expanded form
 - the total can be expressed in expanded form and as a two-digit number

Support Whole Class Discussion

- 4 Be sure students understand that the problem is asking them what strategy they would use to add two-digit numbers.

Ask *What mental strategy could you use to add? What steps are involved?*

Listen for Students should describe how they think in terms of tens and ones. That could include the possible answer on the Student Worktext page, or could be a description of going to the next ten.

- 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 add tens and ones.

- 1 Look at **Picture It** on the previous page. What is the total number of tens and ones?

...7... tens + ...13... ones

- 2 How many tens and ones are in 13?

13 = ...1... ten and ...3... ones, or ...10... + 3.

- 3 Add both tens. Then add the ones.

$$70 + 10 + 3 = \dots 80 \dots + \dots 3 \dots$$

$$= \dots 83 \dots$$

- 4 Explain how you would add $38 + 45$.

Possible answer: Add the tens. $30 + 40 = 70$. Add the ones. $8 + 5 = 13$. Make tens and ones for 13. $10 + 3$. Add tens, then ones. $70 + 10 + 3 = 83$.

- 5 **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 showing addition? Explain.

Possible answer: Base-ten blocks already show tens. Then the ones can be easily regrouped into tens to count up all of the tens and ones in the sum.

**Hands-On Activity**

Use base-ten blocks to model adding tens and ones.

If . . . students are unsure about the idea of combining tens and more than 10 ones,

Then . . . have them use base-ten blocks.

Materials For each pair: base-ten blocks (9 tens rods, 18 ones units)

- Write the problem $25 + 37$ on the board. Have students work together to represent the numbers with base-ten blocks.
- Have students identify the larger group of ones and determine how many they should take from the smaller group to form a ten. One student should trade the ten ones for a ten rod.
- Instruct students to count the tens and ones to find the sum.
- Repeat the process with other problems: $46 + 46$, $17 + 59$, $65 + 28$.
- Discuss how knowing number pairs to ten helps when you need to regroup.

APPLY IT

For all problems, encourage students to use the strategy with which they are most comfortable. Suggest they draw some kind of model or use words or equations to support their thinking.

6 54 pens and pencils in all; Students might find that $1 \text{ ten} + 3 \text{ tens} = 4 \text{ tens}$, $7 + 7 = 14$, $14 = 1 \text{ ten and } 4 \text{ ones}$, and $5 \text{ tens and } 4 \text{ ones} = 54$. They also may use base-ten blocks to represent each number and then find the total number of tens and ones in both groups of blocks.

7 Students' explanations should include adding 4 to 36 to get to the next ten, 40, taking 4 away from 18 to get 14, and then finding $40 + 14 = 54$.

Close: Exit Ticket

8 C; Students could use place-value blocks, add tens and then ones, or go to the next ten to find $67 + 19$.

Students' solution should indicate understanding of:

- breaking apart numbers into tens and ones
- combining the tens and ones in two addends to find the total
- recognizing when a number of ones can be regrouped as a ten and ones

Error Alert If students choose **A**, then they have probably combined tens and ones correctly (7 tens and 16 ones), but have not regrouped the 16 ones as 1 ten and 6 ones. Provide additional practice with representing two-digit addends using base-ten blocks and then regrouping the ones as tens to find the total; for instance, $56 + 28 = ?$ [84], $37 + 19 = ?$ [56], and $17 \text{ and } 47 = ?$ [64].

APPLY IT

Use what you just learned to solve these problems.

- 6** Mr. Dane has 17 pens and 37 pencils. How many pens and pencils does he have in all? Show your work.

Possible answer:

$$1 \text{ ten} + 3 \text{ tens} = 4 \text{ tens}$$

$$7 + 7 = 14 \text{ ones}$$

5 tens and 4 ones are 54.

Solution 54 pens and pencils in all

- 7** Explain how to go to the next ten to add $36 + 18$. Show your work.

Possible student work:

Add 4 to 36 to get 40. Take 4 away from 18 to get 14.

Then add 40 and 14 to get 54.

- 8** What is the sum of 67 and 19?

(A) 76

(B) 79

(C) 86

(D) 89

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Solutions

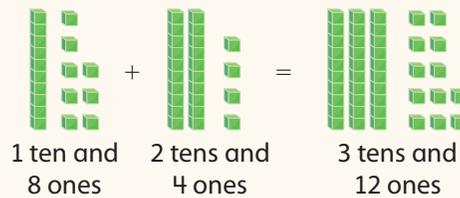
- 1 2 tens 9 ones, 1 ten 5 ones, 3 tens 14 ones
Medium
- 2 1 ten, 4 ones, 4
Basic
- 3 $40 + 4$, or 44; 44 rocks
Basic

Practice Different Ways to Show Addition

Study the Example showing how to use base-ten blocks to add two-digit numbers. Then solve problems 1–7.

EXAMPLE

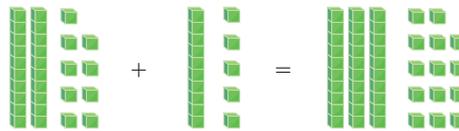
Find $18 + 24$.



$$\begin{aligned} 3 \text{ tens } 12 \text{ ones} &= 30 + 10 + 2 \\ &= 40 + 2 \\ &= 42 \end{aligned}$$

Max has 29 rocks. Then he finds 15 more rocks.

- 1 Write the tens and ones. Then add the tens and ones.



$$\underline{2} \text{ tens } \underline{9} \text{ ones} + \underline{1} \text{ ten } \underline{5} \text{ ones} = \underline{3} \text{ tens } \underline{14} \text{ ones}$$

- 2 How many tens and ones are in 14?

$$14 = \underline{1} \text{ ten and } \underline{4} \text{ ones, or } 10 + \underline{4}$$

- 3 Add the tens. Then add the ones.

$$30 + 10 + 4 = \underline{40} + \underline{4}, \text{ or } \underline{44}$$

Max has 44 rocks.

Fluency & Skills Practice

Teacher Toolbox

Assign Different Ways to Show Addition

In this activity students practice different ways to show addition by finding both sums and missing addends. Practicing this skill will help students understand how numbers can be broken apart, regrouped, and reassembled in ways that simplify the addition process.

Fluency and Skills Practice

Different Ways to Show Addition Name: _____

Find the sums and missing addends.

| | |
|--|----------------------------------|
| 1 $30 + 7 + 50 + 3 = \underline{90}$ | 2 $37 + 53 = \underline{\quad}$ |
| 3 $20 + 8 + 40 + 2 = \underline{\quad}$ | 4 $28 + 42 = \underline{\quad}$ |
| 5 $60 + 6 + 10 + 4 = \underline{\quad}$ | 6 $66 + 14 = \underline{\quad}$ |
| 7 $40 + 5 + 40 + 5 = \underline{\quad}$ | 8 $45 + \underline{\quad} = 90$ |
| 9 $30 + 9 + 20 + 1 = \underline{\quad}$ | 10 $\underline{\quad} + 21 = 60$ |
| 11 $20 + 4 + 60 + 6 = \underline{\quad}$ | 12 $24 + \underline{\quad} = 90$ |
| 13 $40 + 3 + 30 + 7 = \underline{\quad}$ | 14 $\underline{\quad} + 37 = 80$ |

15 How does the information in problem 9 help you solve problem 10?

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4 7, 10 + 4

Basic

5 41 pens; Add the tens, then add the ones, and then add the tens and ones.

Medium

6 52 girls; Break 16 into 4, 10, and 2. Add 4 to 36 to make the next ten, add 10 to that total to find 50, and then add the 2 to 50.

Medium

7 55 red shirts; Add the tens (30 + 10), add the ones (6 + 9), and then add the tens and ones (40 + 15).

Medium

Ms. Kottler has 27 black pens and 14 blue pens.

4 Write the tens and ones.

$$27 = 20 + \underline{7}$$

$$14 = \underline{10} + \underline{4}$$

5 Add the tens, then add the ones from problem 4. How many pens does Ms. Kottler have in all? Show your work.

$$\begin{aligned} \text{Possible work: } 20 + 10 + 7 + 4 &= 30 + 11 \\ &= 41 \end{aligned}$$

.....41.....pens

There are 36 girls with red shirts. There are 19 boys with red shirts. There are 16 girls with blue shirts.

6 How many girls are there? Show your work.

$$\begin{aligned} \text{Possible work: } 36 + 16 &= 30 + 6 + 10 + 6 \\ &= 40 + 12 \\ &= 52 \end{aligned}$$

.....52.....girls

7 How many children have red shirts? Show your work.

$$\begin{aligned} \text{Possible work: } 30 + 6 + 10 + 9 &= 40 + 15 \\ &= 55 \end{aligned}$$

.....55.....red shirts

ELL English Language Learners: Differentiated Instruction Prepare for Session 3 Use with *Apply It*.

Levels 1–3

Listening/Speaking Choral read *Apply It* problem 8. Refer to the anchor chart from Session 1, showing strategies such as *making a ten*.

Help students summarize the steps to *make a ten* as shown in the anchor chart. Then have partners take turns listing the steps to solve $17 + 48$ using the *make a ten* strategy. Have students use these sentence frames:

I _____ to _____ make a ten.

I _____ from _____.

I add _____ plus _____.

Once complete, have students work together to answer problem 8 using the steps they have discussed with their partner.

Levels 2–4

Writing/Reading Choral read *Apply It* problem 8. Refer to the anchor chart from the Session 1 showing strategies such as *making a ten*.

With a partner, have students summarize the steps to *make a ten* as shown in the anchor chart. Then have partners write the steps to solve $17 + 48$ using the *make a ten* strategy. Students' written work should include sequence words (*first, then, next*) to show their steps.

When complete, have students read their work aloud to their partner. Then have students write an answer to problem 8.

Levels 3–5

Speaking/Writing Have students read *Apply It* problem 8 with partners. Ask students to discuss these questions with their partner: *Based on the information in the problem, what strategy do you think was used? Why do you think that?*

Based on their responses, have students prove their opinion by working through the problem using the strategy they identified. Once completed, have students explain their findings to their partner using one of these sentence frames:

I was right. The strategy used was _____ because _____.

I now know this was not the correct strategy because _____.

Purpose In this session, students solve addition problem involving regrouping. They revisit this problem, using open number line and quick-draw models to solve it. The purpose of this problem is to have students explore different ways to solve a two-digit addition problem.

Start

Connect to Prior Knowledge

Why Support students' knowledge of making a ten with two-digit numbers by using an open number line, foreshadowing using an open number line to add two-digit numbers.

How Have students draw and label jumps on an open number line to find the unknown number needed to get to the next ten.

Use an open number line to solve each equation.

| | |
|---------------|---------------|
| $58 + ? = 60$ | $26 + ? = 30$ |
| $13 + ? = 20$ | $71 + ? = 80$ |

Possible Solutions

- $58 + 2 = 60$
- $13 + 7 = 20$
- $26 + 4 = 30$
- $71 + 9 = 80$

Look for Number lines should show jumps of 2, 7, 4, and 9.

Develop Language

Why Clarify the meaning of the word *altogether*.

How Draw students' attention to the word *altogether* in **Apply It** problem 6. Explain that the word *altogether* refers, not to any single number in a problem, but to all numbers added up. Ask: *Does altogether refer to the number 39?* [No] *Does it refer to the number 28?* [No]. Ask: *What does it refer to?* [Students may answer $39 + 28$ or 67]

TRY IT

Make Sense of the Problem

To support students in making sense of the problem, have them identify the number of students that are on Bus A and the number of students on Bus B.

Ask *What are you trying to find out?*

Develop More Ways to Show Addition

Read and try to solve the problem below.

There are 48 students on Bus A and 43 students on Bus B. How many students are on both buses?

TRY IT

Possible student work:

Sample A

First, add $40 + 40$ to get 80.
Add $8 + 3$ to get 11. Then add $80 + 11$ to get 91.

Sample B



8 tens and 11 ones is 9 tens and 1 one.

There are 91 students on both buses.

Math Toolkit

- base-ten blocks
- open number lines
- tens place-value mats



DISCUSS IT

Ask your partner: Do you agree with me? Why or why not?
Tell your partner: A model I used was... It helped me because...

DISCUSS IT

Support Partner Discussion

Encourage students to use the terms *tens* and *ones* as they discuss their solutions. Support as needed with questions such as:

- *Why did you solve the problem that way?*
- *What did you notice about your partner's strategy that is different from yours?*

Common Misconception Look for students who make a ten and find $48 + 2$, but then add 50 and 43 and get a total of 93. When students present, have them specify how they determined what number to add to 50.

Select and Sequence Student Solutions

One possible order for whole class discussion:

- physical models or drawings of the tens and ones in 48 and 43 to show regrouping
- equations decomposing 48 and 43 in order to combine tens and ones
- number bond models decomposing 48 and 43 into tens and ones
- making a ten to add $48 + 43$

Support Whole Class Discussion

Compare and connect the different representations and have students identify how they are related.

Ask How do all the models show 48 and 43?

Listen for Students should recognize that accurate representations include decomposing the numbers to add; for example: 4 tens and 8 ones + 4 tens and 3 ones or $40 + 40 + 8 + 3$. Some students may decompose 43 to go to the next ten to add.

Ask How does each model show adding to find the total?

Listen for Adding the ones results in a number that is greater than 10 ones, so it can be regrouped. You can make a ten to add.

PICTURE IT & MODEL IT

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

- the addends, 48 and 43
- a strategy to make adding easier

For a quick drawing, prompt students to identify how the drawing shows regrouping.

- How is the second group of quick drawings different from the first group?
- What does the second group show?

For an open number line model, prompt students to identify how the jumps show that 43 is being added to 48.

- What number do you start with?
- What does the first jump show? The second jump? The third jump?

Explore more ways to understand and show addition.

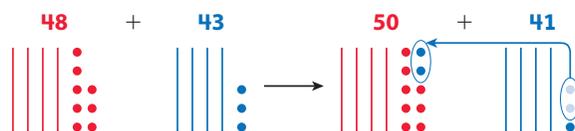
There are 48 students on Bus A and 43 students on Bus B. How many students are on both buses?

PICTURE IT

You can use a quick drawing.

Show each number with a quick drawing.

It is easier to add when one number has no ones. So, **regroup** to make a ten.



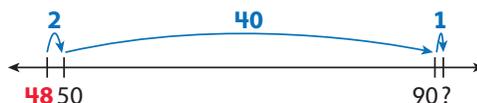
MODEL IT

You can use an open number line.

Start with **48**. Add **2** to go to the next ten.

To add **40**, count on by tens from 50: 60, 70, 80, 90.

Then add **1** more.



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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 model adding two-digit numbers.

Ask Why is 48 the first number labeled on the number line? How does the number line show that you are making a ten first in order to add? What do all of the jumps show?

Listen for The start of the problem is 48, so that is where you start on the number line. You jump 2 to make a ten and find $48 + 2 = 50$. The second jump shows $50 + 40 = 90$, and the third jump shows $90 + 1 = 91$. All of the jumps show that you are adding 43 because the jumps of 2, 40, and 1 add to 43.

Generalize How could you use a number line to add any 2 two-digit numbers? Have students explain their thinking. Listen for understanding that when adding any 2 two-digit numbers, the problem can be represented on a number line by labeling one of the addends and then showing jumps to the right of it to represent parts of the other addend.

CONNECT IT

- Remind students that one thing that is alike about all the representations is the numbers.
- Explain that on this page they will break apart the numbers to find their sum.

Monitor and Confirm

1 – 2 Check for understanding that:

- adding 2 to 48 makes a ten
- since 2 is added to 48, 2 should be subtracted from 43

Support Whole Class Discussion

3 Be sure students understand that the problem is asking them what all of the jumps on the open number line represent.

Ask *What equation could you write to show the three jumps and the total? What does each number in the equation show?*

Listen for You could write $2 + 40 + 1 = 43$.

You can start with the number needed to make a ten when added to 48, which is 2; then you count on by 4 tens or 40; and then add the remaining 1. $2 + 40 + 1 = 43$; 43 is the number you are adding to 48.

4 Be sure students understand that the number at the end of the last jump that is farthest to the right on the number line is the total because after the last jump, students have added all of the parts of 43 to 48.

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 make a ten to add.

Look at **Picture It** on the previous page.

- 1 Why do you add 2 to 48? **to make a ten**
- 2 What does the drawing show? Fill in the blanks.

$$\begin{array}{r} 48 \\ + \boxed{2} \\ \hline 50 \end{array} + \begin{array}{r} 43 \\ - \boxed{2} \\ \hline 41 \end{array} = \boxed{91}$$

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

- 3 What number should you get if you add all the jumps? Why?
You should get 43 if you add all the jumps, because that is the number you are adding to 48. $2 + 40 + 1 = 43$

- 4 Where is the answer on this open number line?
The answer is the number you land on after the last jump, which is 91.

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 showing addition? Explain.

Possible answer: *A quick drawing is a way to show tens and ones in my own way. Then I can see if I need to make more tens to find the answer.*

**Hands-On Activity**

Use base-ten blocks to understand an open number line model.

If . . . *students are unsure about how to use an open number line to add two-digit numbers,*

Then . . . *use the activity below to connect the open number line representation with a concrete model.*

Materials For each student: base-ten blocks (10 tens rods, 15 ones units)

- Have students model 48 and 43 using base-ten blocks.
- Draw an open number line on the board with a jump from 48 to 50. Ask students to model this with their blocks. Students should take 2 ones cubes from 43 and move them to 48.
- Draw a jump from 50 to 90 on the open number line. Ask students to model this with their blocks. Students should take 4 tens rods from 41 and move them to the group of 50 blocks.
- Repeat the procedure for a jump of 1 from 90 to 91. Students should move the last unit cube to the group of blocks showing 90. Discuss how reorganizing the blocks does not change the sum.

APPLY IT

For all problems, encourage students to draw some kind of model or use words or equations to support their thinking. Spacing numbers accurately on an open number line can be difficult and precise spacing is not required.

6 67 miles; Students may first make a ten by finding $39 + 1 = 40$, then take 1 away from 28, and then find $40 + 27 = 67$. Students also may draw an open number line to solve the problem.

7 60; Students may use an open number line that starts at 23, then make a ten by showing a jump of 7 from 23 to 30, and then a jump of 30 from 30 to 60.

Close: Exit Ticket

8 Students could use quick drawings or an open number line to model the problem.

Students' solutions should indicate understanding of:

- making a ten by finding $17 + 3 = 20$
- adding 3 to 17 means that 3 should be subtracted from 48
- the result of adding 3 to 17 and subtracting 3 from 48 is $20 + 45$

Error Alert If students' explanations indicate that they are unclear about why $17 + 48$ is equal to $20 + 45$, **then** have them model 17 and 48 using base-ten blocks. Prompt students to move 3 unit cubes from 48 to 17, and then determine that the numbers represented by base-ten blocks now show $20 + 45$.

APPLY IT

Use what you just learned to solve these problems.

- 6** Sam drives 39 miles north. Then she drives 28 miles east. How far does she drive altogether? Show your work.

Possible work: $39 + 1 = 40$. Take away 1 from 28. Then add $40 + 27 = 67$.

Solution Sam drives 67 miles altogether.

- 7** Find $23 + 37$. Show your work.

Possible work: Start at 23 on a number line. Jump up 7 to get to the next ten, which is 30. There is only 30 left to add. $30 + 30 = 60$.

$$23 + 37 = \dots 60 \dots$$

- 8** Explain how the addition problem $17 + 48$ could be solved by adding $20 + 45$. Show your work.

Possible answer: To make a ten, add 3 to 17 to get 20. You have to also take 3 away from 48 and that leaves 45. Then the problem is $20 + 45$.



Solutions

1 30, 15
Basic

2 45
Basic

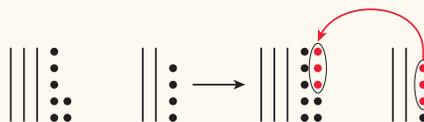
Practice More Ways to Show Addition

Study the Example showing how to use quick drawings to add two-digit numbers. Then solve problems 1–6.

EXAMPLE

What is $37 + 24$?

$37 + 24$ is the same as $40 + 21$.

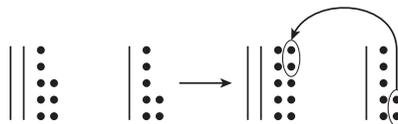


$40 + 21 = 61$

So, $37 + 24 = 61$.

Kim picks 28 apples. Nate picks 17 apples.

1 Look at the quick drawing. Then fill in the blanks.



$28 + 17 \rightarrow \underline{30} + \underline{15}$

2 How many apples do Kim and Nate pick in all? 45

Fluency & Skills Practice

Teacher Toolbox

Assign More Ways to Show Addition

In this activity students practice different ways of solving two-digit addition problems. Within each problem, students may notice and make use of patterns in the addends being added to the first number. Becoming attuned to such patterns will help students develop mental math strategies that make use of place value.

Fluency and Skills Practice

More Ways to Show Addition

Name: _____

Add.

| | |
|--------------------------------|---------------------------------|
| 1 $27 + 3 = \underline{30}$ | 2 $48 + 2 = \underline{\quad}$ |
| $27 + 13 = \underline{40}$ | $48 + 32 = \underline{\quad}$ |
| $27 + 15 = \underline{42}$ | $48 + 35 = \underline{\quad}$ |
| 3 $39 + 1 = \underline{\quad}$ | 4 $26 + 4 = \underline{\quad}$ |
| $39 + 31 = \underline{\quad}$ | $26 + 24 = \underline{\quad}$ |
| $39 + 34 = \underline{\quad}$ | $26 + 27 = \underline{\quad}$ |
| 5 $75 + 5 = \underline{\quad}$ | 6 $53 + 7 = \underline{\quad}$ |
| $75 + 15 = \underline{\quad}$ | $53 + 27 = \underline{\quad}$ |
| $75 + 17 = \underline{\quad}$ | $53 + 29 = \underline{\quad}$ |
| 7 $62 + 8 = \underline{\quad}$ | 8 $23 + 7 = \underline{\quad}$ |
| $62 + 28 = \underline{\quad}$ | $23 + 17 = \underline{\quad}$ |
| $62 + 29 = \underline{\quad}$ | $23 + 18 = \underline{\quad}$ |
| 9 $36 + 4 = \underline{\quad}$ | 10 $41 + 9 = \underline{\quad}$ |
| $36 + 24 = \underline{\quad}$ | $41 + 29 = \underline{\quad}$ |
| $36 + 29 = \underline{\quad}$ | $41 + 32 = \underline{\quad}$ |

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- 3 $60 + 11$; Add 3 to 57 to find 60. Subtract 3 from 14 to find 11.

Medium

- 4 71; See the open number line on the Student Worktext page. Boxes below the open number line in order from left to right show 60 ($57 + 3$), 70 ($60 + 10$), and 71 ($70 + 1$).

Medium

- 5 85 beads; Add 1 to 49 to make the next ten and subtract 1 from 36. Add 50 and 35.

Medium

- 6 Possible answer:

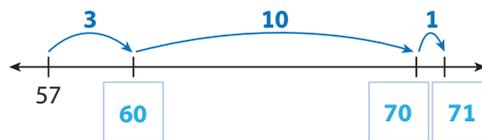
$23 + 28 = 51$
 $24 + 27 = 51$
 $25 + 26 = 51$

Challenge

Possible answer:

- 3 $57 + 14$ is the same as $60 + 11$.

- 4 Fill in the missing numbers in the open number line. Then find $57 + 14$.



$57 + 14 = 71$

- 5 Mia has 49 red beads and 36 yellow beads. How many beads does Mia have in all? Show your work.

Possible work: $49 + 1 = 50$
 $36 - 1 = 35$
 $50 + 35 = 85$



Solution 85 beads

- 6 The equation below shows a sum of 51. Write three different equations with a sum of 51.

$22 + 29 = 51$

Possible answer:

$23 + 28 = 51$

$24 + 27 = 51$

$25 + 26 = 51$

ELL English Language Learners: Differentiated Instruction **Prepare for Session 4**
 Use with *Apply It*.

Levels 1–3

Speaking/Writing Choral read *Apply It* problem 1. With a partner, ask students to explain the meaning of *count on by tens and ones to add*. Encourage them to review the problem in the preceding example if needed. Have students work independently to write and show what 59 flags looks like using the strategy discussed. Repeat the process for 37 flags. Once complete, have students discuss with their partner the next step to solve the problem. Ask students to use the notes they have written to work independently to solve the problem. When finished, have students share their final result with their partner.

Levels 2–4

Speaking/Writing Choral read *Apply It* problem 1. In partners, have students discuss the steps to *count on by tens and ones to add*. Have one partner act as a speaker and the other as a notetaker. Have the speaker describe the steps in the strategy to solve the problem, while the notetaker writes the steps as described by the speaker. When complete, have each pair read aloud their written procedure to another pair. Have pairs follow the steps as read to them to solve the problem.

Levels 3–5

Reading/Writing Have students read *Apply It* problem 1. Have students discuss with partners how they will solve the problem using the strategy *count on by tens and ones to add*. Have students write the steps they used to solve the problem in complete sentences. Challenge students to make two additional problems by increasing and decreasing the number of flags Blanca sells and had before the parade. Once problems are complete, have students exchange the problems they created with other students. Have them solve each other's problems. Remind students to continue using the strategy *count on by tens and ones* when adding two-digit numbers.

Purpose In this session, students use different strategies to add two-digit numbers, sharing their thinking with a partner.

Start

Develop Fluency

Why Reinforce students' knowledge of place value patterns as they count on ten more from any number.

How Have students count on by tens from a given two-digit number.

Count on by tens.

47,,,,,

35,,,,,

23,,,,,

Solutions

57, 67, 77, 87, 97

45, 55, 65, 75, 85

33, 43, 53, 63, 73

EXAMPLE

81 rocks; Adding tens and ones is shown as one way to solve the problem. Students could also solve the problem by making a ten to find $47 + 3 = 50$, subtracting 3 from 34, and then finding $50 + 31 = 71$.

Look for Students should start at 47, count on the 3 tens in 34, and then count on the 4 ones in 34.

APPLY IT

- 1 96 flags; Students could solve the problem by breaking 59 into $50 + 9$ and breaking 37 into $30 + 7$ and then adding the tens and then the ones to find $80 + 16 = 96$.

DOK 2

Look for Students regroup 16 as 1 ten and 6 ones and add 3 tens to 5 tens before finding the sum of 96.

Refine Adding Two-Digit Numbers

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

EXAMPLE

Lucas has 47 rocks in his collection. He gets 34 more rocks. How many rocks does Lucas have now?

You can add tens and add ones.



$$40 + 30 = 70$$

$$7 + 4 = 11, \text{ and } 11 = 10 + 1$$

How many rocks does Lucas have now? **81**



APPLY IT

- 1 Blanca sells 59 flags at a parade. She has 37 flags left. How many flags did she have before the parade? Show your work.

Possible work: $30 + 7 + 50 + 9 = 80 + 16 = 96$ flags

How many tens are in each number?

How many ones?



- 2 75; Students could solve the problem by using an open number line showing a jump from 47 to 50 with 3 above the jump, a jump from 50 to 70 with 20 above the jump, and a jump from 70 to 75 with 5 above the jump. Students also could use base-ten blocks or a quick drawing to solve the problem.

DOK 1

Look for Students understand that they can add 3 to 47 to make a ten, and recognize that they need to subtract 3 from 28.

- 3 C; Students could solve the problem by finding $53 + 7 = 60$ and $60 + 31 = 91$, or $38 + 2 = 40$ and $40 + 51 = 91$.

Explain why the other two answer choices are not correct:

B is not correct because the ones sum to 11; $8 + 3 = 11$, not 13.

D is not correct because $53 + 30 = 83$. One addend is 38, not 30.

DOK 3

Close: Exit Ticket

Check for Understanding

Materials For remediation: base-ten blocks (9 tens rods, 20 ones units)

Have students solve the following problem using any strategy they choose:

Taylor picked 39 apples, and Jordan picked 47 apples. How many apples did they pick altogether?

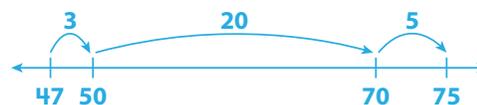
For students who are still struggling, use the table below to guide remediation.

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

On Saturday morning, 48 children and 35 adults visited the museum. How many people visited the museum on Saturday morning? [83]

2 What is the sum of 47 and 28? Show your work.

Possible work:



What can you add to 47 to get to the next ten?



Solution 75

3 Jenny gets 53 points in her first board game. She gets 38 points in her second game. What is the total number of points Jenny gets?

- (A) 81
- (B) 93
- (C) 91
- (D) 83

Brady chose (A) as the correct answer. How did Brady get his answer?

Possible answer: He forgot to add the group of 10 from the 11 ones to the other tens.

Does it matter which number you start with?

Error Alert

| If the error is ... | Students may ... | To support understanding ... |
|---------------------|---|---|
| 76 | have failed to regroup ten ones. | Provide students with base-ten blocks to model the problem. Make sure they recognize that a ten needs to be regrouped. Have students revisit the strategy they used, adding the ten that was regrouped. |
| 87 | have counted on from 39 but failed to subtract one from 47. | Help the student use a quick drawing to see that one is taken from 47 and added to 39. Remind the student that adding one without subtracting from the other added makes the sum correct. |
| 89 | have added 3 to 47 to make 50 but failed to subtract 3 from 39. | Use the strategy discussed above to help students recognize the need for subtracting from one addend when adding to the other. |

Solutions

1 **C**; Students could solve the problem by adding the tens and then adding the ones.
 $40 + 20 + 8 + 3 = 60 + 11 = 71$.

Medium

2 **A**; Students could make a ten to find $39 + 1 = 40$ and then subtract 1 from 16 to get 15.

C; Students could find $15 + 3 = 18$ and then subtract 3 from 40 to get 37.

Medium

3 **B** (No);

C (Yes);

F (No);

G (Yes)

Medium

Practice Adding Two-Digit Numbers

1 Diego reads 48 pages of a book one day. The next day, he reads 23 pages. How many pages does Diego read in all?

A 61

B 62

C 71

D 75

2 Which addition problems could be solved by adding $40 + 15$?

A $39 + 16$

B $38 + 13$

C $37 + 18$

D $36 + 17$

E $35 + 19$

3 Tell if the equation can be used to solve $27 + 56$. Choose Yes or No for each problem.

| | Yes | No |
|-------------------------|------------------------------------|------------------------------------|
| $20 + 50 + 10 + 6 = 86$ | <input type="radio"/> A | <input checked="" type="radio"/> B |
| $20 + 7 + 50 + 6 = 83$ | <input checked="" type="radio"/> C | <input type="radio"/> D |
| $30 + 56 = 86$ | <input type="radio"/> E | <input checked="" type="radio"/> F |
| $20 + 50 + 13 = 83$ | <input checked="" type="radio"/> G | <input type="radio"/> H |

You can add the tens and add the ones.



What do you add to one of the addends to get 40?

There are many ways to add two-digit numbers.

- 4 **C**; Students could solve the problem by finding $37 + 3 = 40$, $40 + 40 = 80$, and $80 + 2 = 82$.

Explain why the other two answer choices are not correct:

B is not correct because after making a ten to find $37 + 3 = 40$, 42 needs to be added to 40 and not 41.

D is not correct because the 12 ones were written as part of the answer instead of being regrouped as 1 ten and 2 ones.

Challenge

- 5 61 books; Since Kayla has 3 more books than Dan and Dan has 29 books, students can find $29 + 3 = 32$ to find how many books Kayla has. Then they can find $29 + 32 = 61$ to find how many books Dan and Kayla have altogether.

Challenge

- 4 A fruit salad has 37 green grapes and 45 red grapes. How many grapes are in the fruit salad?

- (A) 72
(B) 81
(C) 82
(D) 712

Tim chose (A) as the correct answer. How did Tim get his answer?

Possible answer: Tim added $7 + 5 = 12$ to find the total ones. He regrouped the ones as 1 ten 2 ones. He forgot to add the regrouped ten to the total.

How many tens are you adding?



How many books does Kayla have?

- 5 Dan has 29 books. Kayla has 3 more books than Dan. How many books do Dan and Kayla have altogether? Show your work.

Possible work: Kayla has $29 + 3$ books.

$$29 + 3 = 32$$

$$29 + 32 = 30 + 31, \text{ or } 61.$$

Solution 61 books

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

Start

Develop Fluency

Why Reinforce adding three addends to gain fluency in adding tens and adding ones when combining 2 two-digit numbers.

How Have students solve addition equations with three addends, two of which are multiples of 10.

Solve.

$$30 + 10 + 4 = ?$$

$$40 + 10 + 5 = ?$$

$$50 + 10 + 6 = ?$$

$$70 + 10 + 6 = ?$$

Possible Solutions

44

55

66

77

APPLY IT

1 **A**; This problem shows breaking both 78 and 16 apart into tens and ones.

B; This problem shows adding the tens in 78 and 16 and then adding the ones.

C; This problem shows making a ten by finding $78 + 2 = 80$ and then subtracting 2 from 16 before finding $80 + 14$.

DOK 1

2 **B**; Students could solve this problem by counting on tens and ones from 36 until they have counted on 27 more.

DOK 2

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

DOK 1

4 Students' explanations should include that Mrs. Ames added the ones first, then added the tens, and then added the tens and the ones. Students could solve the problem by making a ten to find $59 + 1 = 60$, subtracting 1 from 25, and then finding $60 + 20 = 80$ and $80 + 4 = 84$.

DOK 3

Refine Adding Two-Digit Numbers

APPLY IT

Solve the problems.

1 Which addition problems show a way to add $78 + 16$?

(A) $70 + 8 + 10 + 6$

(B) $70 + 10 + 8 + 6$

(C) $80 + 14$

(D) $70 + 8 + 6$

(E) $70 + 10 + 6$

2 Jo does 36 sit-ups. Then she does 27 more. How many sit-ups does Jo do in all?

(A) 67

(B) 63

(C) 53

(D) 9

3 Tell if the equation shows how to find $24 + 9$.

Choose Yes or No for each problem.

| | Yes | No |
|--------------------|---------------------------|---------------------------|
| $20 + 4 + 9 = 33$ | <input type="radio"/> (A) | <input type="radio"/> (B) |
| $2 + 4 + 9 = 15$ | <input type="radio"/> (C) | <input type="radio"/> (D) |
| $20 + 40 + 9 = 69$ | <input type="radio"/> (E) | <input type="radio"/> (F) |
| $20 + 10 + 3 = 33$ | <input type="radio"/> (G) | <input type="radio"/> (H) |

Differentiated Instruction

RETEACH



Hands-On Activity

Use a hundred chart to add two-digit numbers.

Students struggling with strategies for adding two-digit numbers

Will benefit from additional work using a number model to add two-digit numbers

Materials For each student: 1 counter, Activity Sheet *Hundred Chart*

- Write the addition problem $36 + 27$ on the board.
- Tell students to find 36 on the chart and place the counter on it.
- Prompt students to see that in the hundred chart, moving down vertically adds 10. They can add 20 by moving the counter vertically down the chart from 36 to 46 and from 46 to 56 and then count on the additional 7 by moving the counter horizontally 7 spaces.
- Write other problems such as $45 + 38$, $57 + 36$, and $68 + 26$ on the board for students to model using the hundreds chart and counters.

- 5 Students should add the ones in 47 and 24 first, then add the tens in 47 and 24, and then add the total of the tens and the ones. Students could solve the problem by adding the tens first, then adding the ones, and then adding the tens and ones.

DOK 3

Close: Exit Ticket

6 MATH JOURNAL

Student responses should demonstrate understanding of a strategy that could be used to add 2 two-digit numbers with regrouping.

Error Alert If students are unable to explain and use a strategy to find the sum, **then** have them use base-ten blocks to represent each number, and prompt them to describe each step they perform to combine the base-ten blocks in order to find the sum.

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

- 4 Ms. Ames shows her students the problem at the right. What did she do? Explain. Then show how to solve the problem a different way

Possible answer: Ms. Ames added the ones first. Then she added the tens. Then she added the two sums together.

Possible work showing another way:

$$59 + 1 = 60$$

$$25 - 1 = 24$$

$$60 + 24 = 84$$

| |
|------|
| 25 |
| + 59 |
| 14 |
| + 70 |
| 84 |

- 5 Find $47 + 24$ the way Ms. Ames did in problem 4. Then show a different way. How do the sums compare?

Possible work:

| | |
|------|-----------------|
| 47 | $47 = 40 + 7$ |
| + 24 | $+ 24 = 20 + 4$ |
| 11 | $60 + 11 = 71$ |
| + 60 | |
| 71 | |

Possible answer: If you add the ones first or the tens first, you get the same sum.

6 MATH JOURNAL

What strategy would you use to solve $32 + 49$? Explain and then solve.

Possible answer: I would add the tens and then add the ones. $30 + 40 = 70$; $2 + 9 = 11$; $70 + 11 = 81$.

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

EXTEND

★ Challenge Activity
Add three two-digit numbers.

Students who have achieved proficiency **Will benefit from** deepening understanding of adding two-digit numbers.

- Write $23 + 34 + 16$ on the board. Challenge students to solve the problem using any strategy they want.
- Have students share their strategies.
- Ask: *How did knowing strategies for adding 2 two-digit numbers help you add 3 two-digit numbers?*

- Write other problems on the board for students to solve, such as $41 + 24 + 17$, $35 + 25 + 14$, and $15 + 32 + 47$.

PERSONALIZE



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

3 63; See possible explanation on the student page. Student responses should demonstrate understanding of a strategy for adding 2 two-digit numbers with regrouping, such as making a ten, adding tens and then adding ones, using an open number line, or making quick drawings. 2 points; **2.NBT.B.9, DOK 3**

4 44; See possible work on the student page. Students could also solve the problem by making a ten, using an open number line, or making quick drawings. 2 points; **2.NBT.B.5, DOK 1**

5 **B**; Students could solve the problem by adding the tens and then adding the ones.
E; Students could solve the problem by finding the sum of the tens and then adding the ones.
F; Students could solve the problem by making a ten to find $49 + 1 = 50$, subtracting 1 from 33 to get 32, and adding 50 and 32.
A is not correct because 33 was broken into 3 ones instead of 3 tens and 3 ones.
C is not correct because only 1 ten is added.
D is not correct because after adding the ones to find 1 ten and 2 ones, the 1 ten was not regrouped and added to the sum of the tens. 2 points; **2.NBT.B.5, DOK 1**

4 What is the sum of 16 and 28? Show your work. (2 points)

Possible student work:

$$10 + 6 + 20 + 8 = 30 + 14 = 44$$

$$16 + 28 = \underline{\quad 44 \quad}$$

5 Mr. Diaz has 49 red blocks and 33 blue blocks on a table. He asks his class to find the total number of blocks.

Which addition problems show a way to add $49 + 33$? Choose all the correct answers. (2 points)

- A $40 + 9 + 3$
- B $40 + 30 + 9 + 3$
- C $40 + 10 + 9 + 3$
- D $70 + 2$
- E $70 + 9 + 3$
- F $50 + 32$

Differentiated Instruction

Teacher Toolbox

RETEACH: Tools for Instruction

Tools for Instruction

Two-Digit Addition with Regrouping

Objective: Use base ten blocks to add two-digit numbers with regrouping.

Materials: Base ten blocks (tens, ones)

There are many ways to add with regrouping that do not use the traditional addition algorithm. Working from an understanding of how base ten blocks work, students can build upon two-digit numbers in tens and ones and add them repeatedly. Before using the standard algorithm, students should understand that it is sometimes necessary to regroup tens by regrouping 10 ones in order to add 1 ten, they need to regroup when it is necessary to regroup. This understanding will help them later understand the process of decomposing a ten in order to regroup for addition.

Step by Step

- Add 21 and 25.**
 - Have the student model both 21 and 25 with base ten blocks.
 - Ask the student to identify the total number of tens (2) and the total number of ones (6).
 - Say 1 ten and 6 ones makes 16. Write $21 + 25 = 56$ on the board.
- Demonstrate the need for regrouping.**
 - Add 56 and 46. Have the student model both 56 and 46 and count to find the total number of tens and the total number of ones (12 tens, 12 ones).
 - Ask the student if 12 ones is more than 10 ones. They demonstrate bundling 10 ones and replacing the bundle with a ten block.
 - Explain that bundling 10 ones into a ten is called "regrouping" in addition.
 - Explain that when 12 ones are regrouped into 1 ten and 2 ones, the value is the same.
- Generalize when regrouping is needed.**
 - Have the student use one block to show $1 + 4 + 5 + 1 + 6 + 3 + 9 = 8$ and $3 + 9 = 12$.
 - Ask the student to identify which sums can be regrouped as tens and ones. ($1 + 7 + 1 + 6 + 3 + 9$)
 - Lead a discussion about when regrouping is needed. Guide the student to understand that regrouping from 10 ones to 1 ten is needed when the sum of the ones digits is greater than or equal to 10.

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REINFORCE: Math Center Activities

Center Activity 2.55

100 or Not!

Check Understanding: Find $37 + 45$.

What You Need

- 10 counters
- Digit Cards 0-9 (2 sets)

What You Do

- Shuffle the Digit Cards and place them face-down in a pile.
- Both partners take 2 cards and make a two-digit number. Take 2 more cards and make a different two-digit number.
- Add the 2 two-digit numbers.
- If your sum is less than 100 and greater than your partner's sum, take a counter. If your sum is 100 or greater, or is less than your partner's sum, then do not take a counter.
- The first partner to get 5 counters wins.

Go Further!

Each partner makes 2 two-digit numbers and finds the sum. Take a counter when you have a sum greater than 50.

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EXTEND: Enrichment Activities

Enrichment Activity

Ways to Make 83

Your Challenge

Use the digits below to make two 2-digit numbers that add to 83.

For each equation you can only use each digit once.

0 1 2 3 4 5 6 7 8 9

Example

$$\begin{array}{r} 60 \\ + 23 \\ \hline 83 \end{array}$$

Are there any patterns you notice that might help you think of other possibilities?

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