Objectives

To guide children as they make ballpark estimates; and to provide opportunities to model and practice the partial-sums algorithm for 2- and 3-digit numbers.

1 Teaching the Lesson

Key Activities
Children add 2- and 3-digit numbers, discuss solution methods, and make ballpark estimates to check addition results.

Key Concepts and Skills
- Model multi-digit numbers with base-10 blocks. [Number and Numeration Goal 1]
- Use basic facts to solve extended fact problems with the partial-sums algorithm. [Operations and Computation Goal 1]
- Use base-10 blocks to extend the partial-sums algorithm to 3-digit addends. [Operations and Computation Goal 2]
- Make ballpark estimates as a check for reasonableness of answers. [Operations and Computation Goal 5]

Key Vocabulary
partial-sums algorithm • ballpark estimate • partial-sums method

Ongoing Assessment: Recognizing Student Achievement
Use journal page 45. [Operations and Computation Goal 2]

2 Ongoing Learning & Practice

Children play Target 50.
Children practice and maintain skills through Math Boxes and Home Link activities.

3 Differentiation Options

READINESS
Children use base-10 blocks to model 2-digit numbers.

ENRICHMENT
Children make up and solve 3-digit addition number stories based on a mileage map.

ELL SUPPORT
Children write ballpark estimate using the Word Bank template.

Technology
Assessment Management System
Journal page 45
See the iTLG.

Lesson 2-7 135
Getting Started

Mental Math and Reflexes

Ask such questions as the following:

- Is 42 closer to 40 or 50? 40
- Is 56 closer to 50 or 60? 60
- Is 95 closer to 90 or 100? Same distance away
- Is 150 closer to 100 or 200? Same distance away
- Is 210 closer to 200 or 300? 200
- Is 998 closer to 900 or 1,000? 1,000
- Is 2,068 closer to 2,000 or 2,100? 2,100
- Is 3,243 closer to 3,240 or 3,250? 3,240
- Is 4,250 closer to 4,200 or 4,300? Same distance away

Math Message

Add.
63 + 24 = 87
28 + 37 = 65
49 + 18 = 67

Home Link 2-6 Follow-Up

Review answers as necessary. Have a few children share their strategies for solving the number stories.

Math Message Follow-Up

Ask children how they calculated the answers. Record children’s different strategies on the board. During the discussion, have children name the value in each place, not just the digits. In the first problem, for example, if a child says, “I added the 6 and the 2” remind the class to say they added 60 and 20, or 6 tens and 2 tens.

Possible Strategies for 28 + 37

- 20 + 30 = 50; 8 + 7 = 15; and 50 + 15 = 65. This strategy uses the partial-sums algorithm.
- Take 2 from 37, getting 35, and add the 2 to 28; 28 + 2 = 30, and 30 + 35 = 65.
- Think of 37 as 30 + 7; 28 + 7 = 35; and 35 + 30 = 65.

Making Ballpark Estimates

(Student Reference Book, pp. 190–194)

Remind children that answers should always be checked to see whether they make sense. This is true for number story problems and for problems where there is no story like those in the Math Message.

Children should make a close enough, or ballpark estimate of the answer either before or after calculating by changing the addends to close but easier numbers and then adding them. Have children read about estimation on pages 190–194 in their Student Reference Books.
Ask children to make ballpark estimates for the problems below and tell how they arrived at their estimates. Note that there is often more than one acceptable estimate.

- 42 + 89 is close to 40 + 90 = 130
- 23 + 71 is close to 20 + 70 = 90
- 148 + 51 is close to 150 + 50 = 200
- 213 + 468 is close to 200 + 500 = 700 or 210 + 470 = 680
- 35 + 63 is close to 30 + 60 = 90 or 40 + 60 = 100. Point out that because 35 is halfway between 30 and 40 on the number line, either 30 or 40 may be used as an easier substitute for 35.

**Modeling the Partial-Sums Method for 3-Digit Addends**

*(Math Masters, p. 53)*

Remind children that in *Second Grade Everyday Mathematics* they used the partial-sums method to add 2-digit addends. Today you will show them that the partial-sums method works in the same way with 3-digit addends.

Write these problems on the board in vertical form:

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  145
+ 322
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Ask children to gather in a circle as you demonstrate with base-10 blocks, or use base-10 blocks on the overhead projector. Refer to flats as hundreds, longs as tens, and cubes as ones. For each problem, model addition as a four-part operation: add the 100s, add the 10s, add the 1s, and then add the partial sums.

**Example 1:** Model 145 + 322 with base-10 blocks.

- Count out 1 flat, 4 longs, and 5 cubes to represent 145. Count out 3 flats, 2 longs, and 2 cubes to represent 322.
- Arrange the blocks like the addition problem in vertical form.
- Gather the hundreds into one pile, the tens into a second pile, and the ones into a third pile.
- Count the hundreds. 4 hundreds, or 400 Count the tens. 6 tens, or 60 Count the ones. 7 ones, or 7
- Add the hundreds, tens, and ones. 400 + 60 + 7 = 467
- Ask children how they would record this procedure on paper. You may use *Math Masters*, page 53 if you wish.
Adjusting the Activity

Write each addend in expanded notation before adding. For example, in 145 + 322 rewrite each number in expanded notation.

145 = 100 + 40 + 5
322 = 300 + 20 + 2

Write out each partial sum based on the expanded notation.

100 + 300 = 400
40 + 20 = 60
5 + 2 = 7

Example 2: Model 169 + 175 with base-10 blocks.

▷ Count out and arrange the blocks as before. Gather the hundreds, tens, and ones into separate piles.

▷ Children might notice that the 13 tens can be replaced by 1 hundred and 3 tens. The 14 ones can be replaced by 1 ten and 4 ones. Make these substitutions, but leave the 1 hundred and 3 tens in the tens pile, and leave the 1 ten and 4 ones in the ones pile.

▷ Add the hundreds, tens, and ones: 200 + 130 + 14 = 344.

Show children how to record this procedure on paper.

Try more 3-digit addition problems as needed.

Practicing the Partial-Sums Algorithm and Other Addition Methods
(Math Journal 1, p. 45; Math Masters, p. 53)

Children should show their work on the journal page. Remind them to make ballpark estimates for checking their answers and for finding mistakes if an answer seems unreasonable. Provide base-10 blocks for children to use. Children may share their answers with a partner. If there is a disagreement, encourage them to discuss their strategies with each other and do the problem again until they both can agree on an answer. Abundant practice will be found on Home Link and Math Boxes pages in future lessons. Additional problems may be created on Math Masters, page 53.

Ongoing Assessment: Recognizing Student Achievement

Use journal page 45, Problems 1 and 2, to assess children’s ability to solve multidigit addition problems. Children are making adequate progress if they are able to solve Problems 1 and 2 correctly, with or without the use of manipulatives. Some children may be able to solve the rest of the problems on the page, with or without manipulatives.
2 Ongoing Learning & Practice

Playing Target: 50
(Student Reference Book, p. 312; Math Masters, pp. 411 and 465)

Children practice multidigit addition and subtraction with base-10 blocks by playing Target: 50. Go over the rules for Target: 50 on page 312 in the Student Reference Book.

NOTE The Target: 50 Record Sheet on Math Masters, page 465 may be used as an assessment tool. Have children record one series of turns taken to reach 50.

Math Boxes 2-7
(Math Journal 1, p. 46)

Mixed Practice Math Boxes in this lesson are linked with Math Boxes in Lessons 2-5 and 2-9. The skill in Problem 6 previews Unit 3 content.

Writing/Reasoning Have children write an answer to the following: Explain how you found the length of the fence in Problem 6. Sample answer: I added all of the sides.

Home Link 2-7
(Math Masters, p. 52)

Home Connection Children solve addition problems using 2- and 3-digit numbers. Since the partial-sums algorithm might not be familiar to parents, you might want to send home the Student Reference Book.
Modeling 2-Digit Numbers With Base-10 Blocks
(Math Masters, p. 411)

To explore place-value concepts using a concrete model, have children build numbers with base-10 blocks. Children draw two cards and place them on a Place-Value Mat to make a 2-digit number. They put longs in the tens column to show the tens digit and cubes in the ones column to show the ones digit. On a half-sheet of paper, children draw a picture to show what they did. They write the number in standard notation and in expanded notation under the picture. (See margin.)

Making Up Addition Problems from a Mileage Map
(Student Reference Book, pp. 224 and 225; Math Masters, p. 407)

Social Studies Link To apply children’s understanding of addition, have them write and solve addition number stories. Children study the U.S. mileage map in the Student Reference Book, on pages 224 and 225. Pose problems like the following to be sure that children understand how to read the map.

- Find Minneapolis, Minnesota. Which city on the map is 501 miles from Minneapolis? Bismarck, North Dakota
- Find Seattle, Washington. How would you determine the number of miles from Seattle to Salt Lake City, Utah, by way of Boise, Idaho? Add the distance from Seattle to Boise to the distance from Boise to Salt Lake City. Children pose new addition problems to each other using the mileage map. Children may record one or two of their stories on Math Masters, page 407.

Building a Math Word Bank
(Differentiation Handbook)

To provide language support for estimation, have children use the Word Bank template found in the Differentiation Handbook. Ask children to write the term ballpark estimate, draw a picture representing the term, and write other related words. See the Differentiation Handbook for more information.