Teachers Guide

GRADE 2 – UNIT 8 – MODULE 1

BRIDGES®
IN MATHEMATICS

Module 1

Revisiting Place Value & Three-Digit Computation

Session 1 Target Seven Hundred 3

Session 2 Unit 8 Pre-Assessment 9

Session 3 Solving Story Problems 17

Session 4 Introducing Work Place 8A Sum It Up 23

Session 5 Larger Numbers on a Line 27

Session 6 Roll & Subtract One Thousand 33

Teacher Masters

Pages renumber with each module.

Unit 8 Pre-Assessment T1

Three-Digit Story Problems T4

Work Place Guide 8A Sum It Up T5

Work Place Instructions 8A Sum It Up T6

8A Sum It Up Record Sheet T7

Numbers on a Line Problems T8

Work Place Guide 8B Roll & Subtract One Thousand T9

Work Place Instructions 8B
Roll & Subtract One Thousand T10

8B Roll & Subtract One Thousand Record Sheet T12

Student Book Pages

Page numbers correspond to those in the consumable books.

Target Seven Hundred Record Sheet 98

Three-Digit Story Problems 99

8A Sum It Up Class Record Sheet 100

Numbers on a Line Problem-Solving Sheet 101

Roll & Subtract One Thousand Class Record Sheet 102

Home Connections Pages

Page numbers correspond to those in the consumable books.

Estimation Problems 173

Riddles & Toys 175

Comparing Numbers & Sharks' Lengths 177

Module 1

Revisiting Place Value & Three-Digit Computation

Module Overview

The first module of Unit 8 provides a review of place value through and beyond 1,000, as well as 3-digit addition and subtraction. Students have an opportunity to deepen their understandings, correct misconceptions, solidify strategies for working with 3-digit addition and subtraction problems, and develop new methods of approaching these situations. Two new Work Places, Sum It Up and Roll & Subtract One Thousand, provide opportunities for students to practice these skills in the context of games. These Work Places, along with others carried forward from Unit 7, will be available throughout the rest of the unit.

Planner

Session & Work Places	P&I	WP	A	HC
Session 1 Target Seven Hundred The first module of Unit 8 opens with a new game, Target Seven Hundred. Target Seven Hundred is designed to provide students with opportunities to develop deeper understandings of 3-digit numbers by building them with base ten area pieces. The quantities collected by each team are compared to 700 and differences are calculated to determine which number is closer to the target.	●	●		●
Session 2 Unit 8 Pre-Assessment During the first half of the session, students take the Unit 8 Pre-Assessment. When most students are finished with the assessment, the teacher reconvenes the class and conducts an activity designed to review place value through 999 and then move ahead into the thousands.	●		●	
Session 3 Solving Story Problems Today students solve several 3-digit addition problems, two of which are set in the context of finding a total distance or a total length. As students solve each problem, the teacher circulates to watch the strategies they are using and selects two or three individuals to share and explain their methods. The class locates each strategy on the posters on display from the previous unit. If a new strategy comes up, students and teacher work together to make a new poster.	●	●		●
Session 4 Introducing Work Place 8A Sum It Up The teacher introduces Work Place 8A Sum It Up. In the game, players take turns rolling random numbers and deciding after each roll what place value to assign to that number. After six rolls, each player has two 3-digit numbers, which they add together to try to get either the smallest or largest sum. After playing against the teacher, students work in pairs to play. At the end of the session, students go out to Work Places. **Introducing Work Place 8A** Sum It Up Players take turns rolling random numbers and deciding after each roll what place value to assign to that number. After six rolls, each player has two 3-digit numbers, which they add together to try to get either the smallest or largest sum.		●		
Session 5 Larger Numbers on a Line In this session, students use the open number line to model and solve three subtraction story problems, all of which involve some form of comparing. They work the first problem as a whole group, the second with a partner, and the third independently. When they finish the last problem, they get their folders and go to Work Places.	●	●		●
Session 6 Roll & Subtract One Thousand Students play another new game, Roll & Subtract One Thousand, against the teacher today. In the game, the class and the teacher take turns rolling three dice numbered 1–6 , arranging the numbers rolled to form 3-digit numbers, and subtracting those numbers from 1,000. After three turns, the team with the non-negative score closer to 0 wins. Students play the game twice with the teacher, and then the game is added to the current collection of Work Places. **Introducing Work Place 8B** Roll & Subtract One Thousand Each player takes a turn to roll three dice, arrange the numerals rolled to make a 3-digit number, and subtract the number from 1,000. After that, each player gets two more turns to roll, arrange, and subtract. The player who scores closer to zero (without going past zero into negative numbers) after three turns wins.	●	●		

P&I – Problems & Investigations, **WP** – Work Place, **A** – Assessment, **HC** – Home Connection

Materials Preparation

Each session includes a complete list of the materials you'll need to conduct the session, as well as notes about any preparation you'll need to do in advance. If you would like to prepare materials ahead of time for the entire module, you can use this to-do list.

Task		Done
Copies	Run copies of Teacher Masters T1–T13 according to the instructions at the top of each master.	
	Run 2 display copies of Student Book page 101.	
	If students do not have their own Student Books, run a class set of Student Book pages 97–101.	
	If students do not have their own Home Connections books, run a class set of the assignments for this module using pages 173–178 in the Home Connections Book.	
Work Place Preparation	Prepare the materials for Work Places 8A and 8B using the lists of materials on the Work Place Guides (Teacher Masters T5 and T10).	
Special Items	Use 9 index cards to prepare 100s, 10s, and 1s labels (3 of each) for Session 1. Reuse 1 of each card and make an additional card labeled with 1,000 for Session 2.	
	Write "Thousands" on 9" × 12" green construction paper , "Hundreds" on a yellow sheet of construction paper, "Tens" on a blue sheet, and "Ones" on a white sheet.	

Additional Resources

Please see this module's Resources section of the Bridges Educator site for a collection of resources you can use with students to supplement your instruction.

Session 1
Target Seven Hundred

Summary

The first module of Unit 8 opens with a new game, Target Seven Hundred, designed to provide students with opportunities to develop deeper understandings of 3-digit numbers by building them with base ten area pieces. The quantities collected by each team are compared to 700 and differences are calculated to determine which number is closer to the target. If time allows, the session ends with a visit to Work Places. Finally, the teacher introduces and assigns the Estimation Problems Home Connection.

Skills & Concepts

- Demonstrate an understanding that the digits in a 3-digit number represent amounts of hundreds, tens, and ones (2.NBT.1)
- Skip-count by 10s and 100s up to 1000 (2.NBT.2)
- Read and write numbers to 1000 using base ten numerals and expanded form (2.NBT.3)
- Compare pairs of three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons (2.NBT.4)
- Use strategies based on place value, properties of operations, or the relationship between addition and subtraction to subtract with minuends to 1000 (2.NBT.7)
- Model with mathematics (2.MP.4)
- Look for and express regularity in repeated reasoning (2.MP.8)

Materials

Copies	Kit Materials	Classroom Materials
Problems & Investigations Target Seven Hundred		
SB 98 Target Seven Hundred Record Sheet	• large base ten area pieces (25 mats, 18 strips, and 18 units; have extras available) • 1 die numbered 4–9	• 2 cafeteria trays (see Preparation) • nine 3″ × 5″ index cards (see Preparation) • blue masking tape (see Preparation) • 2 pieces of 3″ × 5″ construction paper, 1 red and the other blue • student whiteboards, markers, and erasers (class set)
Work Places in Use		
6E Halves & Half-Nots (introduced in Unit 6, Module 3, Session 5) **7A** Race to the Cookie Jar (introduced in Unit 7, Module 1, Session 1) **7B** Estimate & Measure Centimeters (introduced in Unit 7, Module 1, Session 3) **7C** Ant Paths (introduced in Unit 7, Module 1, Session 5) **7D** Fair Shares (Introduced in Unit 7, Module 2, Session 4) **7E** Gardener's Friend Game (introduced in Unit 7, Module 3, Session 1)		
Home Connection		
HC 173–174 Estimation Problems		

HC – Home Connection, **SB** – Student Book, **TM** – Teacher Master
Copy instructions are located at the top of each teacher master.

Vocabulary

An asterisk [*] identifies those terms for which Word Resource Cards are available.

compare*
difference*
hundreds*
ones*
tens*

Preparation

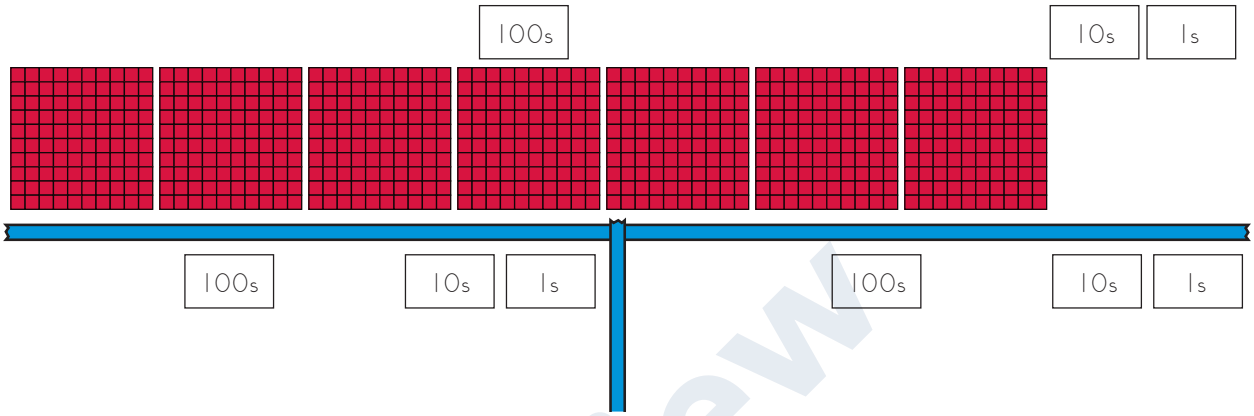
Use the index cards to prepare 100s, 10s, and 1s labels, three of each. Keeping 7 mats in reserve, divide the rest of the base ten area pieces into 2 equal sets of 9 mats, 9 strips, and 9 units, and place one set on each tray. Divide the floor area in the middle of your discussion circle with a 3′–4′ length of blue masking tape, and add another 3′–4′ length across the top to form a "T".

Problems & Investigations

Target Seven Hundred

1 Open the session by asking students to bring their Student Books, pencils, whiteboards, markers, and erasers to the discussion circle.

- As students come to the circle lay out the 100s, 10s, and 1s cards, one set on either side of the blue tape line.
- Lay the third set of place value labels, along with 7 hundreds pieces at the top of the blue line.



2 Tell students that they will play a place value game in this session using base ten area pieces. Then ask them to examine the base ten area pieces you set out on the floor.

- Have them give the thumbs up sign when they determine the value of the collection.
- On your signal, have the class report the total, 700.

3 Explain that you are going to divide the class into two teams to play Target Seven Hundred, a game that is a lot like Place Value Triple Roll. Then give a brief summary of the game rules.

- Each team will get three turns to roll a die numbered 4–9.
- Each time they roll, they have to take the number they rolled in 100s, 10s, or 1s.
- They can choose the order in which they take the 100s, 10s, and 1s, but they have to take each denomination once in the course of three rolls.
- The goal in this game is to make a number as close to 700 as possible.
- The team that gets closest wins the round.

4 Then get the class ready to play the game.

- Divide the group into two teams, the Reds and the Blues.
- Roll the die to see which team will go first.
- Place the blue piece of construction paper on the Blue team's side and the red piece on the Red team's side.

5 Now have a member of the first team roll the die numbered 4–9 and ask the team to decide whether they want to take their first roll in 100s, 10s, or 1s.

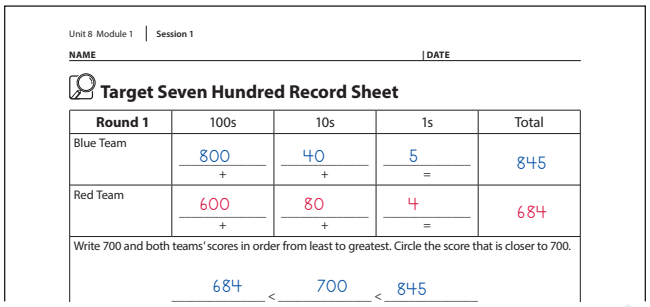
- Give the team a minute to discuss the issue, but do not let them drag out the conversation so long that the game cannot be completed during the session.

- Once they've decided, have a member of the team use the pieces from one of the trays to set out the designated number of 100s, 10s, or 1s on their side of the blue line.

6 Give the other team a turn. Then have the two teams take turns until both have taken three rolls.

7 Display the Target Seven Hundred Record Sheet and have students find the corresponding page in their Student Books.

- Record the results for both teams on your sheet using expanded notation, as students do so on theirs.
- Then work with input from the class to write the two scores along with the number 700 in order from least to greatest in the space provided on your sheet, as students do so on theirs.



Unit 8 Module 1 | Session 1

NAME | DATE

Target Seven Hundred Record Sheet

Round 1	100s	10s	1s	Total
Blue Team	800 +	40 +	5 =	845
Red Team	600 +	80 +	4 =	684

Write 700 and both teams' scores in order from least to greatest. Circle the score that is closer to 700.

684 < 700 < 845

8 Ask students to calculate how far each team's score is from 700.

- Have students estimate which of the two scores is closer to 700, and have them circle that number on their Student Book page.
- Then ask them to put their Student Books aside, and make the calculations on their whiteboards. Invite them to get out the base ten area pieces if these seem helpful.
- After they've had a minute or two to work, reconvene the class. Write an equation to represent each difference, and have students give their answer(s).
- Then invite several volunteers to share the strategies they used to find each difference.

> ***Teacher*** *So, the blue team got 845 and the red team got 684. I'd like you to estimate which of the two scores is closer to 700 and circle that number on your worksheet. OK, now set your workbook aside and use numbers or labeled sketches on your whiteboard to find the differences. You need to find out how far each score is from our target number, 700.* (Gives students a minute or two to work.)
>
> ***Teacher*** *I see lots of good work going on. Let's come back together and discuss the results. Before you share your answers, let's write an equation for each difference. What should I write to represent the difference between 845 and 700?*
>
> ***Student A*** *You write 845 – 700, and I know the answer already.*
>
> ***Teacher*** *Great! Keep it under your hat for a moment. What should I write to represent the difference between 684 and 700?*
>
> ***Student B*** *Well, 700 is bigger, so you have to write 700 – 684.*
>
> ***Teacher*** *OK, so what did you all get for the answers to these equations?*
>
> ***Students*** *It's 145 on the first one.*
> *The other one is way closer—16.*

845 – 700 = 145

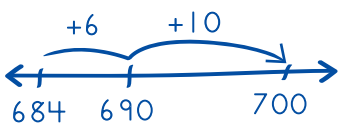
700 – 684 = 16

Teacher *Who'd like to share their strategy for finding one of these differences?*

Student A *On that first one, I knew the difference was 145 right away. You just go up 100, and then 45 more to get from 700 to 845.*

Teacher *So you added to find the difference on that one.*

Student B *I did the same thing with the other one, but I made a number line on my board, like this. I started at 684, then hopped up to 690, and then added 10 more to get to 700. It was 16.*



6 + 10 = 16

Student C *I did sort of the same thing, but I looked at the base ten area pieces. You can see that there are 7 hundreds mats at the top, right? Then on the red side, there's an extra hundreds mat, 4 tens, and 5 ones, so 845 has to be 145 more than 700.*

9 Use the differences to determine which team's score is closer to 700 and circle that score on the record sheet.

10 Play two more rounds of Target Seven Hundred. The team that scores closer to 700 more times wins.

CHALLENGE Change the target number to something that may require more from students when it comes to finding the difference between each team's score and the target. Try 715, or 721, or 749 instead of 700. You can stick with the same target number for each round, or change it each time to provide additional challenge.

11 When the game is over, have students put their materials away and join you in the discussion area.

Work Places

12 If enough time remains in the session, give students their folders and send them out to Work Places.

If there is not at least 20 minutes left in the period, consider introducing and assigning the Home Connection and having students get started on it in class.

13 Close the session.

- Have students clean up and put away the Work Place bins.
- Invite students to talk about what part of the game Target Seven Hundred is the most challenging. Is it choosing the place as each digit is selected? Is it comparing the numbers? Is it finding differences? Use students' answers to informally assess their needs.

Note

The Grade 2 Assessment Guide includes a Work Places Differentiation Chart for each unit. If you like, you can use these charts to make notes about which students need support or challenge with the skills featured in each Work Place.

Home Connection

14 Introduce and assign the Estimation Problems Home Connection, which provides more practice with the following skills:

- Solve two-step addition and subtraction story problems with sums and minuends to 100 involving situations of adding to, taking from, putting together, and taking apart with unknowns in all positions (2.OA.1)
- Fluently add and subtraction with sums and minuends to 100 (2.NBT.5)
- Add three 2-digit numbers (2.NBT.6)
- Explain why strategies for adding and subtracting 2-digit numbers work, using place value and the properties of operations (2.NBT.9)
- Solve money story problems involving dollar and cents amounts (2.MD.8)

Session 2
Unit 8 Pre-Assessment

Summary

During the first half of the session, students take the Unit 8 Pre-Assessment. When most students are finished with the assessment, the teacher reconvenes the class and conducts an activity designed to review place value through 999, and then move ahead into the thousands. Students draw numbered cards from a deck and place them in a pocket chart to form and read 1-, 2-, and 3-digit numbers. Each time they form a 3-digit number, they work together to build it with place value pieces and record it using expanded notation. After the class builds several 3-digit numbers, a fourth place is added, and students form, read, and discuss the place values of 4-digit numbers.

Skills & Concepts

- Demonstrate an understanding that the digits in a 3-digit number represent amounts of hundreds, tens, and ones (2.NBT.1)
- Demonstrate an understanding that 100 can be thought of as a bundle or group of 10 tens, called a hundred (2.NBT.1a)
- Demonstrate an understanding that multiples of 100 from 100 to 900 refer to some number of hundreds and 0 tens and 0 ones (2.NBT.1b)
- Skip-count by 10s and 100s up to 1000 (2.NBT.2)
- Read and write numbers to 1000 using base ten numerals and expanded form (2.NBT.3)
- Compare pairs of four-digit numbers based on meanings of the thousands, hundreds, tens, and ones digits (2.NBT.4)
- Model with mathematics (2.MP.4)
- Look for and make use of structure (2.MP.7)

Materials

Copies	Kit Materials	Classroom Materials
Assessment Unit 8 Pre-Assessment		
TM T1–T3 Unit 8 Pre-Assessment	• large base ten area pieces	• privacy screens (optional)
Problems & Investigations Four-Digit Shuffle		
	• large base ten area pieces (11 hundreds pieces, 10 tens pieces, 10 ones pieces) • Number Cards (1 deck, see Preparation)	• four 3″ × 5″ index cards • 1 sheet of green 9″ × 12″ construction paper (see Preparation) • standard pocket chart • student whiteboards, markers, and erasers (class set)

HC – Home Connection, **SB** – Student Book, **TM** – Teacher Master
Copy instructions are located at the top of each teacher master.

Vocabulary

An asterisk [*] identifies those terms for which Word Resource Cards are available.

digit*
hundreds*
ones*
tens*
thousands

Preparation

- Go through the deck of Number Cards and pull out 2 cards each for the numbers 0 through 9.
- Use the four 3″ × 5″ index cards to make place value labels: 1s, 10s, 100s, and 1,000s.
- Write "Thousands" on the green construction paper. Keep this "Thousands" mat with the "Hundreds," "Tens," and "Ones" mats you saved from Unit 2.
- Hang the pocket chart near the discussion circle.

Assessment

Unit 8 Pre-Assessment

1 Open the session by reviewing what a pre-assessment is and describing how you'd like students to work on the pre-assessment they will complete today.

Explain that a pre-assessment is a way for students to see what they will be learning in the next month or so. It is also a tool that helps you do a better job of teaching, because students' responses to the problems on the pre-assessment will help you learn about what they already know and what they still need to learn. For these reasons, there will be some problems on the pre-assessment that they will probably not be sure how to solve, and that's all right.

Explain that you would like students to do the following thing as they work on the pre-assessment:

- Work independently.
- Raise your hand if you have a question.
- Try to answer all the problems, even those you don't fully understand.
- Explain how you solved a problem when the directions ask you to. You can use pictures, numbers, and words in your explanations.

2 Use the display copy of the Unit 8 Pre-Assessment Teacher Master to review the pre-assessment with the class.

- Display your copy of the pre-assessment and give each student a copy.
- Read each problem out loud, and clarify as needed.
- Let students know that they can use the base ten area pieces if they want, and let them know how and where to access them.
- Here are some things to be aware of as you review each of the problems with the class:
  - » Problem 4 involves listing data points in order and entering them on a line plot. Reassure students that because this is a pre-assessment, it's OK if they're not quite sure how to handle these tasks. Encourage them to do their best and not worry too much about this problem.
  - » Let students know that they need to use a strategy more sophisticated than counting by 1s or counting on or backward to solve problems 5 and 6. They can model and solve these problems on an open number line, or by using and then making labeled sketches of base ten area pieces, or by using an algorithm they have invented or learned.

3 When students understand what to do, let them go to work.

SUPPORT Depending on the strengths and needs of your students, you may want to pull a small group to a back table or quiet corner of the classroom to complete the assessment with you or another adult helper present to help with reading and language questions. If a large number of your students will need this kind of support, you may want to circulate so you're widely available. An alternative would be to work through the assessment item by item with the entire class. If you decide to do this, give each student a half-sheet of colored copy paper to slide down to the next item as you work through the sheets together. (Students who complete an item before the rest of the class is ready to move on can either wait quietly or draw on the copy paper.) Since this is a pre-assessment, the issue is the amount of reading needed to understand and complete each item, rather than whether or not students actually know how to do the tasks.

4 After they've been working for about 20 minutes, check in with the class. If most students have quite a bit more to do, you have several choices:

- Give them as much more of the session as they need to complete the assessment, and have them go to Work Places or read quietly if they finish early. If you do this, you'll need to create an extra session in which to teach the place value activity that follows.
- Have all students turn in their papers now so you can go ahead with the place value activity. Plan to have students who weren't able to finish the assessment complete it the following day, either during a designated seatwork period or during math while other students are at Work Places.

Note

See the Grade 2 Assessment Guide for scoring and intervention suggestions.

Problems & Investigations

Four-Digit Shuffle

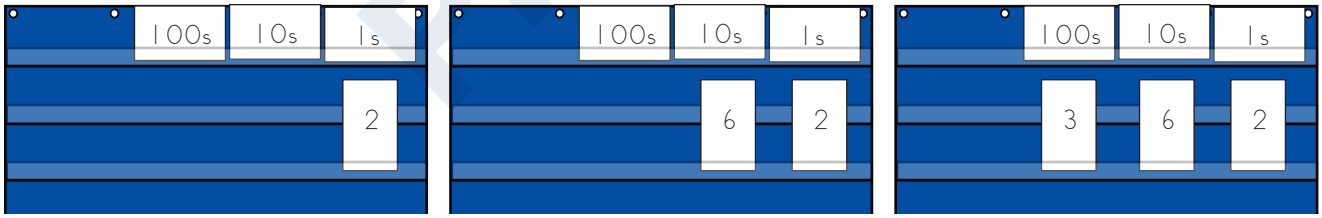
5 Have students bring whiteboards, markers, and erasers to the discussion circle as you post the 100s, 10s, and 1s labels across the top row of the pocket chart.

Hold the thousands label in reserve for now.

6 Show students the Number Cards, fanned out in your hand with the numbers facing away from students and explain that they will use the cards to practice building and reading numbers.

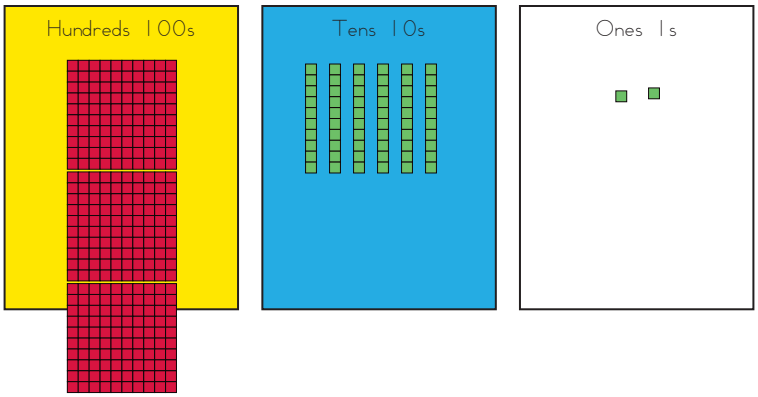
7 Have students help you build a 3-digit number by asking volunteers to come up one at a time to draw a card from your hand and place it in the pocket chart.

- Have them start at the ones place and move to the hundreds place.



Students *First it was 2. Then it was 62 because we got a 6. Then we got a 3, and that put on some hundreds, so it's 362 now.*

8 Set out the Hundreds, Tens, and Ones construction paper mats in the middle of the circle. Choose several helpers to build the number with base ten area pieces, setting the hundreds, tens, and ones pieces in the appropriate locations.



9 Write two expanded equations to match the number as students do so on their whiteboards. Press students to explain how and why the two equations mean the same thing.

300 + 60 + 2 = 362

362 = 300 + 60 + 2

Students *You can write it both ways. It doesn't matter.*
Equals is like saying the same as, and 362 is the same as 300 + 60 + 2.
They are kind of like the opposite of each other, but they both work.

10 Repeat steps 7–9 several times, clearing the pocket chart and base ten area pieces at the end of each repetition.

- After the second repetition, ask students to record the equations on their own, and call on volunteers to share their work with the class.

11 Now place the thousands card in the pocket chart, and set the green Thousands paper mat to the left of the Hundreds paper mat on the floor.

- Ask students to share what they know about 1,000.

  Possible questions:

  » How does it relate to 100?

  » How much is 1,000?

  » Would 1,000 students fit into our classroom? Would the cafeteria or the gym hold that many students?

  » Can you think of a place large enough to hold 1,000 second graders?

12 Use the paper mats and base ten area pieces to illustrate how ten pieces from one paper mat can be traded up for a single piece on the next paper mat as one moves from right to left.

- Start by trading 10 units for a strip and work your way up to trading 10 strips for a mat.

One way to accomplish this task is to set ten units on the Ones paper mat and ask students how these can be traded for a single piece. After making the trade and acknowledging 10 ones equal 1 ten, place 9 more strips on the Tens paper mat as students count with you by

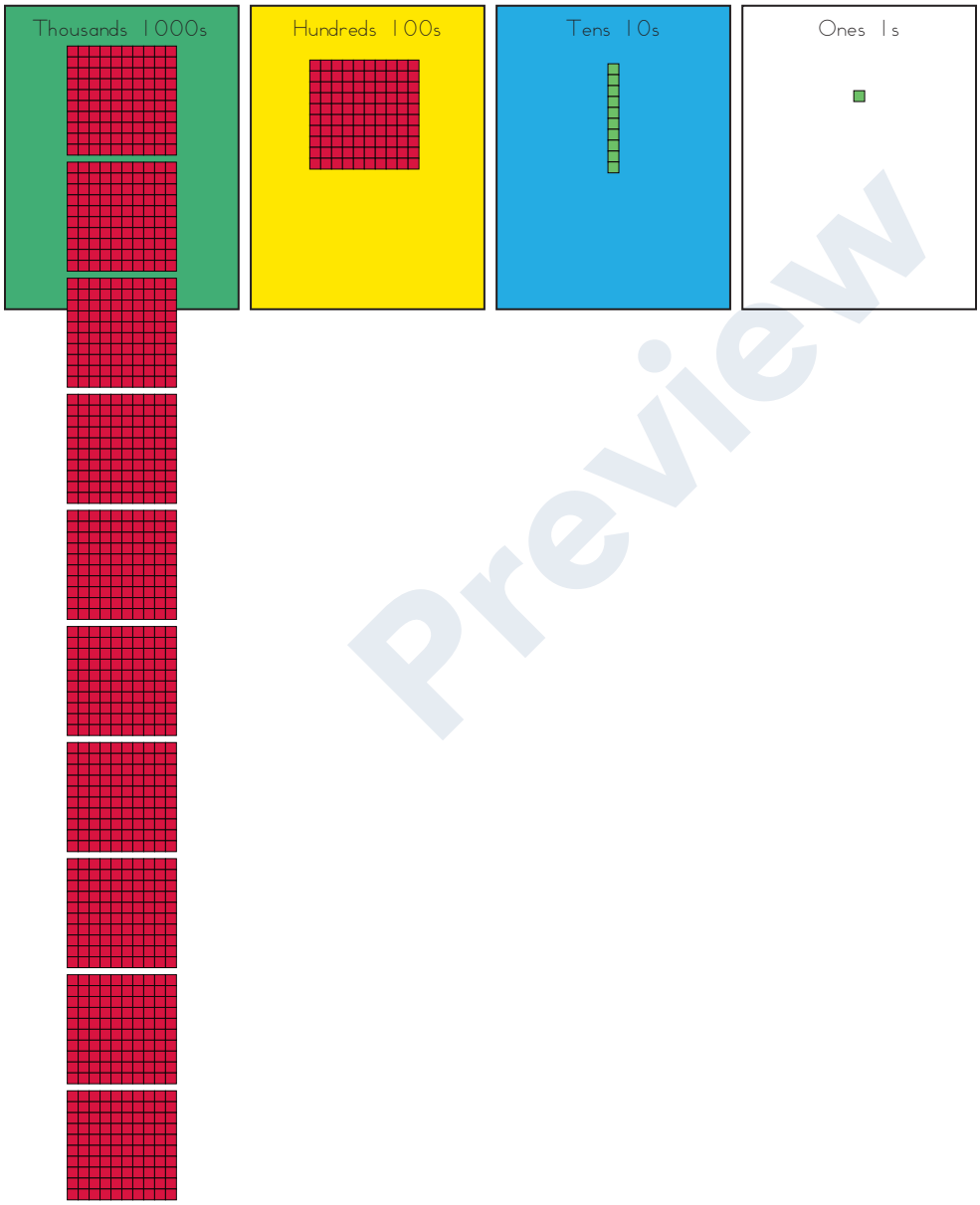
tens. Again ask if these strips can be traded for a single piece. Invite another student to move the 10 strips over to the Hundreds paper mat and replace them with a single mat.

13 Place 10 mats on the Hundreds paper mat as students count with you by 100s to 1,000.

- Ask students if they can trade the mats for a single piece.
- When they acknowledge that they do not have a single piece to represent 1,000s, ask a student to help you lay out 10 mats in a line on the Thousands paper mat.

14 Next, set out 1 mat on the Hundreds paper mat, 1 strip on the Tens paper mat, and 1 unit on the Ones paper mat.

- Ask students to pair-share observations, and then invite volunteers to share their thinking with the class.

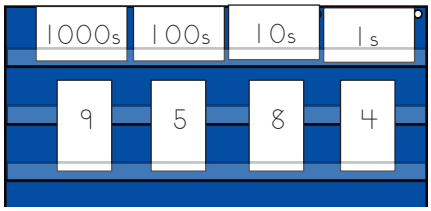


Students *A thousand is really huge!*
A thousand is 10 hundreds. It goes 100, 200, 300, 400, 500, 600, 700, 800, 900, 1,000!
The thousand is like a really giant strip, do you see?
Yeah! Instead of 10 ones in a line, it's 10 hundreds in a line.

I think there's kind of a pattern in the shapes, too. First there's a tiny square, then a long rectangle, then there's a big square for the mat, and then all the mats make a really long rectangle, kind of like a giant ten-strip!

15 Ask students to help you clear the base ten area pieces off the mats for now. Then call up four volunteers in turn to choose Number Cards from your hand and place them in the pocket chart.

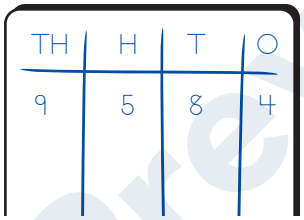
- Have the class read each number as it is formed, first the 1-digit number, then the 2-digit number, then the 3-digit number, and finally, the 4-digit number.



Students *Nine thousand, five hundred eighty-four. That's huge! One thousand is big enough. That number has 9 thousands in it!*

16 Now have students draw three lines to create four columns on their whiteboards and label each with an abbreviation for the place value word: TH, H, T, O.

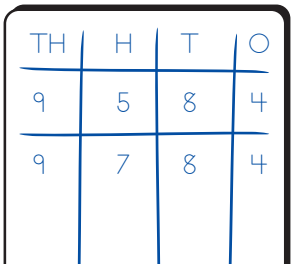
- Then ask them to copy the number in the pocket chart onto their whiteboards.



17 Invite students to draw a line under the number on their boards and then write it again, but have them change the digit in one of the columns.

- For instance, you might say, "Write the number again, but change the digit in the hundreds place to a 7."
- Change the digit in the pocket chart as well to confirm students' work, and have them read the new number.
- Ask them to decide whether the new number is greater than or less than the number above it on their whiteboards, and explain how they know.

Students *The new number is 9,784. That number is bigger. There are more hundreds in it. It was a 5 in the hundreds place. Now it's a 7. It has to be bigger.*



18 Repeat step 17 several times. Ask students to change the digit in a different column each time.

- Each time, ask students to read the new number and compare it to the number directly above it on their whiteboards. Is the new number greater than or less than the previous number? How do they know?
- Ask students to compare the last number on their charts to the first one. Is the very last number greater than or less than the number at the top of the chart? How do they know?

TH	H	T	O
9	5	8	4
9	7	8	4
5	7	8	4
5	7	9	4
5	7	9	6

Students *The last number is less than the first one we wrote because it only has 5 thousands in it instead of 9.*
Look! Every digit has changed.
All of the digits in the last number are bigger than the ones in the first number, except for the one in the thousands column.

CHALLENGE As you play the digit-switching game, pose questions that involve mental calculations, as well as reasoning about place value. Here are some examples:

- How can we change this number so that it is 10 greater?
- Write a number in the next row that is 100 more than the number above it.
- Write a number in the next row that is 500 less than the number above it.
- Write a number in the next row that is 199 more than the number above it.

19 Close the session.

- Have students put their materials away.

Session 3
Solving Story Problems

Summary

Today students solve several 3-digit addition problems, two of which are set in the context of finding a total distance or a total length. As students solve each problem, the teacher circulates to watch the strategies they use and selects two or three individuals to share and explain their methods. The class locates each strategy on the posters on display from the previous unit. If a new strategy emerges, students and teacher work together to make a new poster for display. Then students get their folders and go out to Work Places. Finally, the teacher introduces and assigns the Riddles & Toys Home Connection.

Skills & Concepts

- Use concrete models or drawings to add with sums to 1000 (2.NBT.7)
- Use strategies based on place value, properties of operations, or the relationship between addition and subtraction to add with sums to 1000 (2.NBT 7)
- Use written numbers and symbols to represent strategies for adding with sums to 1000 (2.NBT 7)
- Add with sums to 1000 using strategies that involve adding hundreds to hundreds, tens to tens, and ones to ones (2.NBT 7)
- Add with sums to 1000 using strategies that involve composing a hundred or a ten (regrouping) (2.NBT.7)
- Explain why addition strategies work, using place value and the properties of operations (2.NBT.9)
- Solve addition and subtraction story problems involving lengths given in the same units (2 MD.5)
- Make sense of problems and persevere in solving them (2.MP.1)
- Look for and express regularity in repeated reasoning (2.MP.8)

Materials

Copies	Kit Materials	Classroom Materials
Problems & Investigations Solving Story Problems		
TM T4 Three-Digit Story Problems **SB 99** Three-Digit Story Problems	• large base ten area pieces (see Preparation)	• Strategy Posters from Unit 7, Module 3, Session 4 (see Preparation) • chart paper • markers • piece of paper to mask portions of the display master
Work Places in Use		
6E Halves & Half-Nots (introduced in Unit 6, Module 3, Session 5) **7A** Race to the Cookie Jar (introduced in Unit 7, Module 1, Session 1) **7B** Estimate & Measure Centimeters (introduced in Unit 7, Module 1, Session 3) **7C** Ant Paths (introduced in Unit 7, Module 1, Session 5) **7D** Fair Shares (Introduced in Unit 7, Module 2, Session 4) **7E** Gardener's Friend Game (introduced in Unit 7, Module 3, Session 1)		
Home Connection		
HC 175–176 Riddles & Toys		

HC – Home Connection, **SB** – Student Book, **TM** – Teacher Master
Copy instructions are located at the top of each teacher master.

Vocabulary

An asterisk [*] identifies those terms for which Word Resource Cards are available.

difference*
information
problem
strategy
sum or total*

Preparation

- Re-hang the multi-digit addition and subtraction strategy posters you made with help from the class during Unit 7, Module 3, Session 4. Plan to leave them on display through the rest of this unit if possible.
- Prepare a basket or other container of base ten area pieces (hundreds, tens, and ones pieces) for each table or cluster of desks so students can access them easily if needed.

Problems & Investigations

Solving Story Problems

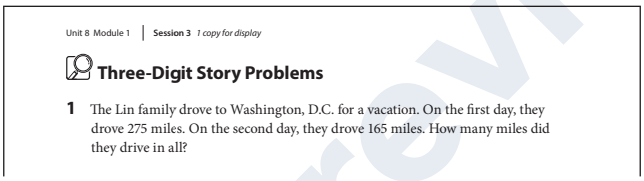
1 Let students know that today they are going to solve some story problems, share their strategies, and then go out to Work Places.

Call students' attention to the strategy posters you and they generated several weeks ago, and explain that they may use one or more of the strategies they see on the posters and possibly add some new ones to the collection today.

2 Then display and read the first problem on the Three-Digit Story Problems Teacher Master.

Ask students to:

- Restate the problem in their own words.
- Explain what they're supposed to find out.
- Identify the information in the problem that will enable them to solve it.


Unit 8 Module 1 | Session 3 *1 copy for display*

Three-Digit Story Problems

1 The Lin family drove to Washington, D.C. for a vacation. On the first day, they drove 275 miles. On the second day, they drove 165 miles. How many miles did they drive in all?

3 Now ask students to think, pair, and share their estimates of the answer.

> ***Student A*** *I think it'll be about 400 miles because 275 is close to 300. You can add 100 to that from the 165, and use the 65 to make up the extra because 275 is less than 300.*
>
> ***Student B*** *I said about 450 miles because 200 plus 100 is 300, and then 75 + 65 is more than another hundred. It's probably about 150 more, so that would make 450.*
>
> ***Student C*** *I agree with Katy on 450. Four hundred isn't enough, and 500 is too much, so it's probably in the middle.*

SUPPORT Scaffold students' thinking by giving them several different ranges to consider. For example, you might ask them whether the total will be less than 300. Why or why not? Then you might ask whether the total will be more than 500. Why or why not? Finally, you might ask whether the total will be closer to 400 or 450. How do they know?

4 Next, have students locate the Three-Digit Story Problems page in their Student Books. Read the instructions on the sheet with the class and give students time to solve the first problem from the teacher master.

- Have helpers place baskets or other containers of base ten area pieces at each table or cluster of desks.

Math Practices in Action 2.MP.1

By modeling how to restate what the problem is asking, identify the information required to solve it, and make a reasonable estimate before starting, you are helping students learn to make sense of problems and persevere in solving them. You are not promoting a formulaic approach to problem solving; instead, you are helping students get in the habit of orienting themselves before beginning their computations.

- Let students know they can work on their own or with the person sitting next to them, but they each need to complete their own sheet.
- Remind students that the answer alone is not enough. They need to use numbers, labeled sketches, or words to model and solve the problem.
- Remind students that they are free to use any of the methods displayed on the class addition strategy posters, or develop their own variations, or even use a strategy no one has shared so far.

5 As students work, circulate around the room to observe their strategies and assist as needed.

As you circulate, choose at least three students to share their work with the class when everyone is finished. Select work that demonstrates effective, efficient strategies and good place value understandings. If some students solve the problem well before the rest of the class is finished, ask them to check their own work by using a different strategy to solve the problem a second time.

SUPPORT Let students know that they can use base ten area pieces to solve the problem. Remind them how to make quick sketches of the pieces—squares for the hundreds, lines for the tens, and dots or Xs for the ones—so they can record their thinking in their books.

6 When most students have finished, solicit and record answer(s) from the class. Then invite the students you selected to share and explain their strategies for solving the problem.

- Encourage students to ask questions of the presenters.
- If needed, ask questions to draw out more about a student's thinking, or to help others understand it more fully.

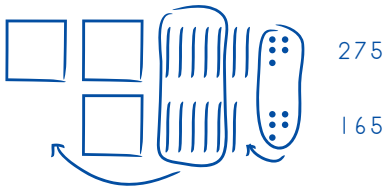
7 As each of the selected students finishes sharing his or her method, ask the class to identify it as one of the strategies on the displayed posters, or as a new strategy deserving of a new poster.

The list below shows some of the strategies you may see. It's likely that the posters displayed in your classroom reflect some variation of each of the first three. The traditional addition algorithm shown last on the chart may or may not emerge from your students. If it doesn't, that's fine. If it does, take care not to value it over the other strategies shared so far.

Common Strategies for Adding with Regrouping

1 Lay out the addends with base ten area pieces. Combine and count them to find the total. Make a sketch of the work.

275 + 165



I put 10 tens together to make a new 100, so then it was 400.
I put 10 ones together to make a new 10, so then it was 40. 400 + 40 = 440

2 Add the hundreds, tens, and ones separately, and then combine the resulting sums.

275 + 165

200 + 100 = 300
70 + 60 = 130
5 + 5 = 10

$$\begin{array}{r} 300 \\ 130 \\ +\ 10 \\ \hline 440 \end{array}$$

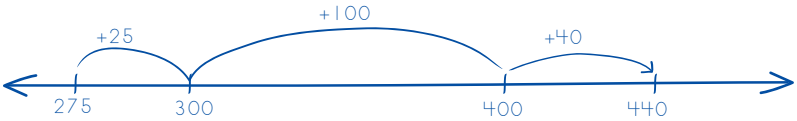
3 Model and solve the problem on an open number line. Add enough to the first addend to get to a landmark number (multiple of 10, 25, or 100), and then add the rest.

275 + 165

5 + 100 = 105
105 + 20 + 40 = 165

275 + 165 = 440

"275 plus 5 is 280. Then I had 160 left. So I added 100 to 280 to get 380. I had 60 more to add, so I added 20 to go up to the next hundred. That left 40 more. Then 400 + 40 = 440."



25 + 100 = 125 and 125 + 40 = 165

275 + 165 = 440

"275 plus 25 makes the next hundred. That's 300. If I add another 100 that is 400. I've only added 125, so I need to add 40 more. That makes 440."

4 Use the traditional algorithm.

275 + 165

```
  11
  275
+ 165
  440
```

Note

If a student uses the traditional algorithm, ask him to explain his method and invite the rest of the class to make sense of this approach conceptually, using base ten area pieces or sketches. As the student models and explains the traditional algorithm, listen and watch for the following:

- What language is he using when he records his work? Is he aware that he is regrouping (or "carrying") a ten, and then a hundred, or does he speak in terms of "carrying the 1," which may indicate a gap in his understanding of the process?
- When he is adding the tens and then the hundreds, does he name the values of the numbers and not just the digits? For example, in adding the tens, does he say, "1 + 7 + 6 is 14 tens. That's 140, so you have to move a hundred over," or, "10 + 70 + 60 is 140, so you have to move the hundred over." Or does he say, "1 + 7 + 6 = 14, so you put down the 4 and carry the 1." If it is the latter, he may have memorized the procedure without fully understanding it.

Sometimes, when students start by adding the numbers in the ones place as is done in the traditional algorithm, they also treat the hundreds and tens as single digits, and thereby make careless errors in notation and alignment because they are not considering place value. On the other hand, when students start from the front end of the number, working from the hundreds to the ones as they usually do when allowed to develop their own strategies, they are better able to gauge whether their final sum is reasonable because they focus more clearly on number size.

In identifying Grade 4, rather than Grade 2, as the target year for mastering the traditional algorithms for multi-digit addition and subtraction, the authors of the Common Core State Standards appear to be aware of these issues. Note too, that CCSS 2.NBT.7 makes reference to the idea of adding *hundreds to hundreds, tens to tens, and ones to ones,* indicating the authors' understanding that primary students tend to start their computations from the front, rather than the back end of the number.

8 Next, repeat steps 2–7 for the second problem on the Three-Digit Story Problems Teacher Master.

9 While students work on the problem, write 345 + 175 on the board. As students finish, ask them to use one of the strategies displayed to find the sum.

- Ask each student to work the problem independently on a piece of scratch paper. Collect these and look them over later to get a sense of students' current strategies, understandings, and misconceptions.

Work Places

10 When students finish solving the problem, invite them to turn in their work, get their folders, and go to Work Places.

11 Close the session.

- Have students clean up and put away the Work Place bins.

Home Connection

12 Introduce and assign the Riddles & Toys Home Connection, which provides more practice with the following skills:

- Solve one- and two-step subtraction story problems with minuends to 100 involving situations taking from, with unknowns in all positions (2.OA.1)
- Identify whether a number is odd or even (2.OA.3)
- Demonstrate an understanding that the digits in a 3-digit number represent amounts of hundreds, tens, and ones (2 NBT.1)
- Read numbers to 1000 represented with numerals (2.NBT.3)
- Read and write numbers to 1000 represented in expanded form (2.NBT.3)
- Add three 2-digit numbers (2.NBT.6)
- Solve money story problems involving dollar amounts (2.MD.8)
- Make sense of problems and persevere in solving them (2.MP.1)

Session 4

Introducing Work Place 8A Sum It Up

Summary

The teacher introduces Work Place 8A Sum It Up. In the game, players take turns rolling random numbers and deciding after each roll what place value to assign to that number. After six rolls, each player has two 3-digit numbers, which they add together to try to get either the smallest or largest sum. After playing against the teacher, students work in pairs to play. At the end of the session, students go out to Work Places.

Skills & Concepts

- Demonstrate an understanding that the digits in a 3-digit number represent amounts of hundreds, tens, and ones (2.NBT.1)
- Compare pairs of 3-digit numbers, based on an understanding of what the digits in their hundreds, tens, and ones places represent, and use >, =, and < symbols to record those comparisons (2.NBT.4)
- Use concrete models or drawings to add with sums to 1000 (2.NBT.7)
- Use strategies based on place value, properties of operations, or the relationship between addition and subtraction to add with sums to 1000 (2.NBT 7)
- Relate strategies for adding with sums to 1000 to written methods, and use written numbers and symbols to represent strategies for adding with sums to 1000 (2.NBT.7)
- Add with sums to 1000 using strategies that involve adding hundreds to hundreds, tens to tens, and ones to ones, and strategies that involve composing a hundred or a ten (2.NBT.7)
- Explain why strategies for adding 2- and 3-digit numbers work, using place value and the properties of operations (2.NBT.9)
- Reason abstractly and quantitatively (2.MP.2)
- Construct viable arguments and critique the reasoning of others (2.MP.3)

Materials

Copies	Kit Materials	Classroom Materials
Work Places Introducing Work Place 8A Sum It Up		
TM T5 Work Place Guide 8A Sum It Up **TM T6** Work Place Instructions 8A Sum It Up **TM T7** 8A Sum It Up Record Sheet **SB 100** 8A Sum It Up Class Record Sheet	• large base ten area pieces (one set for each pair of students) • 1 more/less die • 1 die numbered 1–6 (one for each pair of students)	• Strategy Posters from Unit 7, Module 3, Session 4, and any additional posters generated last session • scratch paper (half-sheet for each student)
Work Places in Use		
7A Race to the Cookie Jar (introduced in Unit 7, Module 1, Session 1) **7B** Estimate & Measure Centimeters (introduced in Unit 7, Module 1, Session 3) **7C** Ant Paths (introduced in Unit 7, Module 1, Session 5) **7D** Fair Shares (introduced in Unit 7, Module 2, Session 4) **7E** The Gardener's Friend Game (introduced in Unit 7, Module 3, Session 1) **8A** Sum It Up (introduced in this session)		

HC – Home Connection, **SB** – Student Book, **TM** – Teacher Master
Copy instructions are located at the top of each teacher master.

Vocabulary

An asterisk [*] identifies those terms for which Word Resource Cards are available.

compare*
greater than*
inequality statement
less than*
sum or total*

Preparation

In today's session, you'll introduce Work Place 8A Sum It Up. Before this session, you should review the Work Place Guide and Work Place Instructions and assemble the bin for Work Place 8A (which replaces Work Place 6E Halves & Half Nots), using the materials listed. The Work Place Guide also includes suggestions for differentiating the activity to meet students' needs.

Work Places

Introducing Work Place 8A Sum It Up

1 Tell the class that today they will play a new game called Sum It Up. This game will give them a chance to practice adding and comparing larger numbers.

- First, they will play against you as an introduction to the game and then play again with a partner.
- After they learn the game, they will go to Work Places.

2 Display the 8A Sum It Up Record Sheet Teacher Master and have students find the Sum It Up Class Record Sheet in their Student Books.

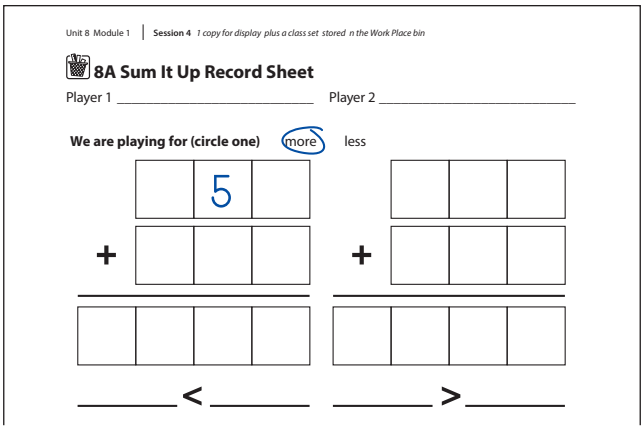
- Ask students to share observations about the record sheet and predictions about the game.

3 Briefly summarize the game.

Players take turns rolling random numbers and deciding after each roll what place value to assign to that number. After six rolls, each player has two 3-digit numbers, which they add together to try to get either the smallest or largest sum.

4 Then start playing the game against the class using the Work Place Instructions 8A Sum It Up as needed.

- Explain that the first step in the game is to find out if you will play for more or less.
- Invite a student volunteer to come to the display and roll the more/less die to determine whether you are going to play for the greatest or smallest sum.
- Choose another student volunteer come up and roll the die numbered 1–6 one time.
- Explain that each team (the class and you) will get to roll the die six times to make two 3-digit numbers.
- Ask students to think about where they would like to place the digit that has just been rolled.
- As you play, have students discuss their options, and then let a volunteer decide where to place the digit for the students' team.
- Write the number on the student side of the 8A Sum It Up Record Sheet as students do so on the record sheet in their Student Books.


Unit 8 Module 1 | Session 4 *1 copy for display plus a class set stored in the Work Place bin*

8A Sum It Up Record Sheet

Player 1 _____ Player 2 _____

We are playing for (circle one) more less

		5					
+				+			

_____ < _____ _____ > _____

Teacher *OK, you rolled a 5 and the spinner tells us we're trying to get the greatest possible sum. Remember, the die goes from 1 to 6. Where do you think you want to put the 5? The ones place, tens place, or hundreds place?*

Student *Most kids think the tens place. We could still get a 6 for the hundreds, but 5 is pretty big, so we don't want to waste it in the ones place. We want a smaller number for the ones place.*

- Verbalize your strategy in placing the digits rolled before you write them down.

5 Make sure students are recording the numbers properly on their own sheets. Use this time to stress the rule that once a digit is placed, it can't be moved.

Note You do not have to place all the digits in the boxes for the first number before placing digits in the boxes for the second number. Suppose you are playing for the greater sum, and you have already rolled a 1 and placed it in the ones box for the first number. On your next turn, you roll a 1 again. You can place this digit in the ones box for the second number, rather than in the tens or hundreds box for the first number.

SUPPORT Encourage students to use base ten area pieces or base ten sketches to keep track of their two numbers as you play. Seeing the visual model of the numbers reinforces the place value concepts at work and can help students think more strategically about assigning place values to the digits they roll.

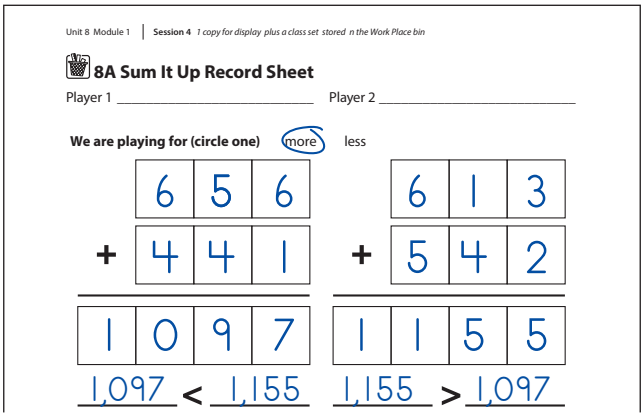
6 When both teams—you and the class—have placed all six of their digits, have students predict the winner by estimating both sums before they do the actual calculations.

7 Then give students a minute or two to compute both sums.

- Have helpers hand out a half-sheet of scratch paper to each student on which to make calculations, and place a couple of sets of base ten area pieces at each table or cluster of desks for easy access by students who want to use them.
- Draw students' attention to the strategy posters on display, and encourage them to use the strategy that makes the most sense and seems most efficient to them right now.
- Have students share and compare their answers and strategies as they finish.

8 Solicit answers to both problems from the class and record them on the board. Then invite two volunteers to explain how they got their answers, a different student for each problem.

9 Finally, work with input from the class to write inequalities to express the relationship between the sums and circle the winning number on your record sheet as students do so on theirs.



Unit 8 Module 1 | **Session 4** *1 copy for display plus a class set stored in the Work Place bin*

8A Sum It Up Record Sheet

Player 1 _____ Player 2 _____

We are playing for (circle one) more less

	6	5	6		6	1	3
+	4	4	1	+	5	4	2
1	0	9	7	1	1	5	5

1,097 < 1,155 1,155 > 1,097

10 Have students use the bottom half of the Sum It Up Class Record Sheet to play the game again in pairs.

- Give each pair a die numbered 1–6 and have students play for the lesser sum if the class played for the greater or vice versa.
- Remind them that they must assign a place value for each digit as they roll the die, and once they've placed a digit, it can't be moved.
- Be sure students understand that they can place each digit they roll in any of the six boxes on their side; they do not have to complete the first number before assigning digits to the second number.

Circulate around the room and listen to how they are discussing place value and computation strategies. As students add these 3-digit numbers with and without regrouping, encourage them to compose number chunks flexibly, use derived facts, and employ visual models such as base ten sketches or the open number line to support their thinking.

11 When most students have finished playing the game in pairs, show them the contents of the new Work Place bin.

Students should note that there is room to play the game twice on one sheet. Since they will be sharing a record sheet, they might consider cutting it in half after playing both rounds of the game so that each of them has a piece of finished work to put in their Work Place folder.

12 Be sure all students know how to play the game.

- Ask students if they have any questions about the game.
- Then have students turn to a partner to summarize the directions.

13 Then give students their folders and send them out Work Places for the rest of the session.

14 Close the session.

- Have students clean up and put away the Work Place bins.
- Ask students if Sum It Up reminds them of any other games they played this year. Invite them to compare the game to other Work Place games.

Session 5

Larger Numbers on a Line

Summary

In this session, students use the open number line to model and solve three subtraction story problems, all of which involve some form of comparing. They work the first problem as a whole group, the second with a partner, and the third independently. When they finish the last problem, they get their folders and go to Work Places. Finally, the teacher introduces and assigns the Comparing Numbers & Sharks' Lengths Home Connection.

Skills & Concepts

- Skip-count by 10s and 100s within 1000 (2.NBT.2)
- Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons (2.NBT.4)
- Use concrete models or drawings to subtract with minuends to 1000 (2.NBT.7)
- Use strategies based on place value, properties of operations, or the relationship between addition and subtraction to subtract with minuends to 1000 (2.NBT.7)
- Relate strategies for subtracting with minuends to 1000 to written methods, and use written numbers and symbols to represent strategies for subtracting with minuends to 1000 (2.NBT 7)
- Mentally add or subtract 10 or 100 to or from any 3-digit number between 100 and 900 (2.NBT.8)
- Explain why strategies for subtracting 2- and 3-digit numbers work, using place value and the properties of operations (2.NBT.9)
- Reason abstractly and quantitatively (2.MP.2)
- Construct viable arguments and critique the reasoning of others (2.MP.3)

Materials

Copies	Kit Materials	Classroom Materials
Problems & Investigations Larger Numbers on a Line		
TM T8 Numbers on a Line Problems **SB 101*** Numbers on a Line Problem-Solving Sheet		
Work Places in Use		
7A Race to the Cookie Jar (introduced in Unit 7, Module 1, Session 1) **7B** Estimate & Measure Centimeters (introduced in Unit 7, Module 1, Session 3) **7C** Ant Paths (introduced in Unit 7, Module 1, Session 5) **7D** Fair Shares (introduced in Unit 7, Module 2, Session 4) **7E** The Gardener's Friend Game (introduced Unit 7, Module 3, Session 1) **8A** Sum It Up (introduced in Unit 8, Module 1, Session 4)		
Home Connection		
HC 177–178 Comparing Numbers & Sharks' Lengths		

HC – Home Connection, **SB** – Student Book, **TM** – Teacher Master
Copy instructions are located at the top of each teacher master.
** Run 2 copies of this page for display.*

Vocabulary

An asterisk [*] identifies those terms for which Word Resource Cards are available.

compare*
difference*
greater than*
less than*
story problem
subtraction

Problems & Investigations

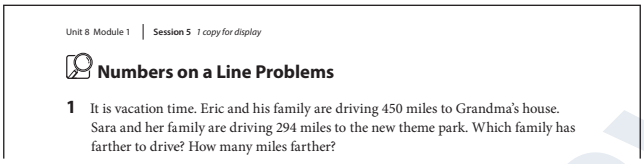
Large Numbers on a Line

1 Let students know that today they're going to use the open number line to model and solve some comparing problems, share their solutions and strategies, and then go out to Work Places.

2 Then display and read the first problem on the Numbers on a Line Problems Teacher Master.

Ask students to:

- Restate the problem in their own words.
- Explain what they're supposed to find out.
- Answer the first question—which family has farther to drive? How do they know?
- Identify the information in the problem that will enable them to answer the second question—how many miles farther?


Unit 8 Module 1 | Session 5 *1 copy for display*

Numbers on a Line Problems

1 It is vacation time. Eric and his family are driving 450 miles to Grandma's house. Sara and her family are driving 294 miles to the new theme park. Which family has farther to drive? How many miles farther?

3 Now ask students to think, pair, and share their estimates of the answer to the second question—how many miles farther?

> ***Student A*** *I think Eric's family will have to drive about 150 miles farther than Sara's because 294 is real close to 300, and 300 + 150 is 450.*
>
> ***Student B*** *I agree with you, Kim. It must be less than 200 miles, because 294 + 200 would be 494, and Eric's family doesn't have to go that far.*

SUPPORT Scaffold students' thinking by giving them several different ranges to consider. For example, you might ask them whether the difference in driving distances will be less than 100 miles. Why or why not? Then you might ask whether the difference will be more than 200 miles. Why or why not? Finally, you might ask whether the difference will be closer to 100 or 150 miles. How do they know?

4 Draw an open number line on the board. Label it with the two driving distances as you retell the story problem.

> ***Teacher*** *Let's pretend this open number line is the freeway. Sara's family is only driving 294 miles, but Eric's family has to drive 450 miles. How might you use the number line to find out how much farther Eric and his family have to drive?*

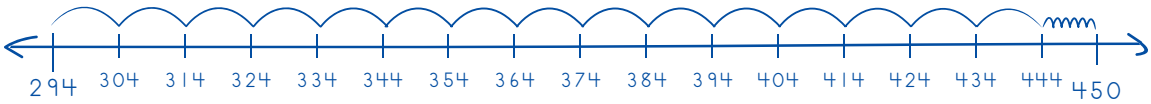
5 Then work with input from the class to determine the distance from 294 to 450. Count forward by 10s, and then 1s, on the line, labeling the landing points as you go.

Math Practices in Action 2.MP.2

Modeling computation strategies on the open number line is an effective and developmentally appropriate way to help students transition from quantitative to abstract reasoning.

Other than making jumps of 1, this is the least efficient way to find the difference between 294 and 450. It is a strategy some students will use, however, unless you plod through it together, and then press them to come up with strategies more efficient than yours.

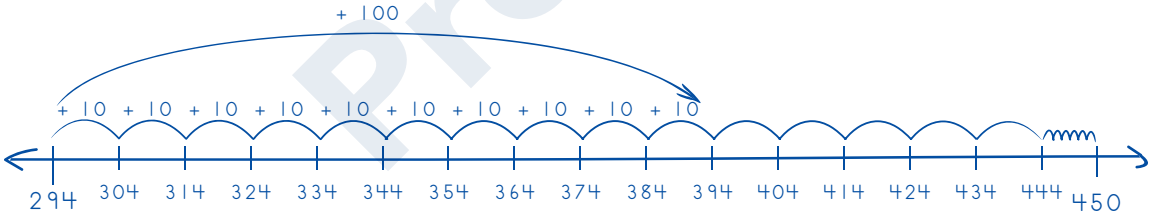
> ***Teacher*** *Sometimes people like to take hops of 10 to see how far it is from one point to another on the number line. I'm going to do that now, but I'm going to need your help counting by 10s. Here we go—you count and I'll make and label the hops on the line.*



6 After you complete this process, return to the second part of the original problem. How many miles farther did Eric's family have to drive?

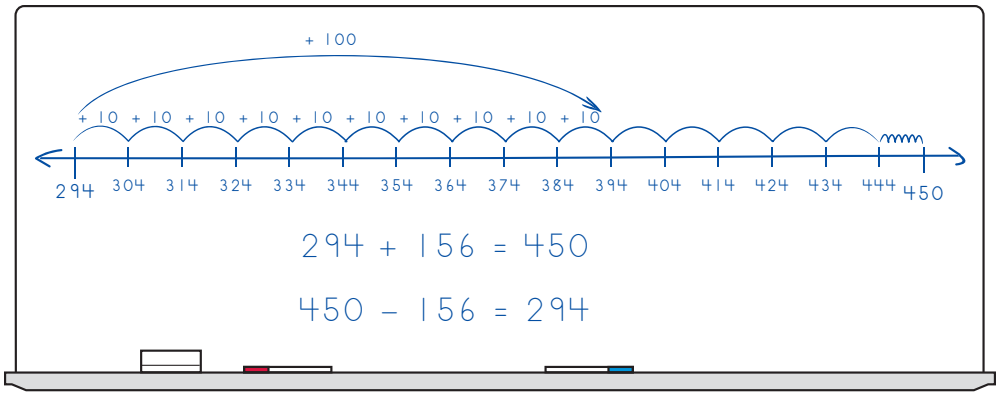
- Students will likely suggest that you have to count the hops by 10s and 1s to find the answer. Have them do so while you label the hops along the line to show how much has been added with each hop.
- Stop when students reach 100, and draw a long arc over all the shorter arcs to highlight the fact that you can take hops that are longer than 10 when working on the open number line, and then label the remaining hops in 10s and 1s.

> ***Teacher*** *So how much farther did Eric's family have to drive?*
>
> ***Students*** *A lot!*
> *You have to go back and count how many 10s you hopped, and then add on the 1s at the end.*
>
> ***Teacher*** *OK. I'll label the hops and you keep track of the distance. Ready?*
>
> ***Students*** *10, 20, 30, 40, 50, 60, 70, 80, 90, 100…*
>
> ***Teacher*** *Wait! Let's draw a long arc over all our little hops of 10 to show that we've gone 100.*



> ***Teacher*** *OK, let's keep going. We haven't finished. You count and I'll label.*
>
> ***Students*** *110, 120, 130, 140, 150…*
> *Now we have to count by 1s!*
> *151, 152, 153, 154, 155, 156.*
> *So Eric had to go 156 more miles than Sara.*
> *That's what I thought—about 150 miles.*

7 When the solution (156 miles) is found, work with input from students to summarize the information in the form of an addition and then a subtraction equation.



8 Now ask students to share ideas for modeling and solving the same problem on the open number line in a more efficient way. Ask them if it is really necessary to make and label so many hops, or can the problem be solved more quickly and easily.

- Give students a minute to talk with one another.
- Then draw a second number line on the board below yours, with the points for 294 and 450 marked and labeled, and invite a student volunteer up to share and explain a different, and hopefully more efficient way to find the difference between the two.

> ***Student*** *I just added 6 to get up to 300. Then I went by 50s, see? 300, 350, 400, 450.*

9 Next, ask students to discuss the volunteer's strategy.

- Did this student get the same answer as you did? How do they know?
- How do the hops the student took compare to yours? How are they the same? How are they different?

10 Now ask students to locate the Numbers on a Line Problem-Solving Sheet in their Student Books.

- Read the instructions at the top of the page together, and ask them to model and solve the first problem in the space allotted.
- Let students know that they can replicate your strategy, but you're hoping they can come up with something quicker and easier than what you demonstrated.
- They can also replicate the strategy just shared by their classmate, but ideally, they can come up with a different way to find the difference.
- Remind students that they can start at 450 and hop backward. They can also use a combination of forward and backward hops.
- Be sure students understand that they need to fill in the answer on the line provided at the bottom of the problem box on their sheets.

11 As students finish, have them share and compare their strategies with others at their tables or nearby.

You may also use this time to stress the importance of communication in problem solving. Students can trade open number lines without talking to see if they can follow the work of their partners just by reading it.

12 Then display the second problem on the Numbers on a Line Problems Teacher Master and read it together.

2 Little Inchworm is going on a trip to see her friend on the other side of the meadow. Her friend lives 519 inches away. Little Inchworm has already crawled 308 inches. How many more inches does she need to go to get to her friend's house?

Little Inchworm still has to go _____ inches to get to her friend's house.

13 Ask students to solve the problem in pairs using the second blank open number line in their Student Books.

As students work, circulate to look for examples that you will want to have students share with the class. Listen to conversations to assess how students are handling the task.

14 Then invite two or three students to share their strategies with the group.

> ***Student A*** *We started at 308 and counted by hundreds, 408, 508. Then we jumped 2 more to 510. To get to 519, we just needed 9 more. So the little worm had to go 200, then 2 more, and then 9 more. That's 211 inches.*
>
> ***Student B*** *We did it kind of like you, but we just made one big jump from 308 to 508. Like this.*

Some students might prefer to use mental strategies that work efficiently for them. If students are computing accurately and efficiently, encourage them to keep using their strategies and invite them to model their thinking on the number line if possible.

> ***Student*** *We did the problem in our head—it's 211. Five hundred nineteen take away 19 is 500. Then you can go back 200, and you land on 300 Then you have to go back up to 308, so that's like 219 – 8, and that's 211.*
>
> ***Teacher*** *Is there a way you two could show your thinking on the board using an open number line?*

15 Finally, read the last problem on the Numbers on a Line Problems Teacher Master together and ask students how they know more pages were read in May than in September.

- Invite a student volunteer to write a comparison statement using the numbers.

3 In September, second graders in Kendra's reading group read 692 pages in all. In May they read 820 pages. How many more pages did they read in May than September?

The second graders in Kendra's group read _____ more pages in May than in September.

16 Ask students to solve the problem independently using the last open number line in their Student Books.

As they finish, have them share and compare solutions and strategies with at least one classmate. If there is disagreement about the answer, have students work together to resolve their differences.

CHALLENGE Some students may insist that they have a better or more efficient strategy for finding the difference; one that does not utilize the number line. Allow these students to use their own methods, but ask them to check their work by solving the problem a second time using the open number line.

Work Places

17 When students finish the assignment, have them get their folders and go out to Work Places.

18 Close the session.

- Have students clean up and put away the Work Place bins.
- Give students time to share their solutions to the last problem presented before Work Places.

Home Connection

19 Introduce and assign the Comparing Numbers & Sharks' Lengths Home Connection, which provides more practice with the following skills:

- Demonstrate an understanding that the digits in a 3-digit number represent amounts of hundreds, tens, and ones (2.NBT.1)
- Demonstrate an understanding that multiples of 100 from 100 to 900 refer to some number of hundreds and 0 tens and 0 ones (2.NBT.1b)
- Read and write numbers to 1000 represented with numerals, words, and expanded form (2.NBT.3)
- Compare pairs of 3-digit numbers, based on an understanding of what the digits in their hundreds, tens, and ones places represent and use >, =, and < symbols to record those comparisons (2.NBT.4)
- Order numbers from 0 to 1,000 (supports 2.NBT)
- Solve subtraction story problems involving lengths given in the same units (2.MD.5)

Session 6

Roll & Subtract One Thousand

Summary

Students play another new game, Roll & Subtract One Thousand, against the teacher today. In the game, the class and the teacher take turns rolling 3 dice numbered 1–6, arranging the numbers rolled to form 3-digit numbers, and subtracting those numbers from 1,000. After three turns, the team with the non-negative score closer to 0 wins. Students play the game twice with the teacher, and then the game is added to the current collection of Work Places.

Skills & Concepts

- Demonstrate an understanding that the digits in a 3-digit number represent amounts of hundreds, tens, and ones (2.NBT.1)
- Compare two numbers based on meanings of the digits, using >, =, and < symbols to record the results of comparisons (2.NBT.4)
- Use concrete models or drawings to subtract with minuends to 1000 (2.NBT.7)
- Use strategies based on place value, properties of operations, or the relationship between addition and subtraction to subtract with minuends to 1000 (2.NBT.7)
- Relate strategies for subtracting with minuends to 1000 to written methods, and use written numbers and symbols to represent strategies for subtracting with minuends to 1000 (2.NBT.7)
- Subtract with minuends to 1000 using strategies that involve subtracting hundreds from hundreds, tens from tens, and ones from ones (2.NBT.7)
- Mentally add or subtract 10 or 100 to or from any 3-digit number between 100 and 900 (2.NBT.8)
- Explain why addition and subtraction strategies work, using place value and the properties of operations (2.NBT.9)
- Reason abstractly and quantitatively (2.MP.2)
- Construct viable arguments and critique the reasoning of others (2.MP.3)

Materials

Copies	Kit Materials	Classroom Materials
Problems & Investigations Roll & Subtract One Thousand		
SB 102* Roll & Subtract One Thousand Class Record Sheet	• 3 dice numbered 1–6	• student whiteboards, markers, and erasers (class set)
Work Places Introducing Work Place 8B Roll & Subtract One Thousand		
TM T9 Work Place Guide 8B Roll & Subtract One Thousand **TM T10–T11** Work Place Instructions 8B Roll & Subtract One Thousand		
Work Places in Use		
7B Estimate & Measure Centimeters (introduced in Unit 7, Module 1, Session 3) **7C** Ant Paths (introduced in Unit 7, Module 1, Session 5) **7D** Fair Shares (introduced in Unit 7, Module 2, Session 4) **7E** The Gardener's Friend Game (introduced Unit 7, Module 3, Session 1) **8A** Sum It Up (introduced in Unit 8, Module 1, Session 4) **8B** Roll & Subtract One Thousand (introduced in this session)		

HC – Home Connection, **SB** – Student Book, **TM** – Teacher Master
Copy instructions are located at the top of each teacher master. ** Run 2 copies of this page for display.*

Vocabulary

An asterisk [*] identifies those terms for which Word Resource Cards are available.

compare*
difference*
greater than*
inequality statement
less than*

Preparation

In today's session, you'll introduce Work Place 8B Roll & Subtract One Thousand. Before this session, you should review the Work Place Guide and Work Place Instructions and assemble the bin for Work Place 8B (which replaces Work Place 7A Race to the Cookie Jar), using the materials listed. The Work Place Guide also includes suggestions for differentiating the activity to meet students' needs.

About This Session

In using an open number line to model and solve subtraction problems, you can either work forward, starting with the subtrahend and making hops up to the minuend—in effect, finding the difference between the two numbers—or backward, starting with the minuend and making hops backward in the amount of the subtrahend. Both methods are shown here.

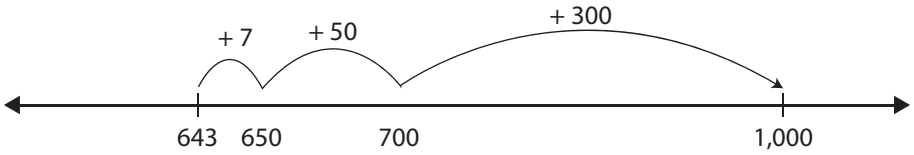


Figure 1: Differencing
1,000 – 643 = 357
(The difference between 643 and 1,000 is 357)

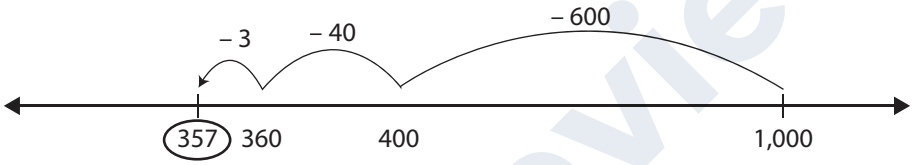


Figure 2: Taking Away
1,000 – 643 = 357
(1,000 takeaway 643 is 357)

Over the last few months, you may have found that many of your second graders prefer the first method, which they may think of (correctly) as adding to find the difference. In the game you introduce today, we suggest that you demonstrate the second method, hopping backward to find the solutions to subtraction problems. In some respects, this is more challenging, requiring that students count backward by 100s, 10s, and 1s, rather than forward. On the other hand, the takeaway model is more fitting for the game itself, in which both teams start with 1,000 and race backward to 0. There is still plenty of flexibility in hopping backward; students are free to hop back to friendly numbers before making longer hops. They are also free to hop backward 1 hundred or 1 ten at a time. While they may not choose to use this approach when they play the game independently, this is a good opportunity to expose them to the idea.

Problems & Investigations

Roll & Subtract One Thousand

1 Tell the class that today they will play a new game called Roll & Subtract One Thousand. This game will give them a chance to practice subtracting larger numbers.

- First, they will play two rounds of the game against you as an introduction.
- Then they will go out to Work Places.

2 Display a copy of the Roll & Subtract One Thousand Class Record Sheet Student Book page and set out 3 dice numbered 1–6 dice alongside the sheet.

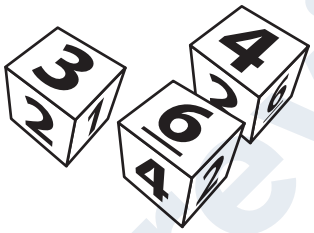
- Invite students to share what they think might happen in this new game.

3 Summarize the game.

The class takes turns with you to roll the three dice, arrange the numbers rolled to form 3-digit numbers, and subtract those numbers from 1,000. After three turns, the team with the score that is closer to 0 wins.

4 Take the first turn by rolling all three dice at once. Then work with input from the class to form the largest number possible with the digits you rolled.

Teacher *First, I'll roll all three dice at the same time.*

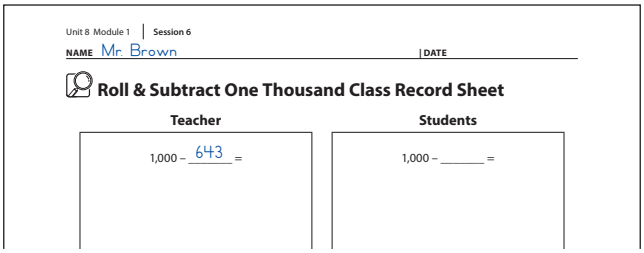


Teacher *I have a 3, 6, and 4. I want to subtract the largest number I can from 1,000 because I'm trying to get to zero. What's the largest number I can make by putting one number each in the ones, tens, and hundreds places? Talk to the person sitting next to you, and let's have everyone tell what the number would be when I raise my hand.*

Students *It's 634!*
No, there's an even bigger number than that—643!

5 Write an equation to represent the situation in the first box on your side of the record sheet. Then ask students to estimate the results, first in pairs and then as a whole class.

Will the results of the subtraction be more or less than 500? How do they know?


Unit 8 Module 1 | Session 6

NAME Mr. Brown | DATE

Roll & Subtract One Thousand Class Record Sheet

Teacher	Students
1,000 – 643 =	1,000 – _____ =

Teacher *OK, so my first subtraction problem is 1,000 – 643. Before we solve the problem, I'd like you to make an estimate. Do you think the answer will be more than 500 or less than 500? Talk to the person next to you, and then let's hear from a few of you.* (Gives students a few moments to talk.)

Teacher *Who'd like to share their thinking? Geraldo?*

Student A *When you take that away from 1,000, you'll be more than halfway to zero.*

Teacher *Can you explain how you know that?*

Student A *Well, 500 is half of 1,000, so if you take away more than 500, you'll be more than halfway from 1,000 to 0.*

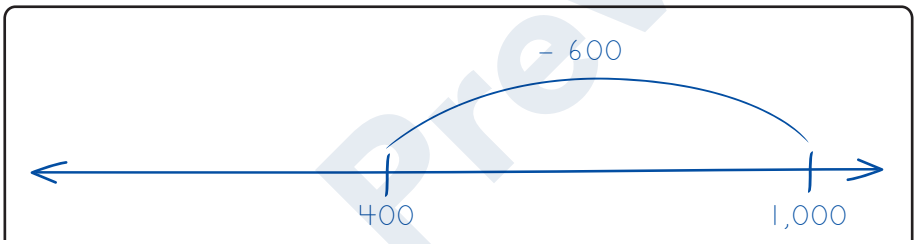
Teacher *Thumbs up if you agree. OK… does someone have a different way to think about this problem? Shelly?*

Student B *It has to be less than 500 because 1,000 – 600 is only 400, and 643 is more, so I think it's going to be around 350.*

6 Next, draw an open number line on the board. Mark and label a point at the far right side for 1,000, and then work with input from the class to subtract the 100s, then the 10s, and then the 1s.

Teacher *Most people think my answer is going to be less than 500. Let's find out. I'm going to draw an open number line on the board and use it to help solve the problem. I'll make and label a point for 1,000 at the far end. How many hundreds do I get to take away?*

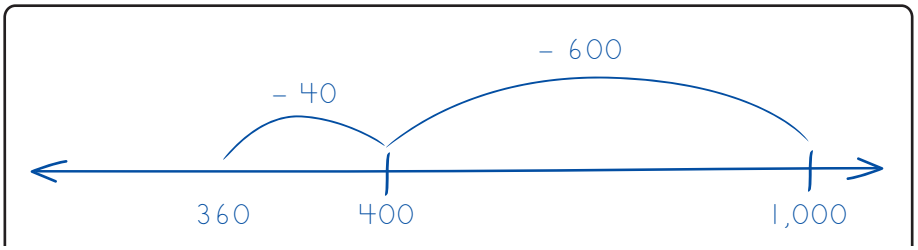
Students *Six hundred!*
The answer is 400! It's just like 10 – 6, but a lot bigger.



Teacher *Now I'm going to subtract the 10s, all in one big jump. How many 10s do I get to take away?*

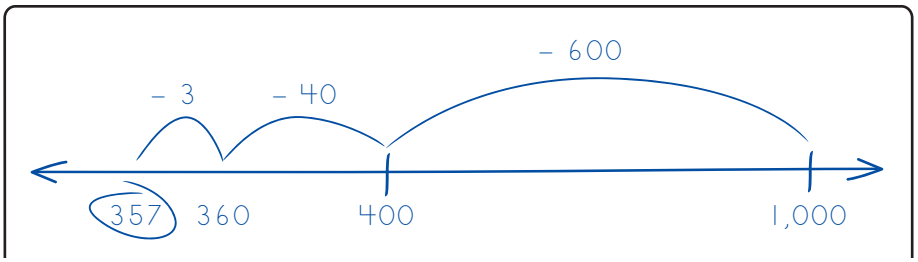
Students *Forty!*
Four tens—that's the same as 40.

Teacher *What is 400 minus 40? Not sure? Let's count backward by 10s—400… 390, 380, 370, 360.*



Teacher *OK, we've subtracted the 100s and the 10s and we're down to 360. What do we need to do now?*

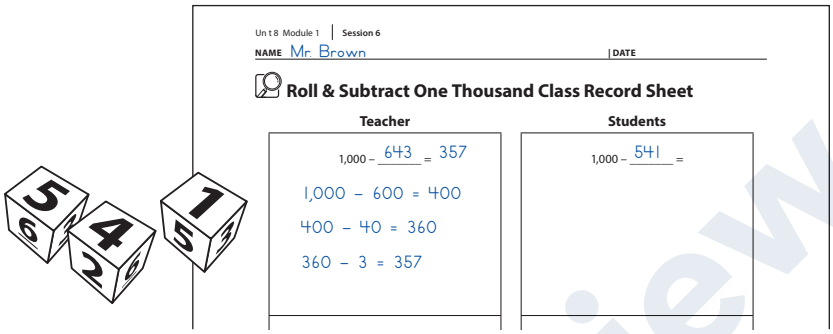
Students *Take 3 more away.*
Take the 1s away. It's like 360 take away 3, and that's 357.



7 Summarize the work you just did on the open number line by writing on your record sheet a series of equations to represent each hop.

8 Then invite a student volunteer to roll for the class and give students time to discuss what number they will create.

- Record an equation to match on the students' side of the record sheet.


Unit 8 Module 1 | Session 6

NAME Mr. Brown | DATE

Roll & Subtract One Thousand Class Record Sheet

Teacher	Students
1,000 – 643 = 357	1,000 – 541 =
1,000 – 600 = 400	
400 – 40 = 360	
360 – 3 = 357	

9 Have students estimate the result and then solve the problem.

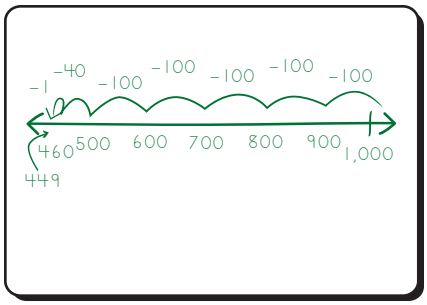
- Ask them if they think the answer will be more than 500 or less than 500, and why.
- Have helpers give each student a whiteboard, marker, and eraser.
- Draw an open number line on the board. Mark and label a point for 1,000 at the far right-hand side of the line.
- Ask students to replicate this drawing on their boards and then use it to model and solve the problem.
- Encourage them to share and compare strategies and solutions as they work. Circulate to observe students and assist.

10 When most students appear to have a solution, reconvene the class and ask for the answer.

- Record all responses on the board without comment.
- Then invite several students to share their work with the class.

As always, the presence of more than one answer provides a real need and motivation for students to explain, justify, and listen actively.

> ***Teacher*** *We have a couple of different answers, 449 and 459. Danielle, you said you got 449. Would you be willing to bring your whiteboard up and show us how you solved the problem?*
>
> ***Student A*** *Sure! I hopped 100 backward 5 times. That was pretty easy and I got to 500. Then I hopped back 40 because I already knew from when you showed us your problem that 500 – 40 would be 460. Then I just hopped back 1 more and got 449.*

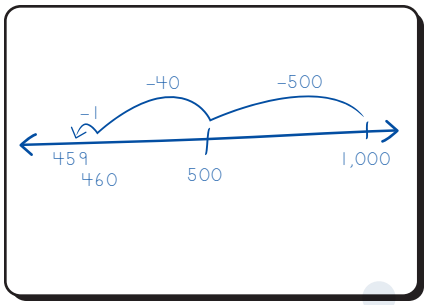


Student B *I disagree. I think 460 minus 1 is 459, not 449.*

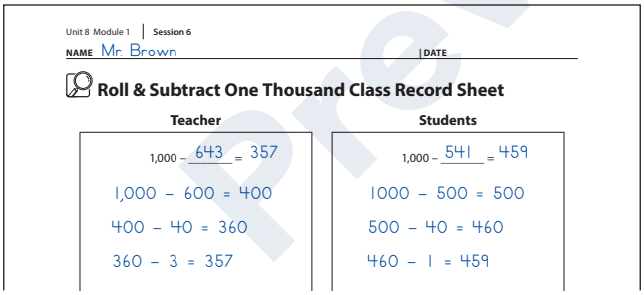
Student A *Oh, you're right! I took 10 extra away by mistake. It is 459.*

Teacher *Did anyone solve the problem a different way? DJ?*

Student C *I did kind of the same thing as she did, but I made one big hop of 500, then 40, and then 1, like this.*



11 Summarize students' work by writing on your copy of the record sheet a series of equations to represent at least some of the hops.


Unit 8 Module 1 | Session 6

NAME Mr. Brown | DATE

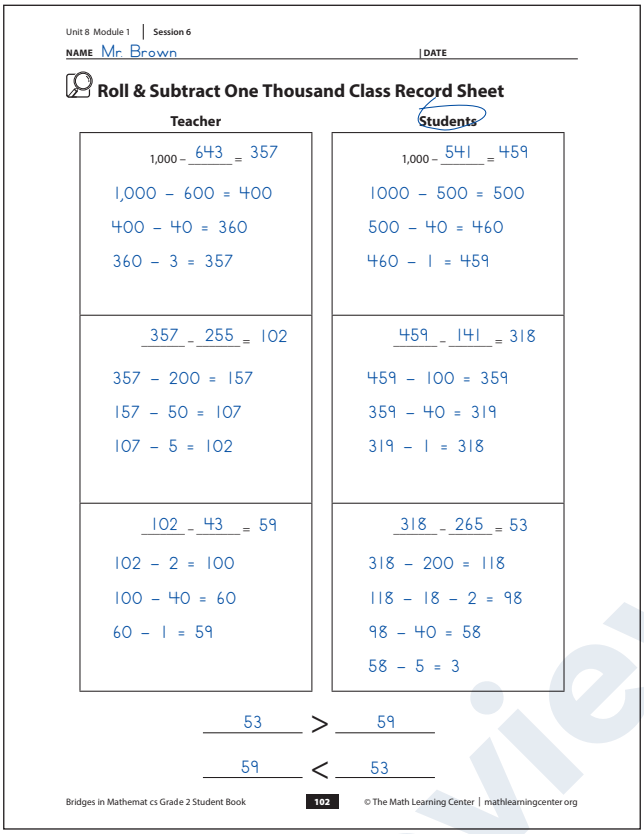
Roll & Subtract One Thousand Class Record Sheet

Teacher	Students
1,000 – 643 = 357	1,000 – 541 = 459
1,000 – 600 = 400	1000 – 500 = 500
400 – 40 = 360	500 – 40 = 460
360 – 3 = 357	460 – 1 = 459

12 Continue playing until you and the class have each taken three turns.

- Repeat steps 4–11, demonstrating your own strategies on the open number line when it's your turn and inviting different students to share their work when it's the students' turn.
- The decisions you make about arranging the digits when you roll will change with each turn. When each team takes its second turn, the concern will be to form a number that doesn't exceed the amount they still have left to take away. If a team rolls three digits that cannot be arranged to form a number they can subtract without getting a negative result, they can roll again.
- On their last turn, a team can decide to roll one or two dice, rather than three, depending on how much they have left to take away.
- The team that scores the positive number closest to 0 wins the game. (A team that gets a negative score automatically loses.)

13 Next, record two inequality statements that show the relationship between the final scores using the spaces at the bottom of the record sheet. Circle the team whose final difference is closest to 0, without going past 0.



Unit 8 Module 1 | Session 6

NAME Mr. Brown | DATE

Roll & Subtract One Thousand Class Record Sheet

Teacher	Students
1,000 – 643 = 357 1,000 – 600 = 400 400 – 40 = 360 360 – 3 = 357	1,000 – 541 = 459 1000 – 500 = 500 500 – 40 = 460 460 – 1 = 459
357 – 255 = 102 357 – 200 = 157 157 – 50 = 107 107 – 5 = 102	459 – 141 = 318 459 – 100 = 359 359 – 40 = 319 319 – 1 = 318
102 – 43 = 59 102 – 2 = 100 100 – 40 = 60 60 – 1 = 59	318 – 265 = 53 318 – 200 = 118 118 – 18 – 2 = 98 98 – 40 = 58 58 – 5 = 3

53 > 59

59 < 53

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14 Then play the game a second time with the class.

- Have students find the Roll & Subtract One Thousand Class Record Sheet in their Student Books, but let them keep their whiteboards as well.
- Repeat steps 4–13 to play, displaying and working on a second copy of the Roll & Subtract One Thousand Class Record Sheet.
- Ask students to follow and record your work on their sheets each time it's your turn.
- When it's their turn, have students do the work on their side of the record sheet in their books. If they don't have enough room to draw an open number line on which to model and solve each problem, let them work on their whiteboards and write equations to represent their work on their record sheets.

SUPPORT Work through each of the students' three subtraction problems with them. Stick with the open number line, but break the backward hops into manageable chunks of 100s and 10s, moving to larger hops if and when the students themselves suggest doing so.

CHALLENGE Allow students to use their own strategies to solve the three subtraction problems they get during the game. Some students may be able to use mental computation, or a combination of mental work and number line sketches to solve each problem; do not insist that they continue to use the open number line if they have other strategies they prefer. (For some of these students, the challenge may be less in the computation than in finding a way to represent their mental work on paper.)

Work Places

Introducing Work Place 8B Roll & Subtract One Thousand

15 When you finish playing the game a second time with the class, show them the contents of the new Work Place bin.

16 Be sure all students know how to play the game.

- Remind them about the special rules for the second and third turns.
  - » If, on their second turn, either player rolls three digits that cannot be arranged to form a number they can subtract without getting into negative numbers, they can roll again.
  - » Players have the option on their final roll, to use one or two of the dice rather than all three.
- Ask students if they have any questions about the game.
- Then have students turn to a partner to summarize the directions.

17 Give students their folders and send them out Work Places for the rest of the session.

18 Close the session.

- Have students clean up and put away the Work Place bins.
- Write the number 356 on the board and explain that it's your second turn in the game of Roll & Subtract One Thousand. Then write the following three digits on the board: 6, 3, and 2. Challenge students to arrange the three digits to form the number that would give you the greatest advantage going into your third turn, and explain their reasoning. (There are four different possibilities, 362, 326, 263, and 236. Students may have a variety of reasons for favoring one of the four over the other three.)
- Consider leaving the problem on the board for students to think about and respond to the following day.

Teacher Masters

GRADE 2 – UNIT 8 – MODULE 1

BRIDGES®
IN MATHEMATICS

NAME | **DATE**

Unit 8 Pre-Assessment page 1 of 3

1 Complete the table below by writing each number in standard form, expanded form, or words.

Standard Form	Expanded Form	Words
ex 657	600 + 50 + 7	six hundred fifty-seven
a 309		three hundred nine
b 528	500 + 20 + 8	
c	900 + 10 + 4	nine hundred fourteen

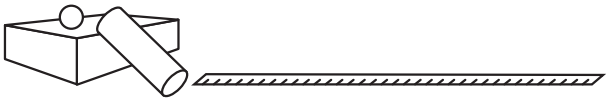
2 Write the correct symbol (>, =, or <) in the circle to compare each pair of numbers.

203 ◯ 230 813 ◯ 785 451 ◯ 451 987 ◯ 978

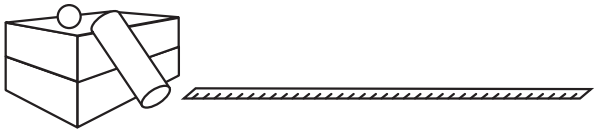
The Marble Roll Experiment

Jay and Kim did a two-part experiment with a marble, a tube, some blocks, and a measuring tape. The pictures and words below show what they did.

Part 1 They got a tube and set it on a block to make a ramp. They rolled a marble down the ramp 10 times, and measured how many inches it rolled each time.



Part 2 The set the tube on 2 blocks to make the ramp higher. They rolled the marble down the ramp 10 times, and measured how many inches it rolled each time.



3 Before they did the second part of the experiment, Jay and Kim predicted that the marble would roll farther from the higher ramp. Do you agree with them? Why or why not? Give at least one reason.

(continued on next page)

NAME | **DATE**

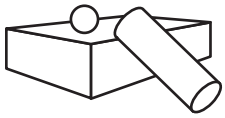
Unit 8 Pre-Assessment page 2 of 3

4 Jay and Kim kept a data table to show how many inches the marble rolled each time.

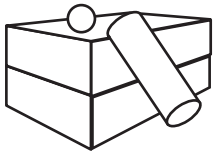
Marble Experiment Data Table

Ramp Height	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Trial 6	Trial 7	Trial 8	Trial 9	Trial 10
1 block high	11″	12″	11″	13″	13″	12″	12″	14″	13″	14″
2 blocks high	29″	27″	28″	29″	29″	30″	27″	29″	29″	28″

a Put the marble roll distances from the data table in order. The first set is done for you. You do the second set. Be sure to put all 10 distances in order.

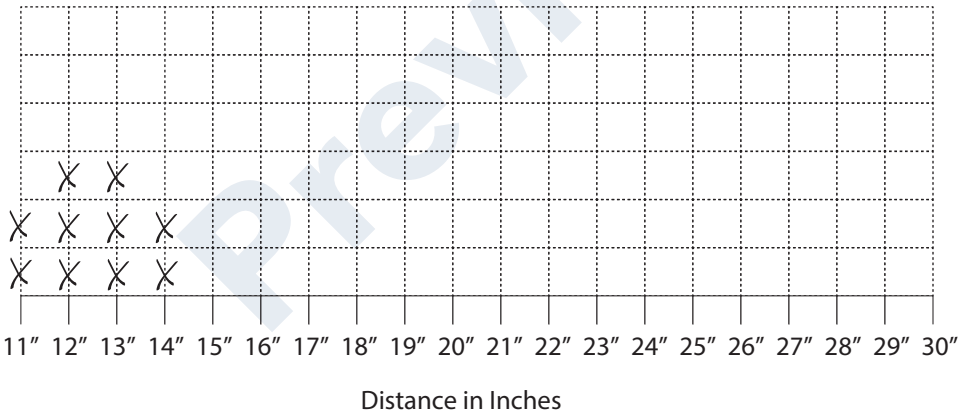


1-block ramp 11″ 11″ 12″ 12″ 12″ 13″ 13″ 13″ 14″ 14″



2-block ramp

b Enter the marble roll distances on the line plot. The first set is done for you.



c Were Jay and Kim right? Did the marble roll farther from the higher ramp? How do you know? Use at least one piece of information from the line plot in your answer.

(continued on next page)

NAME | **DATE**

Unit 8 Pre-Assessment page 3 of 3

5 Find the sum. Show all your work using numbers, labeled sketches, or words.

$$\begin{array}{r} 348 \\ +\ 277 \\ \hline \end{array}$$

Answer _____

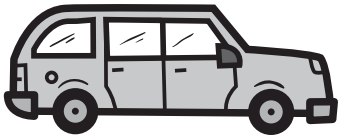
6 Find the difference. Show all your work using numbers, labeled sketches, or words.

$$\begin{array}{r} 653 \\ -\ 495 \\ \hline \end{array}$$

Answer _____

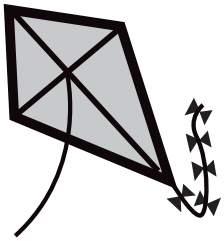
Three-Digit Story Problems

1 The Lin family drove to Washington, D.C. for a vacation. On the first day, they drove 275 miles. On the second day, they drove 165 miles. How many miles did they drive in all?



The Lin family drove _____ miles in all.

2 Mason and Alice measured how many feet of string they used to fly kites. Mason measured 295 feet of string and Alice measured 325 feet. How many feet of string did they measure in all?



Mason and Alice measured _____ feet of string in all.

Work Place Guide 8A Sum It Up

Summary

Players take turns rolling random numbers and deciding after each roll what place value to assign to that number. After six rolls, each player has two 3-digit numbers, which they add together to try to get either the smallest or largest sum.

Skills & Concepts

- Demonstrate an understanding that the digits in a 3-digit number represent amounts of hundreds, tens, and ones (2.NBT.1)
- Compare pairs of 3-digit numbers, based on an understanding of what the digits in their hundreds, tens, and ones places represent (2.NBT.4)
- Use >, =, and < symbols to record comparisons of two 3-digit numbers (2.NBT.4)
- Add with sums to 1000 (2.NBT.7)

Materials

Copies	Kit Materials	Classroom Materials
TM T5 Work Place Guide 8A Sum It Up **TM T6–7** Work Place Instructions 8A Sum It Up **TM T8** 8A Sum It Up Record Sheet	• 3 more/less dice • 3 dice numbered 1–6 • large base ten area pieces (optional)	

Assessment & Differentiation

Here are some quick observational assessments you can make as students begin to play this game on their own. Use the results to differentiate as needed.

If you see that…	Differentiate	Example
Students are making good strategic choices when playing for the greatest sum, but struggle with playing for the smallest.	SUPPORT Build possible numbers with base ten area pieces to see what happens.	If they place the 4 in the hundreds, tens, or ones place, choosing 4 mats, 4 tens, and 4 ones can illustrate the relative size of the choice.
Students aren't sure how to use a strategy to win.	SUPPORT Talk about concepts of probability to help students decide when to take a number and when to try for something different.	Prompt students to consider the chances rolling a number greater than 4. How likely is it that they could get a 5 or a 6 in the rolls they have left? If they're playing for the greatest sum, should they place the 4 in the hundreds place, or place it in one of the other boxes, hoping that they'll roll a 5 or a 6 on one of their other turns?
Students are quickly finishing games and have a good understanding of the mathematics of the strategies behind the game.	CHALLENGE Have students rethink their decisions about placing the digits after they've finished the first round CHALLENGE Pair students working at roughly the same level and invite them to play Game Variation A or B.	Press students to consider what the best possible placement for each digit would have been. Did either player arrange their digits in the most optimal way, or was there another way the digits could have been arranged that would have produced a larger or smaller sum?

Work Place Instructions 8A Sum It Up

1 Each player needs a pencil. Players share a more/less die, a die numbered 1–6, and a record sheet. Players write their names and the date at the top of the record sheet.

2 Players each roll the die numbered 1–6 to determine who goes first.

3 Player 1 rolls the more/less die to see whether the first round of the game will be played for the greatest or smallest possible sum, and records the information on the sheet.

4 Player 1 rolls the die and chooses one of the six boxes available in which to write the digit rolled.
- Once a digit has been placed, it can't be changed.

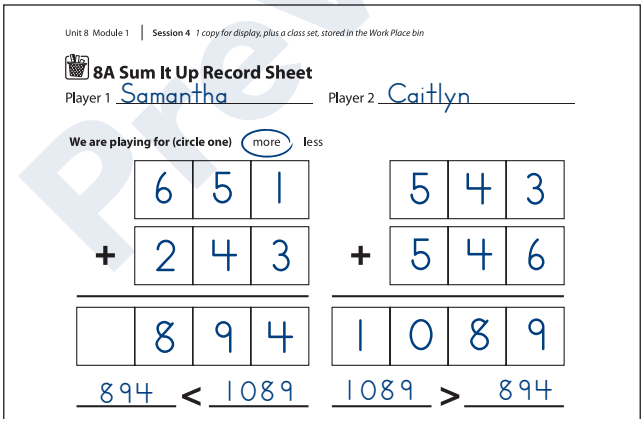
5 Player 2 takes a turn to roll the die and write the digit rolled in one of her boxes.

6 Players continue to take turns rolling the die and placing the digits they've rolled until both of them have formed two 3-digit numbers.

Note A player does not have to place all the digits in the boxes for the first number before placing digits in the boxes for the second number. A digit can be placed in any one of the available boxes.

7 Players each find the sum of their two 3-digit numbers and record it on the sheet.
- Players can use base ten area pieces or sketches to help find the sum.
- Players don't need to show their work on the record sheet, but they do have to explain their thinking to their partner.

8 Players compare their sums, and work together to write two inequality statements in the appropriate spots on the record sheet. Then they circle the winner's sum.


Unit 8 Module 1 | **Session 4** *1 copy for display, plus a class set, stored in the Work Place bin*

8A Sum It Up Record Sheet

Player 1 Samantha Player 2 Caitlyn

We are playing for (circle one) more less

	6	5	1			5	4	3
+	2	4	3	+		5	4	6
	8	9	4		1	0	8	9

894 < 1089 1089 > 894

9 Players play a second round of the game.
- Player 2 gets to roll the more/less cube, record the results of the roll on the sheet, and go first to roll and record a digit.

Game Variations

A Have students find the difference between the sums at the end of each round and record those differences on the sheet. What was the greatest difference after multiple rounds? What is the greatest possible difference?

B Play a version of the game with eight rolls to make two 4-digit numbers.

You or the students will need to modify the existing record sheet or create a new one to play this version of the game.

8A Sum It Up Record Sheet

Player 1 _____ Player 2 _____

We are playing for (circle one) more less

+			

_____ < _____

+			

_____ > _____

Player 1 _____ Player 2 _____

We are playing for (circle one) more less

+			

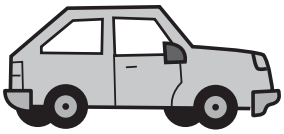
_____ < _____

+			

_____ > _____

Numbers on a Line Problems

1 It is vacation time. Eric and his family are driving 450 miles to Grandma's house. Sara and her family are driving 294 miles to the new theme park. Which family has farther to drive? How many miles farther?



_____'s family has _____ miles farther to drive.

2 Little Inchworm is going on a trip to see her friend on the other side of the meadow. Her friend lives 519 inches away. Little Inchworm has already crawled 308 inches. How many more inches does she need to go to get to her friend's house?

Little Inchworm still has to go _____ inches to get to her friend's house.

3 In September, second graders in Kendra's reading group read 692 pages in all. In May they read 820 pages. How many more pages did they read in May than September?

The second graders in Kendra's group read _____ more pages in May than in September.

Work Place Guide 8B Roll & Subtract One Thousand

Summary

Each player takes a turn to roll three dice, arrange the numerals rolled to make a 3-digit number, and subtract the number from 1,000. After that, each player gets two more turns to roll, arrange, and subtract. The player who scores closer to zero (without going past zero into negative numbers) after three turns wins.

Skills & Concepts

- Compare two numbers based on meanings of the digits, using >, =, and < symbols to record the results of comparisons (2.NBT.4)
- Use concrete models or drawings to subtract with minuends to 1000 (2.NBT.7)
- Use strategies based on place value, properties of operations, or the relationship between addition and subtraction to subtract with minuends to 1000 (2.NBT.7)
- Relate strategies for subtracting with minuends to 1000 to written methods, and use written numbers and symbols to represent strategies for subtracting with minuends to 1000 (2.NBT.7)
- Mentally add or subtract 10 or 100 to or from any 3-digit number between 100 and 900 (2.NBT.8)

Materials

Copies	Kit Materials	Classroom Materials
TM T10 Work Place Guide 8B Roll & Subtract One Thousand **TM T11–12** Work Place Instructions 8B Roll & Subtract One Thousand **TM T13** 8B Roll & Subtract One Thousand Record Sheet	• 9 dice numbered 1–6 • large base ten area pieces (optional, for support suggestion)	

Assessment & Differentiation

Here are some quick observational assessments you can make as students begin to play this game on their own. Use the results to differentiate as needed.

If you see that…	Differentiate	Example
Students struggle with the subtraction in this game.	SUPPORT While the open number line may be the easiest way to model and solve subtraction problems of this magnitude right now, some students may need base ten area pieces in addition to, or instead of the open number line, to help with some of the calculations.	
Students struggle with the format and game steps, possibly in addition to struggling with the computation.	SUPPORT Pair students in such a way that more fluent students are playing the game with less fluent classmates. This kind of peer teaching provides the guided practice the novice student needs and an opportunity for the fluent student to justify her reasoning, thereby increasing her communication skills.	
Students are quickly finishing games and have a good understanding 3-digit subtraction.	CHALLENGE Pair students who are working at roughly the same level and invite them to try Game Variations A and/or B.	

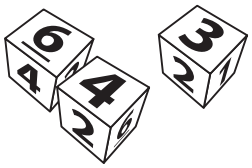
Work Place Instructions 8B Roll & Subtract One Thousand

1 Each player needs a pencil. Players share 3 dice numbered 1–6 and a record sheet. Players write their names and the day's date at the top of the record sheet.

2 Players each roll one of the dice to determine who goes first.

3 Player 1 rolls the three dice and decides what 3-digit number she wants to make.

4 Then she subtracts that number from 1,000, using the space on her side of the record sheet to show her calculations.



- Players can use equations and/or labeled sketches to model and solve the subtraction problems during this game.

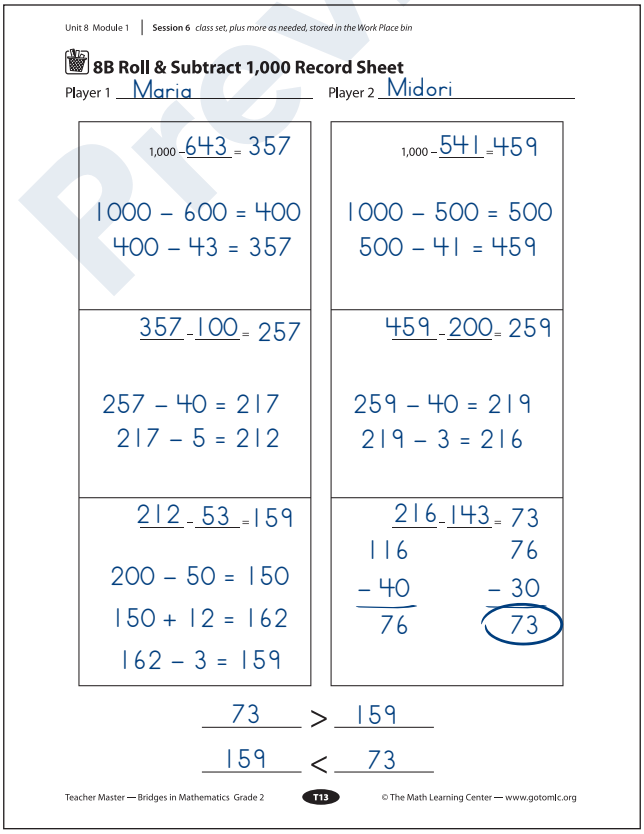
5 Player 1 checks her answer to see if it seems reasonable, and shares her work with her partner.

6 Player 2 rolls the dice, makes a 3-digit number, and subtracts it from 1,000.

7 Players each take two more turns to roll, arrange the digits, and subtract. They should continue to share their strategies and check each other's work.

- If, on their second turn, either player rolls 3 digits that cannot be arranged to form a number they can subtract without getting into negative numbers, they can roll again.
- On their final roll, players have the option to use one or two of the dice rather than all three.

8 Players compare their final scores, and work together to write two inequality statements in the appropriate lines on the record sheet. Then they circle the winner's score.



Unit 8 Module 1 | **Session 6** *class set, plus more as needed, stored in the Work Place bin*

8B Roll & Subtract 1,000 Record Sheet

Player 1 Maria Player 2 Midori

1,000 − 643 = 357 1000 − 600 = 400 400 − 43 = 357	1,000 − 541 = 459 1000 − 500 = 500 500 − 41 = 459
357 − 100 = 257 257 − 40 = 217 217 − 5 = 212	459 − 200 = 259 259 − 40 = 219 219 − 3 = 216
212 − 53 = 159 200 − 50 = 150 150 + 12 = 162 162 − 3 = 159	216 − 143 = 73 116 − 40 = 76 76 − 30 = 73

73 > 159

159 < 73

Teacher Master — Bridges in Mathematics Grade 2 T13 © The Math Learning Center — www.gotomlc.org

9 Players play a second round of the game so each has a record sheet to put in their folders.

(continued on next page)

Work Place Instructions 8B Roll & Subtract One Thousand

Game Variations

A Modify the record sheet so that players each start with 10,000 instead of 1,000. Have players roll 4 dice in order to subtract a 4-digit number each time it's their turn, with an option to use 1, 2, or 3 of the dice instead of all 4 on their final roll.

B Play the game as described, but allow negative numbers. The player who scores closest to 0 on either side (positive or negative) wins the game. For example, if the final score was –22 to 73, the player with –22 would win the game because the difference between –22 and 0 is 22, while the difference between 73 and 0 is 7.

8B Roll & Subtract One Thousand Record Sheet

Player 1 _____ Player 2 _____

1,000 – _____ =	1,000 – _____ =
_____ – _____ =	_____ – _____ =
_____ – _____ =	_____ – _____ =

_____ > _____

_____ < _____

Student Book

GRADE 2 – UNIT 8 – MODULE 1

BRIDGES®
IN MATHEMATICS

NAME | DATE

Target Seven Hundred Record Sheet

Round 1	100s	10s	1s	Total
Blue Team	_____ +	_____ +	_____ =	
Red Team	_____ +	_____ +	_____ =	
Write 700 and both teams' scores in order from least to greatest. Circle the score that is closer to 700. _____ < _____ < _____				

Round 2	100s	10s	1s	Total
Blue Team	_____ +	_____ +	_____ =	
Red Team	_____ +	_____ +	_____ =	
Write 700 and both teams' scores in order from least to greatest. Circle the score that is closer to 700. _____ < _____ < _____				

Round 3	100s	10s	1s	Total
Blue Team	_____ +	_____ +	_____ =	
Red Team	_____ +	_____ +	_____ =	
Write 700 and both teams' scores in order from least to greatest. Circle the score that is closer to 700. _____ < _____ < _____				

NAME | DATE

Three-Digit Story Problems

1 Solve the first problem your teacher poses. Use numbers, labeled sketches, or words to help. Show all your work in the box. Write the answer on the line.

The Lin family drove _____ miles in all.

2 Solve the second problem your teacher poses. Use numbers, labeled sketches, or words to help. Show all your work in the box. Write the answer on the line.

Mason and Alice measured _____ feet of string in all.

NAME | DATE

8A Sum It Up Class Record Sheet

We are playing for (circle one) more less

Students

+			

_____ < _____

Teacher

+			

_____ > _____

We are playing for (circle one) more less

Player 1

+			

_____ < _____

Player 2

+			

_____ > _____

NAME | DATE

Numbers on a Line Problem-Solving Sheet

Use the open number lines below to model and solve each problem your teacher gives you. Write the answer in the space provided at the end of each problem.

1 _____'s family has _____ miles farther to drive.

2 Little Inchworm still has to go _____ inches to get to her friend's house.

3 The second graders in Kendra's group read _____ more pages in May than in September.

NAME | **DATE**

Roll & Subtract One Thousand Class Record Sheet

Teacher	Students
1,000 – _____ =	1,000 – _____ =
_____ – _____ =	_____ – _____ =
_____ – _____ =	_____ – _____ =

_____ > _____

_____ < _____

Home Connections

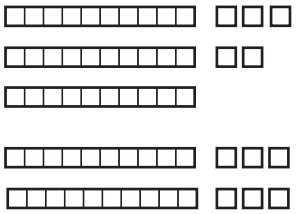
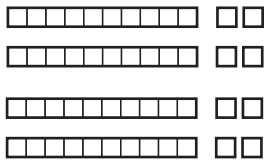
GRADE 2 – UNIT 8 – MODULE 1

BRIDGES®
IN MATHEMATICS

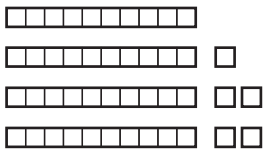
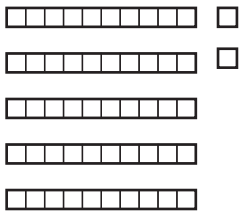
NAME | DATE

Estimation Problems page 1 of 2

1 For each problem below, circle the estimate you think is best. On the last two, explain why you chose the estimate you did. Hint: Make your own pictures to help.

Problem & Picture	Estimate	Problem & Picture	Estimate
a 35 + 26 	50 60 70	**b** 24 + 24 	30 40 50
c 49 + 39	70 80 90	**d** 37 + 24	50 60 70
Why?		Why?	

2 For each problem below, circle the estimate you think is best. On the last two, explain why you chose the estimate you did. Hint: Make your own pictures to help.

Problem & Picture	Estimate	Problem & Picture	Estimate
a 45 − 29 	15 20 25	**b** 52 − 18 	30 40 50
c 50 − 24	25 30 35	**d** 60 − 29	30 40 50
Why?		Why?	

(continued on next page)

NAME | DATE

Estimation Problems page 2 of 2

3 Dora went to the mall yesterday. She got a T-shirt for $9.99 and a new CD for $6.99. About how much money did she spend in all? Circle the estimate you think is best.

$15.00 $16.00 $17.00 $20.00

4 Max got $50.00 for his birthday. He bought 2 video games for $14.00 each. About how much money does he have left? Circle the estimate you think is best.

$10.00 $20.00 $30.00 $40.00

5 Janel is making a quilt. She needs 100 squares of fabric in all. She cut 29 squares this morning and 39 more squares this afternoon. About how many squares does she have left to cut? Circle the estimate you think is best.

10 squares 20 squares 30 squares 40 squares

6 Gerald wants to read 75 books by the end of the year. So far, he has read 18 fantasy books and 21 science books. About how many books does he have left to read? Circle the estimate you think is best.

15 books 25 books 35 books 45 books

7 The second graders at King School are recycling cans.

Day	Number of Cans
Monday	57
Tuesday	98
Wednesday	45
Thursday	105

About how many cans have they recycled so far? Circle the estimate you think is best.

200 cans 300 cans 400 cans 1,000 cans

NAME | DATE

Riddles & Toys page 1 of 2

1 Tell what digit is in each place.

a 289 _____ is in the tens place. _____ is in the ones place. _____ is in the hundreds place.	**b** 945 _____ is in the ones place. _____ is in the hundreds place. _____ is in the tens place.
c 316 _____ is in the tens place. _____ is in the hundreds place. _____ is in the ones place.	**d** 405 _____ is in the ones place. _____ is in the tens place. _____ is in the hundreds place.
e 5,687 _____ is in the tens place. _____ is in the ones place. _____ is in the thousands place. _____ is in the hundreds place.	**f** 4,301 _____ is in the ones place. _____ is in the hundreds place. _____ is in the tens place. _____ is in the thousands place.

2 **CHALLENGE** Solve these number riddles.

I have a 4 in the tens place.

I have a 1 in the hundreds place.

The number in my ones place is more than 6 and less than 9.

I am an odd number.

What number am I? _____

I have a 7 in the hundreds place.

I have a 0 in the tens place.

I have a 3 in the thousands place.

The number in my ones place is less than 3.

I am an even number.

What number am I? _____

(continued on next page)

NAME | DATE

Riddles & Toys page 2 of 2

Toy Store Price List (prices include tax)			
Doll $8.00	Skates $29.00	Puppet $6.00	Hat $13.00
			

3 Ezra got $50.00 for his birthday. He bought a hat at the toy store. How much money did he have left? Show your work. Mark the answer clearly.

4 **CHALLENGE** Maya went into the toy store with $50.00. She bought three different toys and got $2.00 back in change. Which three toys did she buy? Show your work. Mark the answer clearly.

NAME | DATE

Comparing Numbers & Sharks' Lengths page 1 of 2

1 Circle the place value of the underlined digit. Then write its value.

Number	Place Value	Value	Number	Place Value	Value
ex 2<u>3</u>8	ones (tens) hundreds	30	**ex** 10<u>9</u>	(ones) tens hundreds	9
a <u>7</u>43	ones tens hundreds		**b** 25<u>3</u>	ones tens hundreds	
c 1<u>5</u>0	ones tens hundreds		**d** <u>6</u>08	ones tens hundreds	

2 Write one of these signs on each line to make the equation true.

< less than = equal to > greater than

456 __<__ 546 85 ___ 58 327 ___ 372 106 ___ 610

218 ___ 218 735 ___ 573 204 ___ 240 483 ___ 438

3 Fill in the missing digits to make each equation true. There is more than one right answer for each one.

3_2_7 < 347 235 > ___35 307 < ___07 135 < 13___

4___3 > 463 1___9 < 139 182 > 1___2 514 < 51___

(continued on next page)

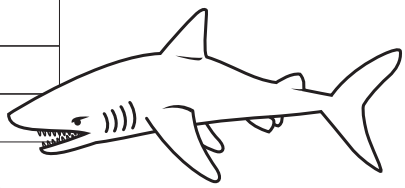
NAME | DATE

Comparing Numbers & Sharks' Lengths page 2 of 2

There are many different types of sharks. Some are longer than others. This chart shows how long some of the different sharks are. Use it to help answer the questions below.

Shark Lengths

Shark Name	Average Length (in centimeters)*
White Shark	204 centimeters
Bignose Shark	174 centimeters
Night Shark	154 centimeters
Bigeye Thresher	312 centimeters
Tiger Shark	247 centimeters
Thresher Shark	373 centimeters



4 Which shark on the chart is the longest? _____

5 Which shark on the chart is the shortest? _____

6 Write one of these symbols on each blank to make the sentence true.

< less than = equal to > greater than

a Length of a Tiger Shark _____ Length of a White Shark

b Length of a Bignose Shark _____ Length of a Tiger Shark

7 Put the lengths of the sharks in order from least to greatest.

_____ , _____ , _____ , _____ , _____ , _____

least greatest

8 How much longer is a Thresher Shark than a Tiger Shark? Show your work. Mark the answer clearly.

* Source: http://na.nefsc.noaa.gov/sharks/