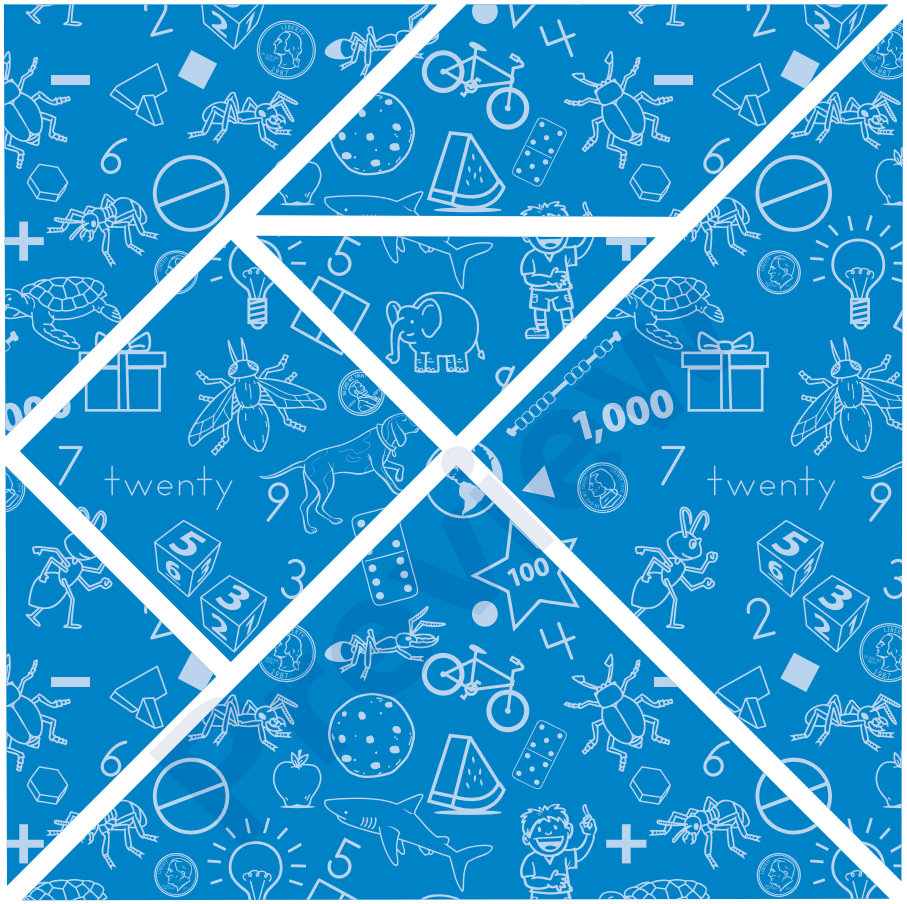
BRIDGES® IN MATHEMATICS



BRIDGES

ASSESSMENT GUIDE

GRADE 2

Published by The MATH LEARNING CENTER Salem, Oregon

Bridges in Mathematics Second Edition Grade 2 Assessment Guide

The Bridges in Mathematics Grade 2 package consists of:

- Bridges in Mathematics Grade 2 Teachers Guide Units 1–8
- Bridges in Mathematics Grade 2 Assessment Guide
- *Bridges in Mathematics Grade 2 Teacher Masters*
- Bridges in Mathematics Grade 2 Student Book
- Bridges in Mathematics Grade 2 Home Connections Volumes 1 & 2
- *Bridges in Mathematics Grade 2 Teacher Masters Answer Key*
- *Bridges in Mathematics Grade 2 Student Book Answer Key*
- *Bridges in Mathematics Grade 2 Home Connections Answer Key*
- Bridges in Mathematics Components & Manipulatives
- *Bridges Educator Site*
- Work Place Games & Activities
- Number Corner Grade 2 Teachers Guide Volumes 1–3
- *Number Corner Grade 2 Teacher Masters*
- Number Corner Grade 2 Student Book
- *Number Corner Grade 2 Teacher Masters Answer Key*
- *Number Corner Grade 2 Student Book Answer Key*
- Number Corner Components & Manipulatives
- Word Resource Cards

Digital resources noted in italics.

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www.mathlearningcenter.org

Prepared for publication using Mac OS X 10 7 Lion and Adobe CS5.5.
Printed in the United States of America.

QBB2801-9
Updated 2014-09-04.

Bridges in Mathematics is a standards-based K–5 curriculum that provides a unique blend of concept development and skills practice in the context of problem solving. It incorporates the Number Corner, a collection of daily skill-building activities for students.

The Math Learning Center is a nonprofit organization serving the education community. Our mission is to inspire and enable individuals to discover and develop their mathematical confidence and ability. We offer innovative and standards-based professional development, curriculum, materials, and resources to support learning and teaching. To find out more, visit us at www.mathlearningcenter.org.

ISBN 978-1-60262-360-6

Grade 2

Bridges Assessment Guide

Assessment Overview

Bridges Unit Assessments

Number Corner Assessments

Comprehensive Growth Assessment

Bridges Assessment Guide

Introduction

Although the role of assessment has become a complex and sometimes charged topic, the daily reality of assessment in the classroom remains both simple and profound. The fact of the matter is that assessment and good teaching go hand in hand. To teach effectively, we must be students of our students, continually observing, listening, and probing to determine how they are responding to our instruction. We can't teach well unless we know what our students already know, are in the process of learning, and need to know. Moreover, our students can't learn as effectively as they might unless they understand the short-term and long-term goals of instruction and have as much of a stake in their own learning as we do.

Assessment should be more than merely a test at the end of instruction to see how students perform under special conditions; rather it should be an integral part of instruction that informs and guides teachers as they make instructional decisions.

» NCTM

As a student-centered curriculum solidly rooted in problem solving, *Bridges in Mathematics* is filled with assessment opportunities. Consider the fact that many, if not most, of the sessions open with a question or prompt: a chart, a visual display, a problem, or even a new game board. Students are asked to share comments and observations, first in pairs and then as a whole class. This gives the teacher an opportunity to take the group's measure and conduct the day's instruction with a feel for the students in the room. While the strategy may be subtle, it reflects a radically different approach to instruction—one in which assessment takes the lead.

The *Bridges in Mathematics* curriculum features a host of informal and formal assessments woven throughout the Bridges units and Number Corner workouts. These range from tips to help teachers elicit student thinking to individual and small group interviews and formal paper-and-pencil tasks. The assessments themselves, along with all the needed materials, teacher masters, and instructions, reside in the Bridges and Number Corner Teachers Guides. The material in this Bridges Assessment Guide—answer keys, scoring guides, intervention and support suggestions, and tips for engaging students and their families in goal setting and progress monitoring—provides the tools teachers need to process and use the results of the assessments to guide instructional decisions.

Assessment Overview

Section 1: Standards & Assessments

Summarizes the Common Core State standards for second grade, provides a description of the types of assessments in Bridges and Number Corner, and features a complete list of all the assessments offered in Bridges Grade 2.

Section 2: Assessing Math Content

Takes a deeper look at the types of assessment tasks offered in Bridges Grade 2. Offers an assessment map that shows exactly where and when each Grade 2 Common Core standard is assessed and targeted for mastery.

Section 3: Assessing Math Practices

Profiles the CCSS Mathematical Practices in terms of second grade behaviors, and offers suggestions for assessing the practices through the year.

Section 4: Assessment as a Learning Opportunity

Describes ways in which the teacher can involve students in taking ownership of their own learning and monitoring their own progress toward mastering targeted skills, concepts, behaviors, and attitudes.

Section 5: Using the Results of Assessment to Inform Differentiation & Intervention

Details the connection between Bridges and Response to Intervention (RTI), and explains the scoring guides provided in the Bridges Unit Assessments and Number Corner Assessments parts of this guide.

Section 6: Reporting to Families

Suggests ways in which to help families understand the instructional targets for the year and monitor their child's growth and progress toward meeting those targets. Includes a Grade 2 Math Progress Report that might be used or adapted for use with other district reporting tools.

Bridges Unit Assessments

Features an assessment collection for each Bridges unit. Each collection includes:

- A brief description of all the assessments in the unit and the skills addressed
- Sheets for collecting observations about students' math skills and practices
- Answer keys and scoring guides for each assessment
- Suggestions for support and intervention

Number Corner Assessments

Features an assessment collection for Number Corner Grade 2. This collection includes:

- A brief description of the baseline and quarterly checkups
- A list of the skills addressed by each of the five assessments
- Answer keys and scoring guides for each assessment
- Suggestions for support and intervention

Comprehensive Growth Assessment

Describes the Comprehensive Growth Assessment (CGA), an instrument that provides global coverage of all the CCSS requirements for grade 2. It includes:

- A copy of the CGA, along with tips about how to use it to best advantage
- A list of materials needed to conduct the assessment, and all needed teacher masters
- A list of the skills addressed by each item on the assessment
- An answer key and scoring guide
- Suggestions for support and intervention

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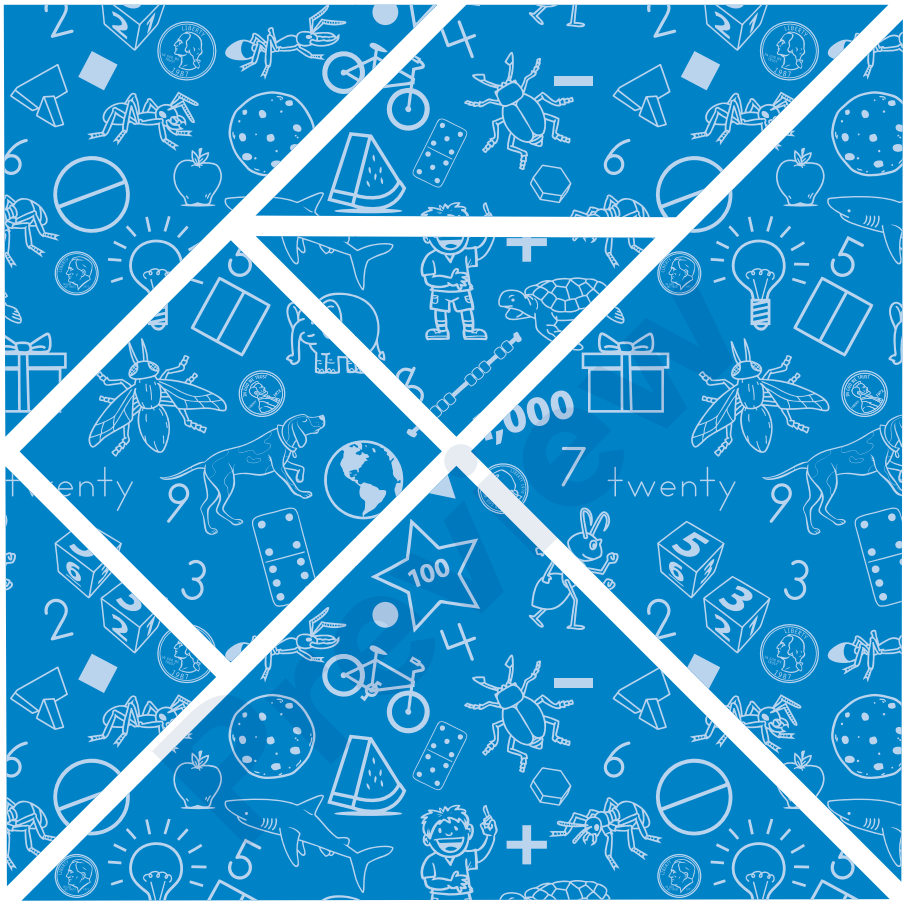


BRIDGES ASSESSMENT GUIDE

GRADE 2

Assessment Overview

Published by The MATH LEARNING CENTER Salem, Oregon

Section 1

Standards & Assessments

Types of Assessments in Bridges and Number Corner

We have many ways of finding out what our students know. We can observe them as they work in a variety of settings—whole group discussions, problem-solving sessions, Work Places. We can converse with students informally as they solve problems or play games, or we can conduct more formal interviews with individuals or small groups. We can check near the midpoint of each unit to see how they're responding to our instruction, and again at the end of the unit for a level of mastery appropriate to the time of year. Finally, every two or three months we can have students complete sets of written tasks that cover a range of skills and concepts to look at long-term growth.

You've got to be very careful if you don't know where you are going, because you might not get there.

» Yogi Berra

To help teachers determine what their students already know, are in the process of learning, and need to know, Bridges and Number Corner feature several different types of assessments. Here is brief description of each, and an indication of where it is found in the program.

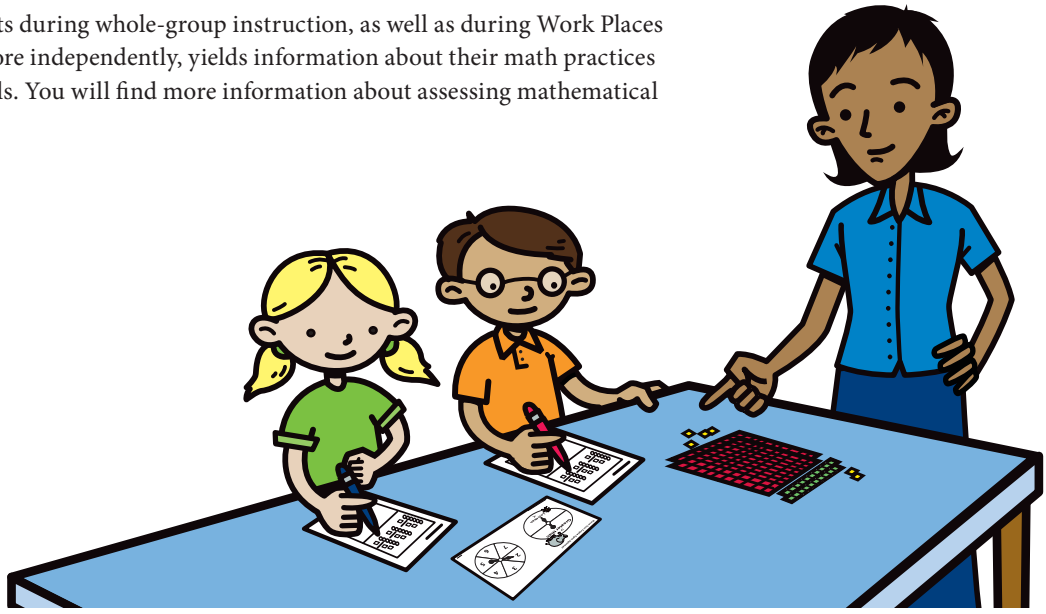
Informal Observation

Located throughout Bridges Sessions and Number Corner Workouts

Informal observation is one of the best but perhaps most undervalued methods of assessing students. Teachers develop intuitive understandings of students through careful observation, but not the sort where they carry a clipboard and sticky notes. These understandings develop over a period of months and involve many layers of relaxed attention and interaction. Experience with the age-level helps—after several years at second grade, a teacher begins to notice patterns of behavior, things that 7- and 8-year-olds seem to say, think, or do on a fairly consistent basis. Knowledge of learning outcomes is essential—the better you know where you're headed, the easier it is to recognize skills and concepts as they emerge in students.

Bridges sessions and Number Corner workouts, which continually ask students to share and explain their thinking, present ongoing assessment opportunities. As we become accustomed to learning from our students, we become increasingly skilled at spotting their strengths and needs without resorting to more formal means. Throughout Bridges sessions and Number Corner workouts, teachers will find suggested questions and prompts along with sample dialogs to elicit student thinking, conversation, sharing, and explanation. To make the CCSS Mathematical Practices easy to spot, Teachers Guide sidebars feature Math Practices in Action, which highlight and describe selected instances in which the practices are integrated into instruction.

Carefully observing students during whole-group instruction, as well as during Work Places when they are operating more independently, yields information about their math practices as well as math content skills. You will find more information about assessing mathematical practices in Section 3.



Structured Observation: Work Place Guides

Located in Bridges Units

Work Places—individual and small group games and activities—offer almost daily opportunities to observe and interact with students in authentic settings. To help teachers make the most of opportunities to assess students and provide on-the-spot support and challenge, each Work Place is accompanied by a guide that lists the skills and concepts involved, the materials needed, and a set of Assessment & Differentiation suggestions. This example is from Unit 3.

Unit 3 Module 3 | **Session 1** *1 copy kept in a clear plastic sleeve and stored in the Work Place bin*

Work Place Guide 3D Base Ten Triple Spin

Summary

Players begin by spinning to determine if they will win with a large or small number. Players then take turns spinning for a digit 2–7 and deciding if they want that spin to represent ones, tens, or hundreds. As they decide, they take the appropriate base ten area pieces and continue spinning until each player has built a 3-digit number. The players then sketch their base ten area pieces on a shared record sheet, write their numbers in expanded form, and compare the numbers to determine the winner.

Skills & Concepts

- Understand that the three digits of a 3-digit number represent amounts of hundreds, tens, and ones (2.NBT.1)
- Skip-count by 10s and 100s within 1000 (2.NBT.2)
- Read and write numbers to 1000 represented with numerals and in 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 (2.NBT.4)
- Use >, =, and < symbols to record comparisons of two 3-digit numbers (2.NBT.4)
- Reason abstractly and quantitatively (2.MP.2)

Materials

Copies	Kit Materials	Classroom Materials
TM T3 Work Place Guide 3D Base Ten Triple Spin **TM T4–T5** Work Place Instructions 3D Base Ten Triple Spin **TM T6** 3D Base Ten Triple Spin Record Sheet	• large base ten area pieces (3 sets) • additional red base ten hundreds pieces (30, placed in the bottom of the Work Place bin, under the other materials) • 3 Base Ten Triple Spin Spinners	

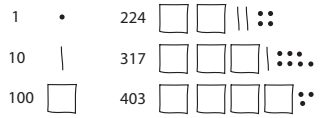
Assessment & Differentiation

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
Students are struggling to decide which denomination to take each spin in.	**SUPPORT** Most students figure out how the game works after they play it several times. If some of your students can't make sense of it after a reasonable amount of time, have them take their three spins before they spin the Greater than/Less than spinner. Invite them to take the first spin in 100s, the second in 10s, and the third in 1s. After they have each recorded the results of their spins, ask them to spin the Greater than/Less than spinner to determine the winner.
Students are playing the game with confidence and ease, and might benefit from a challenge.	**CHALLENGE** Invite such students to take six spins each, build two 3-digit numbers, and add the numbers to determine the winner. These students will need to figure out how to modify the existing record sheet or make one of their own.

English-Language Learners Use the following adaptations to support the ELL students in your classroom.

Review the idea of using sketches to record the results of each spin by laying large base ten area pieces—one each of the hundreds, tens, and ones pieces—on a piece of paper and drawing the shorthand for each piece right next to it along with the number it represents. Use a square to represent the mat (100), a vertical line to represent the strip (10), and a dot to represent the unit (1).



Bridges in Mathematics Grade 2 Teacher Masters **T3** © The Math Learning Center | mathlearningcenter.org

Work Samples

Located in Bridges, Units 2, 3, 4, and 7

Another informal method of assessment is work samples, papers completed by students in the course of normal instruction that you collect, examine carefully, and keep in individual files. Saved over the year, a collection of work samples can contribute to your picture of each student's growth. Opportunities to collect work samples appear in Units 2, 3, 4, and 7, and you might decide to collect such samples from other units on your own after you're more familiar with the program. The samples from Units 2 and 4 focus on students' ability to look for and make use of structure, and make generalizations in the context of numeric and visual patterns. The samples from Units 3 and 7 involve students' written responses to story problems.

Unit Assessments

Located in Bridges (Unit Pre-Assessments, Checkpoints, and Post-Assessments)

Each Bridges unit has three or four written assessments—a pre-assessment at the beginning of the first module, a checkpoint or two during the second module, and a post-assessment at the end of the third module (see examples from Unit 3 below). The pre-assessments help teachers gauge students' skill levels at the start of each unit, making it easier to determine those students most likely to need extra support or challenge. Checkpoints allow teachers to see how students are doing with key skills and concepts midway through the unit, so they can modify instruction if necessary. The unit post-assessments are similar to the pre-assessments, though often more challenging. They are, however, similar enough that they can examine students' growth over each three- to four-week period of instruction.

This is the second page of the pre-assessment and post-assessment for Unit 3. Notice that the items on each sheet are very similar, but pitched at a higher level on the post-assessment.

Unit 3 Module 1 | **Session 1** *class set plus 1 copy for display*

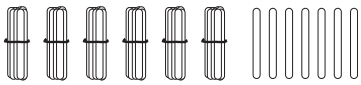
NAME | **DATE**

Unit 3 Pre-Assessment page 2 of 4

3 Start at 0 and make jumps of 1, 5, and 10 to get up to 47. You have to use at least one jump of each length; you cannot make 47 jumps of 1.

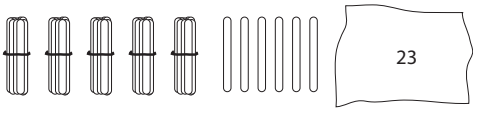
___ Draw your jumps on the number line.
___ Write the length of each jump.
___ Label 47.

4 Juanita counted sticks. Every time she got to 10, she made a bundle with a rubber band. How many sticks does Juanita have in all?



Juanita has _____ sticks in all.

5 Ana has some sticks on the table. She has 23 more sticks under the cloth. How many sticks does Ana have in all? Show your work.



Ana has _____ sticks in all.

(continued on next page)

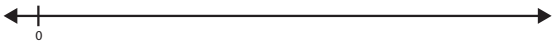
Unit 3 Module 3 | **Session 7** *class set plus 1 copy for display*

NAME | **DATE**

Unit 3 Post–Assessment page 2 of 4

3 Start at 0 and make jumps of 5, 10, and 20 to get up to 115. You have to use at least one jump of each length.

___ Draw your jumps on the number line.
___ Write the length of each jump.
___ Label 115.

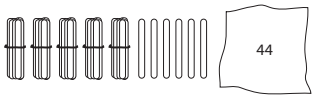


4 Julia counted sticks. Every time she got to 10, she made a bundle with a rubber band. How many sticks does Julia have in all?

Julia has _____ sticks in all.

5 Ana has some sticks on the table. She has 44 more sticks under the cloth. How many sticks does Ana have in all?

___ Write an equation for this problem here. _____
___ Solve the equation.
___ Show your work.



Ana has _____ sticks in all.

(continued on next page)

Long-Range Assessments

Located in the Number Corner (Baseline and Checkups)

The Number Corner Teachers Guide, September, offers a baseline assessment designed to gauge incoming students' proficiency with key number skills and concepts that were targeted for mastery by the end of first grade. In addition, the Teachers Guide includes four Number Corner checkups, designed to be administered at two- or three-month intervals. These periodic assessments reflect the Common Core Critical Areas of Focus; check for conceptual understanding, procedural fluency and application of coherent and rigorous standards; and provide a snapshot of each student's skills near the end of each quarter of the school year.

May | **Assessment** *class set plus 1 copy for display*

NAME | **DATE**

Number Corner Checkup 4 page 1 of 5

1 Solve as many of these addition problems as you can in one minute.

9	7	10	7	6	8	4
+ 3	+ 3	+ 5	+ 9	+ 6	+ 7	+ 10
6	6	7	9	5	9	6
+ 5	+ 7	+ 7	+ 10	+ 5	+ 5	+ 4
9	2	9	8	6	10	
+ 5	+ 8	+ 9	+ 8	+ 9	+ 7	

2 Add these two numbers. Use numbers, pictures, or words to help solve the equation and show your thinking.

264 + 468 = _____

3 Subtract these two numbers. Use numbers, pictures, or words to help solve the equation and show your thinking.

314 – 145 = _____

(continued on next page)

Number Corner Grade 2 Teacher Masters **T6** © The Math Learning Center | mathlearningcenter.org

May | **Assessment** *class set plus 1 copy for display*

NAME | **DATE**

Number Corner Checkup 4 page 2 of 5

4 Your teacher will give you two pieces of string—one will be shorter than the other. Use them to solve the problems below. You will also need the centimeter side of a ruler.

a Estimate the length of the shorter string in centimeters. ____ cm

b Measure the shorter string in centimeters. ____ cm

c Estimate the length of the longer string in centimeters. Use what you know about the length of the shorter string to help. ____ cm

d Measure the length of the longer string in centimeters. ____ cm

e What is the difference in the lengths of the two strings? How many centimeters longer is one than the other? Write an equation and then solve the problem. Show your work.

My Equation:

5 Jake measured two pieces of string. The first string was 42 centimeters. The second string was 15 centimeters. How much longer was the first string than the second string? Use the number line to show and solve the problem. Write your answer on the line below.

The first string was ____ centimeters longer than the second string.

(continued on next page)

Number Corner Grade 2 Teacher Masters **T7** © The Math Learning Center | mathlearningcenter.org

A Year's Worth of Assessments

Each assessment written into Bridges and Number Corner offers a window into individual students' skills and concepts at a particular moment in time. Any one of these assessments also gives you a snapshot of your entire class—you can literally see the spread of strategies and skills by sorting through the sheets or entering the information on the Class Checklist/Scoring Guide provided for each assessment in this guide. As you collect impressions, observations, interview results, and responses to written tasks, patterns of growth and development begin to emerge for the whole class and for each individual student, allowing you to make more nuanced and responsive instructional decisions.

The chart below shows all the assessments offered in Bridges and Number Corner Grade 2, in order of appearance during the year. The listing for each assessment includes its title, assessment type, and location in the program.

	Assessment Title	**Assessment Type**	**Location**
September	Work Place Guides for Work Places 1A, 1B, 1C, 1D, 1E, 1F, 1G, 1H, 1I, 1J, 1K	Observation	**Bridges** Unit 1
	Unit 1 Pre-Assessment	Pre-Assessment	**Bridges** Unit 1, Module 1, Session 5
	Number Combinations to Ten Checkpoint	Mid-Unit Checkup	**Bridges** Unit 1, Module 2, Session 5
	Unit 1 Post-Assessment	Post-Assessment	**Bridges** Unit 1, Module 4, Session 5
	Baseline Assessment	Assessment of Incoming Skills	**Number Corner** September
October	Work Place Guides for Work Places 2A, 2B, 2C, 2D, 2E	Observation	**Bridges** Unit 2
	Unit 2 Pre-Assessment	Pre-Assessment	**Bridges** Unit 2, Module 1, Session 2
	Place Value Checkpoint	Mid-Unit Checkup	**Bridges** Unit 2, Module 2, Session 1
	Measuring Checkpoint	Mid-Unit Checkup	**Bridges** Unit 2, Module 2, Session 4
	Unit 2 Post-Assessment	Post-Assessment	**Bridges** Unit 2, Module 3, Session 7
	Twos Chart Observations	Work Sample	**Bridges** Unit 2, Module 4, Session 2
	Extending the Twos Chart	Work Sample	**Bridges** Unit 2, Module 4, Session 3
	Number Corner Checkup 1	Quarterly Assessment of Skills	**Number Corner** October
Nov./Dec.	Work Place Guides for Work Places 3A, 3B, 3C, 3D, 3E	Observation	**Bridges** Unit 3
	Unit 3 Pre-Assessment	Pre-Assessment	**Bridges** Unit 3, Module 1, Session 1
	Addition & Subtraction Checkpoint	Mid-Unit Checkup	**Bridges** Unit 3, Module 2, Session 5
	Presents & Parcels Story Problems	Work Sample	**Bridges** Unit 3, Module 3, Session 6
	Unit 3 Post-Assessment	Post-Assessment	**Bridges** Unit 3, Module 3, Session 5
January	Work Place Guides for Work Places 4A, 4B, 4C, 4D	Observation	**Bridges** Unit 4
	Unit 4 Pre-Assessment	Pre-Assessment	**Bridges** Unit 4, Module 1, Session 1
	Inches, Feet & Yards Checkpoint	Mid-Unit Checkup	**Bridges** Unit 4, Module 2, Session 5
	Unit 4 Post-Assessment	Post-Assessment	**Bridges** Unit 4, Module 3, Session 6
	Snow People Threes Chart Observations	Work Sample	**Bridges** Unit 4, Module 4, Session 3

	Assessment Title	Assessment Type	Location
February	Extending the Threes Chart	Work Sample	**Bridges** Unit 4, Module 4, Session 4
	Number Corner Checkup 2	Quarterly Assessment of Skills	**Number Corner** January
	Work Place Guides for Work Places 5A, 5B, 5C, 5D, 5E	Observation	**Bridges** Unit 5
	Unit 5 Pre-Assessment	Pre-Assessment	**Bridges** Unit 5, Module 1, Session 1
	Three-Digit Numbers Checkpoint	Mid-Unit Checkup	**Bridges** Unit 5, Module 1, Session 5
	Money Checkpoint	Mid-Unit Checkup	**Bridges** Unit 5, Module 2, Session 6
	Unit 5 Post-Assessment	Post-Assessment	**Bridges** Unit 5, Module 3, Session 5
March	Work Place Guides for Work Places 6A, 6B, 6C, 6D, 6E	Observation	**Bridges** Unit 6
	Unit 6 Pre-Assessment	Pre-Assessment	**Bridges** Unit 6, Module 1, Session 1
	Unit 6 Post-Assessment	Post-Assessment	**Bridges** Unit 6, Module 3, Session 6
	Number Corner Checkup 3	Quarterly Assessment of Skills	**Number Corner** March
April	Work Place Guides for Work Places 7A, 7B, 7C, 7D, 7E	Observation	**Bridges** Unit 7
	Unit 7 Pre-Assessment	Pre-Assessment	**Bridges** Unit 7, Module 1, Session 1
	Metric Measuring & Fractions Checkpoint	Mid-Unit Checkup	**Bridges** Unit 7, Module 2, Session 5
	Unit 7 Post-Assessment	Post-Assessment	**Bridges** Unit 7, Module 3, Session 5
	Toy Store Story Problems	Work Sample	**Bridges** Unit 7, Module 4, Session 5
May/June	Work Place Guides for Work Places 8A, 8B	Observation	**Bridges** Unit 8
	Unit 8 Pre-Assessment	Pre-Assessment	**Bridges** Unit 8, Module 1, Session 2
	Unit 8 Post-Assessment	Post-Assessment	**Bridges** Unit 8, Module 3, Session 5
	Number Corner Checkup 4	Quarterly Assessment of Skills	**Number Corner** May
	Grade 2 Comprehensive Growth Assessment (CGA)*	Comprehensive Skills Assessment	**Bridges Assessment Guide** Comprehensive Growth Assessment

* The Grade 2 Comprehensive Growth Assessment (CGA) addresses every Common Core standard for second grade. It can be administered at the end of the school year as a summative assessment of all the CCSS for Grade 2, administered twice or even three times over the course of the year to monitor s' progress toward mastering the Common Core Standards, or used as a flexible bank of test items. See the Comprehensive Growth Assessment part of this guide for more details.

Section 2

Assessing Math Content

Setting Our Targets: Desired Learning Outcomes for Grade 2

In a 2012 article titled "From Common Core Standards to Curriculum: Five Big Ideas," assessment specialists Jay McTighe and Grant Wiggins remind us that the Common Core Standards were developed with long-term outcomes in mind. The authors further explain that the Common Core Standards were designed to help educators "construct plans for what learners should be able to *accomplish* with learned content," rather than develop checklists of discrete skills to be "covered" at each grade level.

Since it is impossible to construct or administer assessments without clear targets in mind, let's take a minute to envision the Common Core second grader. If a 7- or 8-year-old student were fully immersed in a classroom in which the Common Core Standards were well and skillfully addressed, what would that child be able to do by the end of second grade?

Perhaps the best answer comes from the Common Core document itself. Text on page 13 characterizes the desired results of second grade instruction in this way:

> (1) Students [will] extend their understanding of the base-ten system. This includes ideas of counting in fives, tens, and multiples of hundreds, tens, and ones, as well as number relationships involving these units, including comparing. Students [will] understand multi-digit numbers (up to 1000) written in base-ten notation, recognizing that the digits in each place represent amounts of thousands, hundreds, tens, or ones.
>
> (2) Students [will] use their understanding of addition to develop fluency with addition and subtraction within 100. They [will] solve problems within 1000 by applying their understanding of models for addition and subtraction, and they [should be able to] develop, discuss, and use efficient, accurate, and generalizable methods to compute sums and differences of whole numbers in base-ten notation, using their understanding of place value and the properties of operations. They [will] select and accurately apply methods that are appropriate for the context and the numbers involved to mentally calculate sums and differences for numbers with only tens or only hundreds.
>
> (3) Students [will] recognize the need for standard units of measure (centimeter and inch) and use rulers and other measurement tools with the understanding that linear measure involves an iteration of units. They [should be able to] recognize that the smaller the unit, the more iterations they need to cover a given length.
>
> (4) Students [will] describe and analyze shapes by examining their sides and angles. Students [will] investigate, describe, and reason about decomposing and combining shapes to make other shapes. Through building, drawing, and analyzing two- and three-dimensional shapes, students [will] develop a foundation for understanding area, volume, congruence, similarity, and symmetry in later grades.

To maximize the instructional value of assessment, teachers need to move beyond a superficial 'right or wrong' analysis of tasks to a focus on how students are thinking about the tasks. Efforts should be made to identify valuable student insights on which further progress can be based rather than to concentrate solely on errors or misconceptions. […] Assembling evidence from a variety of sources is more likely to yield an accurate picture of what each student knows and is able to do.

» NCTM

Critical Areas of Focus

The description above reflects the Critical Areas of Focus for Grade 2. The authors of the Common Core Standards point out that, "Not all of the content in a given grade is emphasized equally in the standards. Some clusters require greater emphasis than others based on the depth of the ideas, the time that they take to master, and/or their importance to future mathematics or the demands of college and career readiness."

The chart below, taken from the "Major Emphases and Shifts in Mathematics" document developed by the Common Core State Standards Initiative, shows the major, supporting, and additional clusters for Grade 2. In this chart, we see that addition and subtraction (facts to 20, double-digit, and triple-digit computation), place value, and measurement of length in standard units are deemed more important than working with equal groups in preparation for multiplication, time and money, data analysis, and geometry.

Cluster	Major Clusters	Supporting Clusters	Additional Clusters
Operations and Algebraic Thinking			
Represent and solve problems involving addition and subtraction.	●		
Add and subtract within 20.	●		
Work with equal groups of objects to gain foundations for multiplication.		●	
Number and Operations in Base Ten			
Understand place value.	●		
Use place value understanding and properties of operations to add and subtract.	●		
Measurement and Data			
Measure and estimate lengths in standard units.	●		
Relate addition and subtraction to length.	●		
Work with time and money.		●	
Represent and interpret data.		●	
Geometry			
Reason with shapes and their attributes.			●

Assessments in Grade 2 Bridges reflect these emphases. If you examine the Assessment Map at the end of this section, you'll notice that students are assessed three to nine times over the course of the year on story problems, facts to 20, place value, two- and three-digit addition and subtraction, and measurement. By contrast, work with equal groups, time, money, data analysis, and geometry skills receive quite a bit less attention, and the assessment of those skills is generally tied more tightly to the period of instruction in the program rather than being spread over the year.

Levels of Cognitive Demand

Along with a tighter focus on fewer skills at each grade level, the authors of the Common Core Standards call for greater levels of rigor in instruction, citing the need to help students develop conceptual understanding, procedural skill and fluency, and the ability to apply math concepts in "real world" situations.

The call for rigor demands that we make efforts to assess students accordingly, especially when grade-level standards call for understanding, analysis, or fluency. This is why some of the assessments in Grade 2 involve observation rather than written tasks, and written tasks often ask the students to show their work, explain their reasoning, or justify their responses.

One construct that has proved useful in designing the instruction and assessment in Bridges is the Depth of Knowledge scheme developed by Dr. Norman Webb at the University of Wisconsin. Dr. Webb points out that the expectations at a given grade level involve different degrees of cognitive demand, and sets out the following levels for educators to consider in developing instructional activities and assessment tasks.

Level 1: Recall & Reproduction
Recall, recognition; skill, behavior or sequence of behaviors learned through practice and easily performed

Level 2: Skills & Concepts
Engagement of some mental processing beyond recalling; the use of information or conceptual knowledge; requires making some decisions regarding how to approach a question or problem

Level 3: Strategic Thinking
More sophisticated reasoning and analysis; deep understanding; students are required to solve problems & draw conclusions

Level 4: Extended Thinking
Requires integration of knowledge from multiple sources and ability to represent knowledge in a variety of ways; usually requires work over an extended period of time

The chart below indicates the level of cognitive demand involved in several different CCSS standards for Grade 2 and outlines the types of assessment tasks needed to elicit corresponding levels of thinking from the student.

	Common Core Standard	**Sample Assessment Task**
Level 1: Recall	**2.NBT.3** Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.	Supply one of three different written forms for a 3-digit number, and ask students to supply the other two (e.g., ask students to write 467 in words and in expanded notation, or ask students to show 900 + 10 + 13 in base ten numerals and in words).
Level 2: Skills & Concepts	**2.NBT.5** Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.	Pose a 2-digit addition problem. Ask the student to solve the problem and show all of her work.
Level 3: Strategic Thinking	**2.OA.1** Use addition and subtraction within 100 to solve two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions.	Pose a two-step story problem that involves both double-digit addition and subtraction. Ask the student to solve the problem and explain his thinking as completely as possible on paper, using drawings, numbers, or words
Level 4: Extended Thinking	**2.MBT.5, 2.MD.1, 2.MD.4, 2.MD.5, 2.MD.9** Construct a simple marble roll. Investigate the effect of increasing the height of a ramp on the distance rolled by a marble. Draw conclusions based on data collected by the entire class and shown on a line plot.	After students have conducted the experiment themselves and drawn conclusions based on class data, give student sets of measurement data collected for ramps set at two different heights. Ask student to construct a line plot representing the data and draw conclusions based on the information on the line plot.

Targets for Mastery

The Assessment Map at the end of this section indicates when mastery of each standard is expected. As we might predict, most of the Grade 2 Common Core Standards are targeted for mastery in the latter half of the year. While it is tempting, and not unusual, for a program or a district to divide a set of grade-level standards into three or four piles and target each pile for mastery by the end of a particular quarter or trimester, this approach disregards the fact that skills and concepts involving higher levels of cognitive demand require more time to develop than others. It also tends to trivialize learning by breaking skills and concepts into small bits, rather than retaining the connections among them that support the focus, coherence, and rigor demanded by the Common Core Standards.

The fact is that most of the new second grade standards involve a degree of cognitive demand beyond Level 1 (recall and recognition). Even a relatively simple skill, such as measuring the length of an object in U.S. customary units, is made more complex in that students are expected to select the most reasonable unit (inches, feet, or yards) for the particular task, select the most appropriate measurement tool, and justify their decisions. Furthermore, this particular skill is part of a larger conceptual complex that requires a deep and thorough understanding of linear measurement as a process of iteration—something that takes most students a couple of years' worth of instruction, experience, and practice to develop.

Standard 2.OA.1 provides another good example of the rigor and complexity the Common Core Standards demand. This standard has to do with using addition and subtraction within 100 to solve fifteen different types of word problems (add to, start unknown; take from, change unknown; compare, smaller unknown; and so on). Furthermore, second graders are expected to be able to solve word problems that involve two steps rather than just one. Can we not teach and expect mastery of the easier types of word problems earlier in the school year? Certainly, but in the end, students need to be able to comprehend what any given problem is asking, decide how many steps will be necessary to solve the problem, employ viable strategies using the information provided, demonstrate good number sense in the process, and explain and justify their thinking. This requires that they develop a rich network of interconnected skills and concepts, which takes time and many varied layers of experience and application. While we might reasonably expect incremental progress through the year in the three major second grade learning progressions (addition and subtraction, place value, and length measurement), the whole of each progression is much greater than the sum of a set of discrete parts. We best serve our students by viewing each unit of instruction as another layer in a yearlong journey toward mastery.

Grade 2 Assessment Map

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	Bridges Unit 1	September NC	Bridges Unit 2	October NC	Bridges Unit 3	Bridges Unit 4	January NC	Bridges Unit 5	Bridges Unit 6	March NC	Bridges Unit 7	Bridges Unit 8	May NC	CGA
1.OA.1 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions.		●												
1.OA.4 Understand subtraction as an unknown-addend problem. For example, subtract 10 – 8 by finding the number that makes 10 when added to 8.	M1, S5 Unit 1 Pre-Assessment M2, S5 Number Combinations Checkpoint M4, S5 Unit 1 Post-Assessment													
1.OA.8 Determine the unknown whole number in an addition or subtraction equation relating to three whole numbers.		●												
1.NBT.1 Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.		●												
1.NBT.2 Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases: **a** 10 can be thought of as a bundle of ten ones, called a "ten." **b** The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones. **c** The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).		●			M1, S1 Unit 3 Pre-Assessment M3, S7 Unit 3 Post-Assessment									
1.NBT.3 Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.	M1, S5 Unit 1 Pre-Assessment M4, S5 Unit 1 Post-Assessment	●												
1.NBT.4 Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.		●												
1.NBT.5 Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.		●												
1.NBT.6 Subtract multiples of 10 using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.		●												

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Grade 2 Assessment Map

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	Bridges Unit 1	September NC	Bridges Unit 2	October NC	Bridges Unit 3	Bridges Unit 4	January NC	Bridges Unit 5	Bridges Unit 6	March NC	Bridges Unit 7	Bridges Unit 8	May NC	CGA
1.MD.2 Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps.		●	M1, S2 Unit 2 Pre-Assessment M2, S4 Measuring Checkpoint M3, S7 Unit 2 Post-Assessment											
1.G.3 Partition circles and rectangles into two and four equal shares; describe shares using appropriate language.		●												
2.OA.1 Use addition and subtraction within 100 to solve one- step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions.	M1, S5 Unit 1 Pre-Assessment M4, S5 Unit 1 Post-Assessment			●	M1, S1 Unit 3 Pre-Assessment M2, S5 Addition & Subtraction Checkpoint M3, S6, S7 Work Sample M3, S7 Unit 3 Post-Assessment	M1, S1 Unit 4 Pre-Assessment M3, S6 Unit 4 Post-Assessment	●			●	M1, S1 Unit 7 Pre-Assessment M3, S5 Unit 7 Post-Assessment		●	●
2.OA.1 Use addition and subtraction within 100 to solve two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions.						M1, S1 Unit 4 Pre-Assessment M3, S6 Unit 4 Post-Assessment					M1, S1 Unit 7 Pre-Assessment M3, S5 Unit 7 Post-Assessment		●	●
2.OA.2 Fluently add and subtract within 20 using mental strategies. 2 By end of Grade 2, know from memory all sums of two one-digit numbers.	M1, S5 Unit 1 Pre-Assessment M2, S5 Number Combinations Checkpoint M4, S5 Unit 1 Post-Assessment			●			●			●			●	●
2.OA.3 Determine whether a group of objects (up to 20) has an odd or even number of members; write an equation to express an even number as a sum of two equal addends.	M1, S5 Unit 1 Pre-Assessment M4, S5 Unit 1 Post-Assessment			●										●
2.OA.4 Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.			M1, S2 Unit 2 Pre-Assessment M2, S1 Place Value Checkpoint M3, S7 Unit 2 Post-Assessment	●		M4, S4 Work Sample			M1, S1 Unit 6 Pre-Assessment M3, S6 Unit 6 Post-Assessment				●	●
2.NBT.1 Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases: **a** 100 can be thought of as a bundle of ten tens, called a "hundred." **b** The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).			M1, S2 Unit 2 Pre-Assessment M2, S1 Place Value Checkpoint M3, S7 Unit 2 Post-Assessment				●	M1, S1 Unit 5 Pre-Assessment M1, S5 Three-Digit Numbers Checkpoint M3, S5 Unit 5 Post-Assessment						●

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	Bridges Unit 1	September NC	Bridges Unit 2	October NC	Bridges Unit 3	Bridges Unit 4	January NC	Bridges Unit 5	Bridges Unit 6	March NC	Bridges Unit 7	Bridges Unit 8	May NC	CGA
2.NBT.1a 100 can be thought of as a bundle of ten tens, called a "hundred."							●	M1, S5 Three-Digit Numbers Checkpoint						●
2.NBT.1b The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).							●	M1, S5 Three-Digit Numbers Checkpoint						●
2.NBT.2 Count within 1000; skip-count by fives, tens, and hundreds.			M2, S4 Checkpoint	●	M1, S1 Unit 3 Pre-Assessment M2, S5 Addition & Subtraction Checkpoint M3, S7 Unit 3 Post-Assessment		●	M1, S1 Unit 5 Pre-Assessment M1, S5 Three-Digit Numbers Checkpoint M3, S5 Unit 5 Post-Assessment						●
2.NBT.3 Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.			M1, S2 Unit 2 Pre-Assessment M2, S1 Place Value Checkpoint M3, S7 Unit 2 Post-Assessment	●			●	M1, S1 Unit 5 Pre-Assessment M1, S5 Three-Digit Numbers Checkpoint M3, S5 Unit 5 Post-Assessment				M1, S2 Unit 8 Pre-Assessment M3, S5 Unit 8 Post-Assessment		●
2.NBT.4 Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.								M1, S1 Unit 5 Pre-Assessment M1, S5 Three-Digit Numbers Checkpoint M3, S5 Unit 5 Post-Assessment		●		M1, S2 Unit 8 Pre-Assessment M3, S5 Unit 8 Post-Assessment		●
2.NBT.5 Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.			M1, S2 Unit 2 Pre-Assessment M3, S7 Unit 2 Post-Assessment		M1, S1 Unit 3 Pre-Assessment M2, S5 Addition & Subtraction Checkpoint M3, S7 Unit 3 Post-Assessment			M1, S1 Unit 5 Pre-Assessment M1, S5 Three-Digit Numbers Checkpoint M3, S5 Unit 5 Post-Assessment		●				●
2.NBT.6 Add up to four two-digit numbers using strategies based on place value and properties of operations.					M1, S1 Unit 3 Pre-Assessment M3, S7 Unit 3 Post-Assessment	M1, S1 Unit 4 Pre-Assessment M3, S6 Unit 4 Post-Assessment				●				●
2.NBT.7 Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.			M3, S7 Unit 2 Post-Assessment					M1, S1 Unit 5 Pre-Assessment M1, S5 Three-Digit Numbers Checkpoint M3, S5 Unit 5 Post-Assessment			M1, S1 Unit 7 Pre-Assessment M3, S5 Unit 7 Post-Assessment M4, S5 Work Sample	M1, S2 Unit 8 Pre-Assessment M3, S5 Unit 8 Post-Assessment	●	●

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	Bridges Unit 1	September NC	Bridges Unit 2	October NC	Bridges Unit 3	Bridges Unit 4	January NC	Bridges Unit 5	Bridges Unit 6	March NC	Bridges Unit 7	Bridges Unit 8	May NC	CGA
2.NBT.8 Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900.							●	M1, S1 Unit 5 Pre-Assessment M1, S5 Three-Digit Numbers Checkpoint M3, S5 Unit 5 Post-Assessment						●
2.NBT.9 Explain why addition and subtraction strategies work, using place value and the properties of operations.								M1, S1 Unit 5 Pre-Assessment M3, S5 Unit 5 Post-Assessment		●	M1, S1 Unit 7 Pre-Assessment M3, S5 Unit 7 Post-Assessment		●	●
2.MD.1 Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.						M1, S1 Unit 4 Pre-Assessment M2, S5 Inches, Feet & Yards Checkpoint M3, S6 Unit 4 Post-Assessment					M1, S1 Unit 7 Pre-Assessment M2, S5 Metric Measuring & Fractions Checkpoint M3, S5 Unit 7 Post-Assessment		●	●
2.MD.2 Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.			M2, S4 Measuring Checkpoint			M1, S1 Unit 4 Pre-Assessment M2, S5 Inches, Feet & Yards Checkpoint M3, S6 Unit 4 Post-Assessment								●
2.MD.3 Estimate lengths using units of inches, feet, centimeters, and meters.						M1, S1 Unit 4 Pre-Assessment M2, S5 Inches, Feet & Yards Checkpoint M3, S6 Unit 4 Post-Assessment					M1, S1 Unit 7 Pre-Assessment M2, S5 Metric Measuring & Fractions Checkpoint M3, S5 Unit 7 Post-Assessment		●	●
2.MD.4 Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.			M1, S2 Pre-Assessment M2, S4 Measuring Checkpoint M3, S7 Unit 2 Post-Assessment			M1, S1 Unit 4 Pre-Assessment M2, S5 Inches, Feet & Yards Checkpoint M3, S6 Unit 4 Post-Assessment					M1, S1 Unit 7 Pre-Assessment M2, S5 Metric Measuring & Fractions Checkpoint M3, S5 Unit 7 Post-Assessment		●	●
2.MD.5 Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.					M1, S1 Unit 3 Pre-Assessment M3, S7 Unit 3 Post-Assessment	M1, S1 Unit 4 Pre-Assessment M3, S6 Unit 4 Post-Assessment					M1, S1 Unit 7 Pre-Assessment M3, S5 Unit 7 Post-Assessment		●	●
2.MD.6 Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, . . . , and represent whole-number sums and differences within 100 on a number line diagram.			M1, S2 Unit 2 Pre-Assessment M3, S7 Unit 2 Post-Assessment		M1, S1 Unit 3 Pre-Assessment M3, S7 Unit 3 Post-Assessment								●	●

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	Bridges Unit 1	September NC	Bridges Unit 2	October NC	Bridges Unit 3	Bridges Unit 4	January NC	Bridges Unit 5	Bridges Unit 6	March NC	Bridges Unit 7	Bridges Unit 8	May NC	CGA
2.MD.7 Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.				●						●				●
2.MD.8 Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using $ and ¢ symbols appropriately. Example: If you have 2 dimes and 3 pennies, how many cents do you have?								M1, S1 Unit 5 Pre-Assessment M2, S6 Money Checkpoint M3, S5 Unit 5 Post-Assessment		●	M1, S1 Unit 7 Pre-Assessment M3, S5 Unit 7 Post-Assessment M4, S5 Work Sample			●
2.MD.9 Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.												M1, S2 Unit 8 Pre-Assessment M3, S5 Unit 8 Post-Assessment		●
2.MD.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph.							●							●
2.G.1 Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.									M1, S1 Unit 6 Pre-Assessment M3, S6 Unit 6 Post-Assessment	●				●
2.G.2 Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.									M1, S1 Unit 6 Pre-Assessment M3, S6 Unit 6 Post-Assessment				●	●
2.G.3 Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words halves, thirds, half of, a third of, etc., and describe the whole as two halves, three thirds, four fourths.									M1, S1 Unit 6 Pre-Assessment M3, S6 Unit 6 Post-Assessment		M1, S1 Unit 7 Pre-Assessment M2, S5 Metric Measuring & Fractions Checkpoint M3, S5 Unit 7 Post-Assessment		●	●
2.G.3 Recognize that equal shares of identical wholes need not have the same shape.									M1, S1 Unit 6 Pre-Assessment M3, S6 Unit 6 Post-Assessment					●

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Section 3

Assessing Math Practices

In addition to presenting a set of math content standards for each grade level, the authors of the Common Core Standards have established a set of Mathematical Practice Standards that rest on important "processes and proficiencies with longstanding importance in mathematics education." This set is identical for each grade level, K–12.

Dr. William McCallum, one of the authors of the CCSS, points out that the eight math practices can be grouped into four categories, as shown on the chart below.

Habits of Mind of a Productive Mathematical Thinker **MP.1** Make sense of problems and persevere in solving them. **MP.6** Attend to precision.	**Reasoning and Explaining** **MP.2** Reason abstractly and quantitatively. **MP.3** Construct viable arguments and critique the reasoning of others.
	Modeling and Using Tools **MP.4** Model with mathematics. **MP.5** Use appropriate tools strategically.
	Seeing Structure and Generalizing **MP.7** Look for and make use of structure. **MP.8** Look for and express regularity in repeated reasoning.

It is important to note that these practices reflect the attitudes and ways of thinking and working that characterize successful mathematicians. They are much bigger and somewhat more amorphous than math content skills, and at least as important. However, they are not a list of discrete skills to be "covered." They are, rather, vehicles for teaching, learning, and doing mathematics at every level.

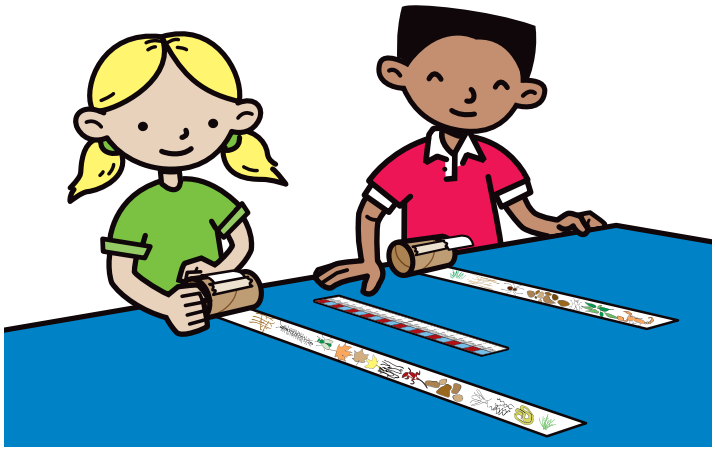
In rich settings in which informal and formal possibilities for solving problems are numerous, young children develop the ability to focus attention, test hypotheses, take reasonable risks, remain flexible, try alternatives, exhibit self-regulation, and persevere.

» Juanita Copley

What Do the Math Practices Look Like at Grade 2?

It is impossible to address and assess these practices without having a clear picture of the desired outcomes. The language of the math practices is straightforward, but exactly what does "reasoning abstractly and quantitatively" look like in second grade? How do we know when a 7-year-old is proficient at "modeling with mathematics?"

The North Carolina Department of Instruction has produced a document that "unpacks" the Common Core Standards, providing clear descriptions of what the standards mean a student must know, understand, and perform at each grade level. The chart on the next page features explanations and examples of the math practices in action at second grade adapted from the North Carolina unpacking document.



	Math Practice	Explanations and Examples
Habits of Mind	**MP. 1** Make sense of problems and persevere in solving them.	Mathematically proficient students in Grade 2 examine problems and tasks, can make sense of the meaning of the task and find an entry point or a way to start the task. Grade 2 students also develop a foundation for problem-solving strategies and become independently proficient in using those strategies to solve new tasks. In Grade 2, students' work continues to use concrete manipulatives and pictorial representations as well as mental mathematics. Grade 2 students also are expected to persevere while solving problems; that is, if students reach a point in which they are stuck, they can reexamine the situation in a different way, consult with classmates, try a different strategy and continue to work constructively. Lastly, mathematically proficient students complete a task by asking themselves the question, "Does my answer make sense?"
	MP. 6 Attend to precision.	Mathematically proficient students in Grade 2 are precise in their communication, calculations, and measurements. In all mathematical tasks, students in Grade 2 communicate clearly, using grade-level appropriate vocabulary accurately as well as giving precise explanations and reasoning regarding their process of finding solutions. For example, while measuring an object, care is taken to line up the tool correctly in order to get an accurate measurement. During tasks involving number sense, students consider whether or not their answer is reasonable and check their work to ensure the accuracy of solutions.
Reasoning & Explaining	**MP. 2** Reason abstractly and quantitatively.	Mathematically proficient students in Grade 2 make sense of quantities and relationships while solving tasks. This involves two processes—decontexualizing and contextualizing. In Grade 2, students represent situations by decontextualizing tasks into numbers and symbols. For example, in the task, "There are 25 children in the cafeteria and they are joined by 17 more children. How many students are in the cafeteria? " Grade 2 students translate that situation into an equation, such as: 25 + 17 = ___ and then solve the problem. Students also contextualize situations during the problem-solving process. For example, while solving the task above, students can refer to the context of the task to determine that they need to add 17 since 17 children join the group already in the cafeteria. The processes of reasoning also influence other areas of mathematics such as estimating lengths of objects in standard units when information about objects previously measured is available.
	MP. 3 Construct viable arguments and critique the reasoning of others.	Mathematically proficient students in Grade 2 accurately use definitions and previously established strategies and solutions to construct viable arguments about mathematics. During discussions about problem-solving strategies, students constructively critique the strategies and reasoning of their classmates. For example, while solving 74 – 18, students may use a variety of strategies, and after working on the task, can discuss and critique each others' reasoning and strategies, citing similarities and differences between strategies.
Modeling & Using Tools	**MP. 4** Model with mathematics.	Mathematically proficient students in Grade 2 model real-life mathematical situations with an equation, and check to make sure that their equation accurately matches the problem context. Grade 2 students use concrete manipulatives and pictorial representations to provide further explanation of the equation. Likewise, Grade 2 students are able to create an appropriate problem situation from an equation. For example, students are expected to create a story problem for the equation 43 + 17 = ___ such as "There were 43 cookies in the jar. Kelsey made 17 more cookies and put them in the jar with the others. How many cookies are in the jar now?"
	MP. 5 Use appropriate tools strategically.	Mathematically proficient students in Grade 2 have access to and use tools appropriately. These tools may include linking cubes, number racks, base ten pieces, hundreds grids, number lines, rulers, and concrete geometric shapes (e.g., pattern blocks, 3-D solids, and so on). Students also have experiences with educational technologies, such as calculators and virtual manipulatives, which support conceptual understanding and higher-order thinking skills. During classroom instruction, students have access to various mathematical tools as well as paper, and determine which tools are the most appropriate to use. For example, while measuring the length of the hallway, students can explain why a yardstick is more appropriate to use than a ruler.
Structure & Generalizing	**MP. 7** Look for and make use of structure.	Mathematically proficient students in Grade 2 carefully look for patterns and structures in the number system and other areas of mathematics. For example, students notice number patterns in the tens place as they skip count by 10s off the decade and find the corresponding numbers on a hundreds grid. While working in the Numbers in Base Ten domain, students note that 10 ones equal a ten, and 10 tens equal 1 hundred, and 10 hundreds equal 1 thousand.
	MP. 8 Look for and express regularity.	Mathematically proficient students in Grade 2 begin to look for regularity in structures when solving mathematical problems. For example, after solving two-digit addition problems by decomposing numbers (33 + 25 = 30 + 20 + 3 +5), students may begin to generalize and apply that strategy independently on future tasks. Further, students begin to look for ways to be more efficient in computations, using familiar combinations to derive the answers to less familiar combinations (e.g., 25 + 27 is 52 because it's just 2 more than 25 + 25, which is 50). Lastly, while solving problems, Grade 2 students accurately check for the reasonableness of their solutions during and after completing the problem.

How Can We Best Assess the Math Practices?

While it is possible to score extended response items for a variety of traits, much as writing samples are scored, the characteristics, habits of mind, and dispositions represented by the math practices don't easily lend themselves to paper-and-pencil testing, especially among young students. We need to observe our students in action during daily instruction, at Work Places, and in individual and small group interview settings, watching and listening carefully for evidence that they are demonstrating the desired proficiencies and performances.

What Is the Teacher's Role in Eliciting Math Practices?

As we consider how to best teach and assess math practices, we need to examine the teacher's role as a model and a facilitator in the classroom. What behaviors and attitudes can we hold and model on a consistent basis, whether in instructional or assessment settings, that will elicit and reinforce the practices?

- **Value the process of finding the answer at least as much as the answer itself.** This means listening carefully to students and trying to understand how they get their answers, even when they don't make much sense to you. Students' responses, as random as they may seem at times, are based on their current understandings. There is almost always some kind of underlying logic.
- **Create an atmosphere in which it's OK to take risks and make mistakes.** If you listen to students with genuine respect and curiosity, you'll find that they begin to do the same for their classmates.
- **When appropriate, make a selection of tools available,** including Unifix cubes, pattern blocks, the number rack, base ten pieces, bundles & sticks, coins, whiteboards and pens, paper and pencil, and virtual tools such as the number rack, geoboard, and base ten apps. Talk with students about their choices from time to time, and encourage them to explain why, for example, they've chosen a sketch of an open number line instead of base ten pieces to model and solve a particular problem.
- **Give students time to share their observations, ideas, and strategies with one another.** This can take place in small group settings or whole group discussions, but means that you have to establish the idea of listening to and learning from one another as a classroom norm. The care and respect you demonstrate in listening to each member of your classroom community will serve as an important model to your students.
- **Help students clarify and justify their thinking with the questions you ask** as they are working independently or discussing problems in group settings. We have included dialog in many of the sessions and workouts for modeling possible questioning techniques. Beyond these examples, we find that there are key questions that elicit specific math practices. Some of these are listed on the following chart.

Math Practice		Questions that Elicit the Desired Behavior
Habits of Mind	**MP.1** Make sense of problems and persevere in solving them. **MP.6** Attend to precision.	• What do you think that problem is asking? • How would you describe this problem in your own words? • What might you do to get started? • Share your thinking with the person next to you. What does your partner think? • Did your partner get the same answer? If not, can the two of you figure out why not? • What's the word we use for any shape with 4 sides and 4 vertices? • What measuring tool would give you the most precise answer? • Does your answer seem reasonable? Why or why not? • What can you do to double-check your answer?
Reasoning & Explaining	**MP.2** Reason abstractly and quantitatively. **MP.3** Construct viable arguments and critique the reasoning of others.	• Can you find a combination of cards that totals 20? • How many more do you need to make 100? • Which team is winning our game so far? By how much? • What number do you hope you spin next in this game? Why? • What equation might we use to represent this story problem? Does someone have a different idea? • What answer did you get for this problem? How did you figure it out? • Does anyone have a different solution? • Does anyone have a different strategy; a different way to solve the problem? • We have seen three different strategies for solving this problem. How are these strategies alike? How are they different? • Can you convince us? • Can you find a way to prove that?
Modeling & Using Tools	**MP.4** Model with mathematics. **MP.5** Use appropriate tools strategically.	• Can you make a sketch to show your thinking? • Can you label your sketch with numbers? • What equation might we use to represent this situation? • Would you prefer to use base ten pieces or a number line sketch to help solve this problem? • How might you use the number rack to show this situation? • Would you rather use the number rack you made with beads or the number rack app on your tablet today? Why? *Continued*
Structure & Generalizing	**MP.7** Look for and make use of structure. **MP.8** Look for and express regularity.	• What do you notice (about this chart, picture, pattern, problem, etc.)? • Do you see any patterns here; anything that repeats over and over? • What might come next? Why? • What do you predict will happen? Why? • How is this problem like the one we just solved? How is it different? • Does that always work? Why or why not? • How are these shapes alike? How are they different? • What do you notice about the numbers in this list? • If you mark all the counting-by-3s numbers on this grid, will you land on 100? Why or why not? What if you mark all the counting-by -5s numbers?

Looking for the Math Practices in All the Right Places, Part 1

Although teachers' beliefs and attitudes regarding the math practices shape their questioning and instructional strategies and go a long way toward eliciting the desired behaviors, we need to acknowledge that certain types of activities are more effective than others in educing particular practices. To say that we're doing all the math practices all of the time strips them of their fundamental value.

Math educator Susan Jo Russell suggests instead that we identify "Content-Practice nodes" or places in a curriculum where a teaching/learning emphasis on each practice can most productively occur. The chart below identifies some of the types of activities in Bridges and Number Corner that are particularly strong at facilitating each practice in Grade 2, and gives an example of each.

MP	Activity from Bridges or Number Corner Grade 2
MP.1, MP.6 MP.2, MP.3 MP.4, MP.5	**Story Problems** **Unit 3 Module 3: Presents & Parcels** Students solve and pose story problems around the theme of presents and parcels. Each parcel holds exactly 10 presents, which elicits the use of base ten strips to model the parcels and base ten units to model the individual presents.

Students are at liberty to use sketches of base ten pieces in place of concrete models, as well as the open number line, or invented algorithms for adding and subtracting double-digit problems. In conducting the session, teachers are encouraged to solicit students' answers after they've had time to work the problem, and then have a few share their strategies with the class. The reason for collecting the answers first is that when there are different answers, as there usually are, students are particularly motivated to listen to one another's strategies.

Teacher *Our first problem said, "Dad ordered 51 presents for the party. Twenty-seven of the presents are already on the table. The rest of the presents are still in the delivery truck. How many presents are in the truck?" What did you get for an answer to this one?*

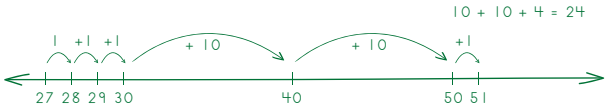
Students *Twenty-four!*
I got 23.
I got 36.

Teacher *OK, sounds like we've got some different ideas going. Who'd like to come up to the document camera to show and explain their solution? When you come up, please tell us your answer and show us how you got it.*

Student A *I got 24. First I drew 5 lines and a dot to show 51. I saw right away I couldn't take 27 away because there weren't enough ones, so I traded in a ten for 10 ones. Then I crossed out 2 tens and 7 ones, and there were 2 tens and 4 ones left. That's 24.*

Teacher *Did someone have a different answer, or a different strategy?*

Student B *I made a number line. I put 27 at one end for the presents on the table, and 51 at the other to show how many in all. I knew the difference would tell how many presents were still in the truck. Then I took 3 hops of 1 to get up to 30, then 2 hops of 10 and 1 more hop of 1. It was 24.*



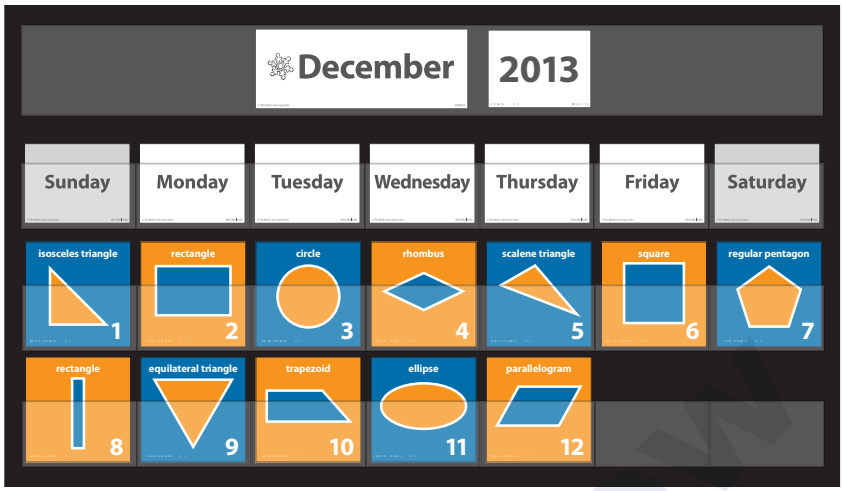
Teacher *Ryan, two classmates just showed how they got 24. Your answer was 23. Can you show us how you got your answer?*

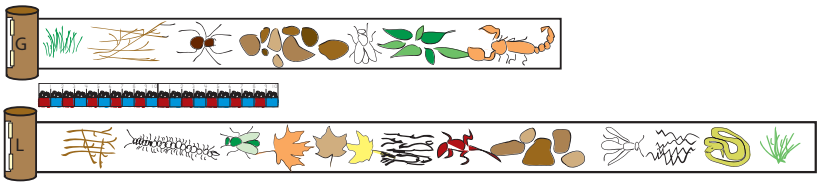
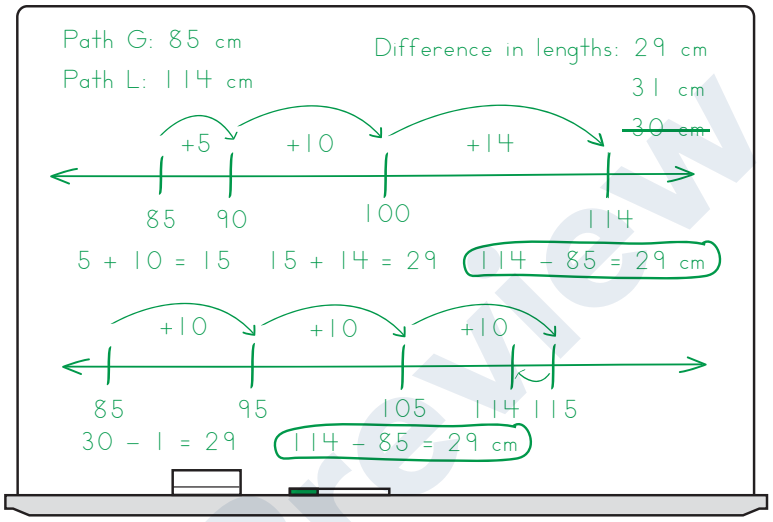
Student C *I can, but I agree with 24 now. I was almost right, but I made a mistake. See, first I decided to subtract 50 – 20 and just ignore the 1 for awhile. I got 30, and then I took away the 7, but I forgot to add the 1 back in. If you do that, you get 24.*

51 – 27

50 – 20 = 30
30 – 7 = 23

23 + 1 = 24

MP	Activity from Bridges or Number Corner Grade 2
MP.1, MP.6 MP.3 MP.7, MP.8	**Pattern Problems** **December Number Corner: Calendar Grid Workout** Each day, a new marker is posted in the Calendar Grid pocket chart. In December, the sequence is designed help students recognize shapes having specified attributes, with an emphasis on quadrilaterals. The markers are patterned in a predictable sequence, making it possible for students to predict the appearance of new markers based on the markers that have already been posted. By mid-month, students' predictions are becoming increasingly precise with respect to the language used to describe upcoming shapes.  ***Teacher*** *What do you think the Calendar Grid marker for today will look like? Please talk to the person next to you, and then we'll have some people share their thinking with the class.* ***Students*** *It will definitely have an orange shape with blue in the background.* *Maybe it'll be a circle or another triangle.* *I don't think we can tell what the shape will be.* ***Teacher*** *Why not?* ***Student A*** *Well, so far, only the colors go in a pattern. The shapes always go orange, blue, orange, blue, and the backgrounds go the other way—blue, orange, blue, orange.* *The shapes are all different—triangle, rectangle, circle, rhombus, triangle, square, pentagon, rectangle, triangle, trapezoid, ellipse, parallelogram. There's no way to tell what the shape on today's marker will be.* ***Student B*** *I respectfully disagree. I think we can know that it's not going to have 4 sides.* ***Teacher*** *How are you thinking about that?* ***Student B*** *Well, all the blue shapes have 4 sides. They're all different, but they're all quadrilaterals. None of the orange shapes are quadrilaterals, so we know that today's shape will not be a quadrilateral.* ***Teacher*** *Do you all agree? Please talk to the person next to you for a few moments and show thumbs up if you agree and thumbs down if you disagree. OK, I see you're showing thumbs down. Can you explain why?* ***Student C*** *It could be a quadrilateral. Maybe there just haven't been any orange shapes with 4 sides yet.* ***Student D*** *I respectfully disagree! That would break the pattern. So far the orange shapes never have 4 sides, and the blue shapes always have 4 sides. The orange shape today could have any number of sides, like 5 or 6, or maybe even 10, but it can't have 4.*

MP	Activity from Bridges or Number Corner Grade 2
MP.6 MP.2 MP.4, MP.5	**Measuring Problems** **Unit 7 Module 1: Session 5 Ant Paths** In this session, students estimate, measure, and compare the lengths of ant paths they have created, using lengths of adding machine tape. In the illustration below, the teacher has placed two 10-centimter rulers end-to-end between the two paths as a benchmark to facilitate more accurate estimates.  Once students have estimated the two lengths and measured them carefully, their task is to figure out how many centimeters longer one path is than the other. While it's possible to measure the difference, the teacher also asks students to use numeric strategies. This request generates a variety of ideas, including those shown below. 

The sessions and workouts shown in the chart above are meant to give examples of the types of activities teachers will find throughout the program. Each Bridges session and Number Corner workout is accompanied by a skills list that identifies two or three math practices that are most strongly elicited by the activity. For a complete listing, see the Bridges in Mathematics Grade 2 CCSS Correlations on the Bridges Educator website. Here, you can view all the Bridges sessions and Number Corner workouts that are most closely associated with each math practice.

Looking for the Math Practices in All the Right Places, Part 2

On the next page, you'll find a Math Practices Observation Sheet. Here you can note observations about students' use of math practices during Bridges sessions and Number Corner workouts. Consider running several copies, labeling each row with one of the students' names, and making periodic notes about each student once every week or two.

Math Practices Observation Chart

You can use this chart to record notes about students' use of Math Practices during Bridges sessions and Work Places, as well as during Number Corner workouts. See the Grade 2 Correlations on the Bridges Educator site for the sessions and workouts most likely to elicit particular Math Practices.

Students	**Habits of Mind** **2.MP.1** Make sense of problems and persevere in solving them **2.MP.6** Attend to precision	**Reasoning & Explaining** **2.MP.2** Reason abstractly and quantitatively **2.MP.3** Construct viable arguments and critique the reasoning of others	**Modeling & Using Tools** **2.MP.4** Model with mathematics **2.MP.5** Use appropriate tools strategically	**Seeing Structure & Generalizing** **2.MP.7** Look for and make use of structure **2.MP.8** Look for and express regularity in repeated reasoning

Section 4

Assessment as a Learning Opportunity

There is no question that second graders can participate in an informed way in their own learning, setting goals and monitoring their progress toward meeting those goals. One of the easiest and most effective ways to help them become active participants in their own learning is through the use of learning targets.

Assessment should not merely be done to students; rather it should also be done for [and with] students, to guide and enhance their learning.
» NCTM

Setting Learning Targets

A learning target is, very simply, a statement of intent for a lesson. Such a target lets students know what the goal of the lesson is. Teachers sometimes set two or even three targets for a math session: one that has to do with the content (skills or concepts), one that has to do with key vocabulary, and one that has to do with a mathematical practice likely to be elicited in the course of the activity.

Each Bridges session includes a summary, list of skills and concepts, and list of related vocabulary to make the task of generating learning targets easier for teachers.

Unit 3 Module 2

Unit 3
Module 2
Session 3

Session 3
Height & Length Problems

Summary

Students work as a group with the teacher to compare and contrast three different solutions to a story problem involving length. The discussion of the different solutions gives the class another opportunity to observe and discuss methods of using the open number line to solve problems. Students then work in pairs or individually to solve two related story problems using the open number line. Students go out to Work Places as they finish and then come back together as a class to discuss solutions.

Skills & Concepts

- Solve one-step subtraction story problems with minuends to 100 involving situations of comparing, with unknowns in all positions (2.OA.1)
- Measure the length of an object in inches using a measuring tape (2.MD.1)
- Estimate length in inches (2.MD.3)
- Determine exactly how much longer one object is than another (2.MD.4)
- Express the difference between two lengths in terms of a standard unit of length (2.MD.4)
- Solve subtraction story problems with minuends to 100 involving lengths given in the same units (2.MD.5)
- Represent whole-number differences from minuends up to 100 on a number line (2.MD.6)
- Make sense of problems and persevere in solving them (2.MP.1)
- Construct viable arguments and critique the reasoning of others (2.MP.3)

Materials

Copies	Kit Materials	Classroom Materials
Problems & Investigations Height & Length Problems		
TM T4 David's Problem **SB 38*** Length Problems on the Open Number Line	• measuring tape marked in inches	• a piece of paper to mask portions of the overhead • student whiteboards, markers, and erasers (class set)
Work Places in Use		
2B The Subtraction Wheel (introduced in Unit 2, Module 1, Session 5) **2C** Number Line Race (introduced in Unit 2, Module 2, Session 1) **2D** Pick 2, Roll & Subtract (introduced in Unit 2, Module 2, Session 4) **2E** Steps & Leaps (introduced in Unit 2, Module 3, Session 3) **3A** Star Power (introduced in Unit 3, Module 1, Session 3) **3B** Five in a Row (introduced in Unit 3, Module 1, Session 5)		

HC – Home Connection, **SB** – Student Book, **TM** – Teacher Master

Vocabulary

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

difference*
height*
length*

A teacher might examine the front material for a session such as the one shown above, and devise one, two, or even three learning targets in the form of "I can" statements:

I can use an open number line to show and solve a comparing story problem.

I can explain the difference between length and height.

I can listen to my classmates explain their strategies for solving today's problems and tell how the strategies are alike and how they're different.

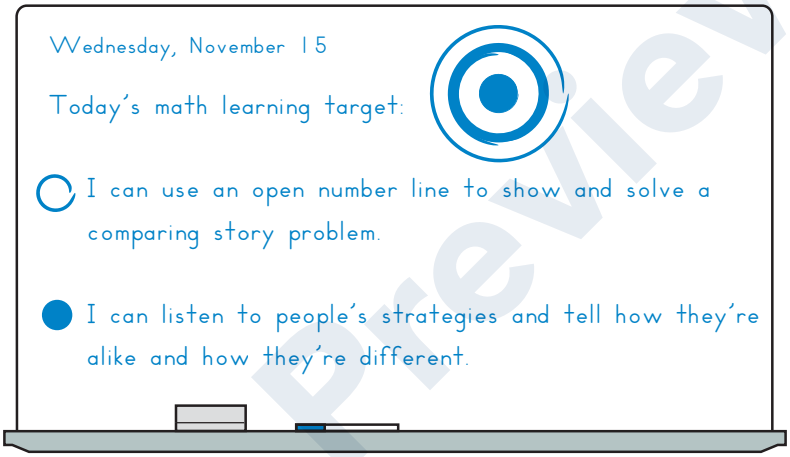
These are only three of many possible learning targets for this particular session. Other content targets might deal with reading and solving comparison problems, determining the difference between two lengths, or writing two different equations to represent the same story problem. Other vocabulary targets might revolve around any of the words listed for the session. Alternate math practice targets might have to do with sharing and explaining one's thinking, being able to restate a classmate's explanation or strategy, or evaluating strategies for efficiency. It is not hard to come up with an assortment of possible targets; the challenge is to choose the one or two that best address the strengths and needs of your students at the time and to frame those targets in student-friendly terms (e.g., "I can . . . " statements).

Teachers generally find that the process of devising learning targets for their students is helpful in focusing their own thinking about the purpose of a lesson. It's not unusual for teachers to collaborate during grade-level team meetings or professional learning communities in generating learning targets for the sessions they plan to teach in the coming week.

Communicating Learning Targets

Once a teacher has decided on the learning targets for a particular session, she must then communicate them to the students. Oftentimes, she does this by writing the targets on the board before the session and then sharing them with the students at the very opening of the session, or directly after the warm-up activity.

Some teachers even make a drawing of a target on the board to accompany the display, like this:



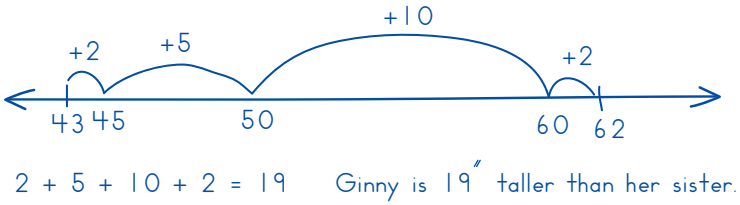
After sharing the targets with the students and clarifying as needed, the teacher conducts the lesson, referring back to each target once or twice during instruction to refocus students on their learning goals. At the end of the activity, the teacher draws students' attention back to the targets and evaluates each with the class, perhaps conducting a mini-assessment in the process, as illustrated in the dialog below.

> ***Teacher*** *Our first learning target today was to use an open number line to show and solve comparing story problems. What if we had a problem to solve where Ginny was 62 inches tall and her little sister was 43 inches tall, and we wanted to find out how much taller Ginny was? How might we use an open number line to solve the problem?*
>
> ***Student*** *You could draw a line and put the numbers on it, but leave room to make hops.*
>
> ***Teacher*** *OK, I'll draw and label a line on the board with 43 inches at one end and 62 inches at the other. Now, would each of you work with the person next to you to draw and label a line on one of those scratch paper strips at your table and solve the problem?*
>
> ***Teacher*** *I've been walking around watching you work, and I'm seeing some interesting strategies. What did you get for an answer?*

Students *It's 19.*
We said Ginny is 19 inches taller than her sister.
We got 20.

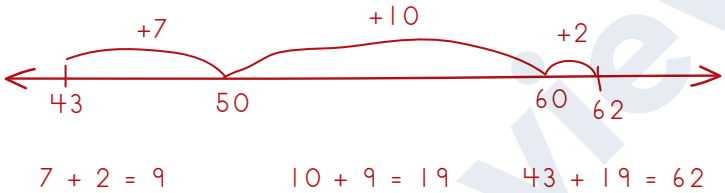
Teacher *Who'd like to share how they got their answer? Please bring your paper up and explain what you did.*

Students *We made a line and put 43 and 62. Then we hopped up to 45. Then it was easy to add 5 more and get to 50.*
Then we added 10 and 2 more, and we got up to 62. All those hops made 19, so we knew Ginny was 19 inches taller than her little sister.

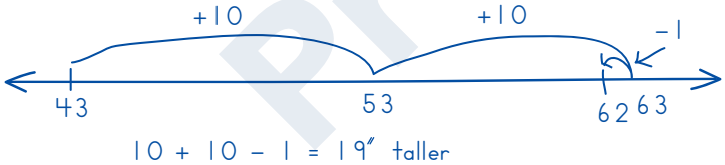


Teacher *Did anyone use a different strategy?*

Students *We did! Can we show?*
It's kind of the same, but we only took one hop to get up to 50.
Then we went up to 60 and then 62.
We wrote an addition equation to show 43 and 19 more is 62.



Students *We did it kind of a different way. Can we show our way?*
We went up 10 and 10, and then just took 1 away, like this.



Teacher *Oh, interesting! How are these strategies alike, and how are they different?*

Students *Everyone used a line and made hops.*
Everyone went up, kind of like they added to get the answer.
We didn't! We went backward. I think that's how we got goofed up. We thought it was 20, but now we think it's really 19.
You can do it both ways, but it seems easier going up.
People took different hops, but almost everyone used 10.
We used 2 tens and then we took 1 away.

Teacher *How are we doing at using an open number line to show and solve comparing story problems? Show thumbs up if you think we hit the bull's-eye, thumbs sideways if you think we're not really there yet, and thumbs down if you're still not sure about this skill. OK—looks like lots of bull's-eyes!*

Other Ways to Encourage Student Reflection

Learning Lines

At the end of an activity, have students each draw a line on a whiteboard or small piece of scratch paper and label it with three faces, as shown in the illustration. Then have them mark an X along the line to indicate how well they think they did with the skill, concept, or practice that was targeted for the lesson.

Student *I really like showing and solving problems on an open number line. I'm going to put my X by the smiley face.*

Exit Cards

At the end of an activity or session, give students each a 3″ × 5″ index card or a small piece of scratch paper and ask them to respond to one final question or problem, or use quick sketches or words to show one thing they learned during math class.

Using the Unit Pre-Assessments for Goal Setting

Although teachers sometimes hesitate to administer unit pre-assessments for fear that students may feel overwhelmed and defeated before the instruction even begins, there are a number of good reasons to conduct these assessments. One of the strongest arguments for doing so is that you can use the results to guide your instruction, knowing ahead of time which students are likely to struggle and need extra support, and which are likely to need extra challenges along the way. It's important to reassure students that the unit pre-assessments are designed to help you understand what they already know and what they still have to learn with regard to the skills and concepts in the upcoming unit. You don't expect them to know how to answer all the questions and solve all the problems yet, but you also don't want to spend lots of time on things they can already do. You might encourage your students to regard each pre-assessment as a "sneak preview of coming attractions" or a peek at some of the things they'll be studying over the next few weeks.

Once you have established a classroom culture of trust, including permission to take risks and learn from one's errors, unit pre-assessments can also be used to help students take ownership of their learning. Starting midyear, you might consider returning the pre-assessments to students to examine after you've corrected them. After everyone has had a few minutes to look through corrected material, you might also ask students to each write two goals for themselves—identifying skills or concepts on which they want to improve over the course of the unit. This is not easy for most second graders, and you can anticipate that their goals will be very concrete (e.g., write more neatly, remember to put my name on my paper, get more problems right, get better on subtracting), but the opportunity to participate in their own learning is invaluable, providing an informal introduction to the process of reflection and goal-setting used in Bridges Grades 3–5.

Before & After

Many second graders enjoy comparing the results of their unit pre- and post-assessments, looking to see which items they were able to do correctly the second time around, and noting changes in their handwriting, organizational skills, the strategies they used to solve various problems, and so on. This is a relatively quick and simple way to help students take ownership, and something you might consider implementing fairly early in the school year.

Section 5

Using the Results of Assessment to Inform Differentiation & Intervention

The key to meaningful intervention is for teachers at a grade level to conduct the same assessments, score them the same way, discuss the results with colleagues, and develop a plan that accurately targets and addresses the needs of students.

This time-tested recipe for success has been formalized over the past decade, partly as a result of state and federal demands for increased accountability. The last ten years have seen the rise of professional learning communities, data walls, and Response to Intervention (RtI). At the heart of these developments is the goal of ensuring that *all* students meet the standards and achieve mathematical success.

One of the most challenging tasks we face as classroom teachers is finding ways to reach all our students and match each student's level of mathematical readiness and performance to the skills we are required to teach.

» Regina Gresham and Mary Little

What is RtI?

Succinctly stated by math educators Gina Gresham and Mary Little, Response to Intervention (RtI) is the practice of "1) providing high-quality instruction or intervention matched to student needs and 2) using learning rate over time and level of performance to 3) make important educational decisions to guide instruction."

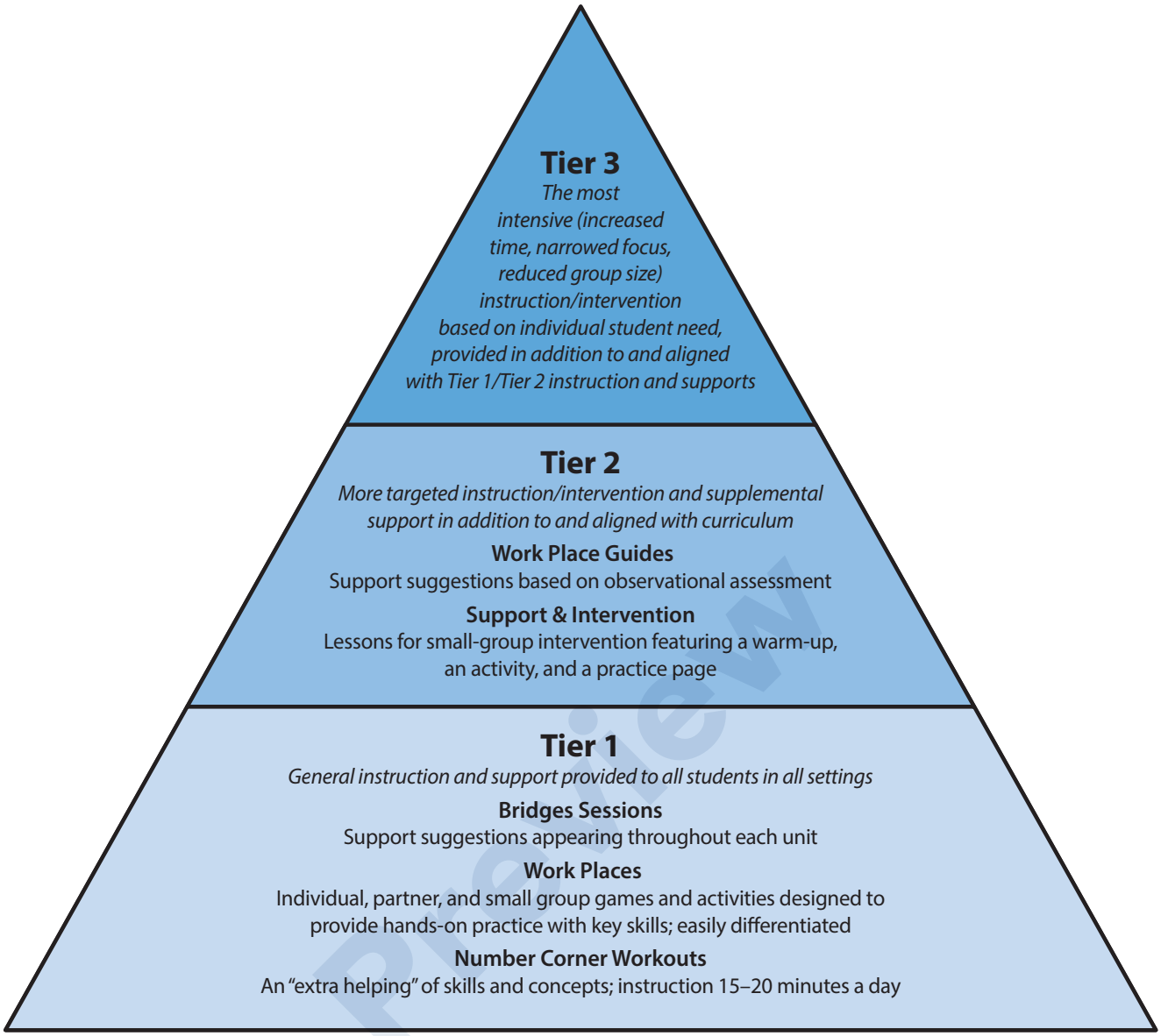
Gresham and Little go on to identify the important role of classroom teachers:

> The RtI process relies on proactive, instructional problem solving among educators to develop dynamic instructional or intervention plans that are based on assessment data and that address academic or behavioral concerns about students. RtI in mathematics focuses on the effective use of evidence-based instructional approaches, resources, and strategies within the classroom while continuously monitoring student learning. Because the goal is to increase mathematical achievement for students, general education classroom teachers are crucial participants in the RtI process.

How Does Bridges Support RtI?

RtI models generally describe a three-tiered approach to providing instruction and intervention to students at increasing levels of intensity, as determined by student response. Assessment data is collected at each tier in order to make instructional decisions and determine whether or not students are responding to instruction and interventions.

As illustrated in the diagram below, Bridges provides Tier 1 instruction and a solid set of Tier 2 resources, along with the assessments, including recheck opportunities, needed to monitor students' progress. Although Bridges is not designed to deliver Tier 3 instruction (intensive, individualized interventions and support), the models and instructional methods employed throughout the program are highly compatible with those of Math Recovery, a well-regarded Tier 3 program.



Continual use of assessments throughout the school year helps guide decisions about the level of intervention required to ensure success for each student. The following items are part of an instructional path that follows a set of RtI-friendly steps:

1 Conduct Tier 1 instruction for approximately 75 minutes a day following the sequence laid out in the Bridges units and monthly Number Corner write-ups. The RtI model is most effective if it rests on a curriculum such as Bridges, which is based on best practices, research-validated models and instructional methods, consistent development of key vocabulary, and an unflagging commitment to access and equity for all students.

2 Use the observational assessments included with each Work Place Guide in the Bridges units to fine-tune instruction during Work Places. The Assessment & Differentiation section on the first page of each Work Place Guide teacher master provides guidance about specific behaviors to watch for and suggests appropriate on-the-spot support or challenge as needed (see example below). The support suggestions, implemented during Work Places, may be just the type of Tier 2 instruction needed to address the needs of your struggling students most of the time.

Unit 7 Module 1 | **Session 5** *1 copy kept in a clear plastic sleeve and stored in the Work Place bin*

Work Place Guide 7C Ant Paths

Summary

Partners select two Ant Paths, roll them out, and estimate the lengths of the paths. Then they work together to measure both paths and find the difference between the two lengths.

Skills & Concepts

- 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)
- Use written numbers and symbols to represent strategies for subtracting with minuends to 1000 (2.NBT.7)
- Select and use the appropriate tool for measuring the length of an object (2.MD.1)
- Measure the length of an object in centimeters a ruler, meter stick or measuring tape (2.MD.1)
- Estimate length in centimeters (2.MD.3)
- Measure length to the nearest whole centimeter (supports 2.MD)
- Determine exactly how much longer one object is than another, and express the difference in terms of a standard unit of length (2.MD.4)
- Represent whole-number differences from minuends up to 100 and beyond on a number line (2.MD.6)
- Attend to precision (2.MP.6)

Materials

Copies	Kit Materials	Classroom Materials
TM T18 Work Place Guide 7C Ant Paths **TM T19** Work Place Instructions 7C Ant Paths **TM T20** 7C Ant Paths Record Sheet	• 3 measuring tapes	• student-made army ant rulers • student-made ant paths rolled up on cardboard tubes • meter stick (one or more, optional) • masking tape (one roll)

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
One or more students are struggling to measure longer lengths with their army ant rulers.	SUPPORT Suggest that students use the tape measure in addition to, or instead of their army ant rulers.	
Students are having difficulty subtracting.	SUPPORT Provide additional resources to help students model their subtraction.	Some students may need a gentle nudge toward using an open number line to subtract. Try drawing the number line for students and marking the two lengths. Suggest counting by a number such as 10 to get to the larger length. For students who need even more support, try bringing out base ten area pieces to model subtraction.
Students are insisting that it is better to just measure the distance between the ends of the two ant paths to find the difference in their lengths.	CHALLENGE Ask them to use subtraction to compare the lengths of the ant paths, and then measure the distance between the ends of the paths as a way to double-check their work. If they prefer, they can measure the distance between the ends of the paths first, and then do the computation to check their results.	
English-Language Learners Use the following adaptations to support the ELL students in your classroom.		
• Consider the fact that students recently arrived from other countries may already be familiar with metric measure. Such students may be able to draw on previous experiences to help their classmates estimate and measure in centimeters.		

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3 Administer the baseline assessment (found in the Number Corner Teacher's Guide) in September. Examine students' work, and score it using the suggestions found in the Number Corner Assessments part of this guide. Use the results to inform your initial thinking about support and intervention. While it may seem a little early in the school year to make hard-and-fast judgments about incoming second graders, the baseline assessment serves as an early warning system. You'll want to keep a close eye on students who are unable to perform the featured assessment tasks, as some of these students may emerge as candidates for additional services either this year or in third grade.

4 Administer the checkpoints and unit assessments as they appear in the Bridges units. Assessment instructions, materials, and teacher masters can be found in the Bridges Teachers Guide.

5 Examine, correct, and score students' work, using the class list/scoring guides found in the Bridges Unit Assessment part of this guide. Use of the scoring guides is optional, of course, but the guides will help you and your colleagues, school- or district-wide, score the unit assessments consistently.

6 Use your observations and the results of the assessments to help make decisions about interventions for specific students. The suggestions in the Work Place Guides may be adequate to support those who struggle with one or more skills from time to time. Students who consistently score between 25% and 50% on the Bridges and Number Corner assessments may be targeted for small group Tier 2 instruction, provided during Work Places using games and activities from the Support & Intervention resources found within the Curriculum section of the Bridges Educator site. Students who consistently score less than 25% on the assessments may need Tier 3 instruction, conducted one-on-one or in a very small group with a tutor or in the resource room.

7 Conduct the Number Corner checkups near the end of each quarter. You will find the instructions, materials, and needed teacher masters in the Number Corner Teachers Guide for October, January, March, and May. These quarterly checkups retest many of the skills covered in the Bridges unit assessments, but may be considered more summative than the unit-end assessments because they reflect a longer span of instruction. Examine, correct, and score students' work, using the class list/scoring guides in the Number Corner Assessments part of this guide.

8 It is well worth your time to meet with other teachers at your grade level, either in your building or in your district, to share, examine, and discuss the results of the Number Corner checkups at or near the end of each quarter. Given that the Number Corner Checkups address a broad set of skills each quarter, the results may provide you and your colleagues with the information you need to make decisions about grouping students needing support as you devise strategies for delivering Tier 2 and Tier 3 instruction to all students in need of intervention, school-wide.

9 Resources under Support & Intervention in the Curriculum section of the Bridges Educator site may be used as a source of Tier 2 instruction, in or out of the classroom. After targeted students have received Tier 2 instruction for 6–8 weeks, you can pull items from the Comprehensive Growth Assessment to retest specific skills.

What About RtI Screeners?

The assessment in Bridges is multi-layered and complex, designed to help teachers monitor students' growth and progress with respect to the entire set of Common Core standards for Grade 1. There are times when you might need something much shorter and faster to administer. There are a number of RtI "screeners" currently available, including some fine products available free online. These are generally one-on-one interviews featuring a few carefully selected items related to key numeracy skills for the grade level. They are quick and easy to conduct, and are sometimes used by teachers at the start of the school year to quickly identify students in need of Tier 2 or Tier 3 instruction. These screeners can be re-administered midyear and again at the end of the year as needed to gauge the effects of interventions.

The key difference between RtI screeners and the assessments in Bridges and Number Corner is that screeners address a very limited set of skills, selected for their importance in determining the success of a student in developing the desired level of numeracy for a given grade level. Such screeners may be found free of charge online. An online search will bring up several sites that offer these screeners free of charge.

A Word About the Scoring Guides

In the Bridges Unit Assessments and Number Corner Assessments parts of this guide, you'll find scoring guides for every assessment in the Bridges units (including the work samples) and all the Number Corner assessments. These guides assign a point value to every item on an assessment. If an item involves a level of cognitive demand greater than simple recall, the scoring guide generally gives specific direction about how to assign points. Consider the example below, taken from the scoring guide for the Unit 7 Pre-Assessment.

Item	CCSS	Points Possible
3 Demonstrates the understanding that fractions have to be equal parts of the same whole. *Yes. Explanations will vary. Example: The 3 parts aren't the same size.*	2.G.3	**2 pts.** • 1 pt. for agreeing with Max • 1 pt. for any explanation that makes reference to the parts' different sizes or identifies the parts as halves and fourths rather than thirds.

Here is another example, taken from the scoring guide for Number Corner Checkup 3.

Item	CCSS	Points Possible
4b Solve a story problem that involves finding the number that leaves 87 when removed from 100 (Change Unknown) *13, student work and equations will vary*	2.OA.1	**4 pts.** (See scoring scale below.) Acceptable equations include: 100 – 87 = 13
Scoring Scale for Solving Story Problems (4 points possible for each problem): • 1 point for writing an equation to represent the situation • 1 point for using the information given in the problem (e.g., the numbers and the situation) • 1 point for using a viable strategy that could lead to the answer; strategies may include drawings, equations, numeric representations, etc. • 1 point for showing the correct answer		

In this case, a student who is able to write an equation to represent the situation, use the given information, and demonstrate a strategy that could lead to the correct answer is able to score 3 points, even if he doesn't get the correct answer. Why not award 1 point for the correct answer and be done with it? Because we're interested in taking a more nuanced look at what the student *can* do. Representing and solving a story problem is a complex operation. If a student can write an equation to represent the problem, take all the information into account and devise a strategy that could lead to the correct answer, he is working at a good level of understanding, even if he makes an arithmetical error and winds up with the wrong answer. This is not to say that accuracy is unimportant, but the Common Core standards *also* value practices such as making sense of a problem, modeling with mathematics, and communicating effectively, so these must be taken into account.

Assessment vs. Evaluation

Assessment and evaluation are often confused or taken to mean the same thing, but there is an important distinction between the two. Assessment is the process of gathering information in order to make decisions. Evaluation is a step beyond assessment in that we assign a rank, level, score, or grade to the information that has been collection. Assessment captures the situation as it exists at a particular moment or over a period of time. Evaluation places a judgment on it—adequate, not adequate; enough, not enough, below, at, or above expectation.

The fact that RtI is data-driven requires a move in the direction of evaluation. In working with our colleagues to make instructional decisions that sometimes go beyond the walls of our own classroom, the results of our assessments take on added weight at times. The scoring guides in this assessment guide bear out this line of thinking, in that the points possible for each item are added together, and the total scored by a student is assigned a value: meeting standard, approaching standard, strategic (Tier 2), or intensive (Tier 3). Here are examples taken from two of the scoring guides in the Bridges Unit Assessments part of this guide. The first is from the scoring guide for the Unit 3 Pre-Assessment. This pre-assessment, like the others that appear at the beginning of each unit, is formative, designed to help teachers make instructional decisions (plan to slow down or speed up the rate of instruction; reteach a certain skill or concept to the whole class before starting the unit; anticipate pulling a small group during Work Places to provide extra support with a particular skill; and so on) based on students' responses.

TOTAL SCORE/LEVEL OF PROFICIENCY* **21 pts.**

* 6–21 points: Working at Tier 1 or Tier 2 Level
5 points or fewer: May need Tier 3 Support

The example below is taken from the Unit 3 Post-Assessment, administered toward the end of the unit. This assessment, like the rest of the unit-end assessments, is more summative in nature, basically serving to evaluate how well each student did with skills and concepts presented over the course of the unit.

TOTAL SCORE/LEVEL OF PROFICIENCY* **21 pts.**

* Meeting Standard	16–21 points (75–100% correct)
Approaching Standard	11–15 points (50–74% correct)
Strategic	6–10 points (25–49% correct)
Intensive	5 points or fewer (24% or less correct

The cut scores and the designations assigned to each range in the second example are designed to help teachers identify students in need of Tier 2 or Tier 3 instruction as well as students who are approaching or meeting standard. This ranking system is particularly useful in districts with standards-based report cards, where the marks shared with parents have to do with whether or not their children are meeting nationally established standards.

Section 6

Reporting to Families

Research has shown that the home environment has a profound impact on the academic achievement of our students. Its relationship to student achievement is much stronger than that of household income, parent's occupations, or parents' education. Ongoing communication is critical to the success of the parent-teacher and family-school relationship. With the proper resources and information, parents, families, and the community can become a teacher's greatest asset and support system.

In contrast to years past, when grade level standards varied from one state, one district, or even one school to another, most states have adopted the common, coherent, rigorous, and focused goals set by the Common Core State Standard Initiative. It is safe to anticipate that we will have support from a variety of organizations, ranging all the way from the federal and state government to the National PTA, in communicating grade-level expectations to parents. In fact, as of this writing, the PTA has made available a set of parent guides that explain the Common Core State Standards at each grade level and offer tips about how parents can support their children's mathematical development at home. Such resources are likely to be increasingly available, many online. Links to the PTA *Parents' Guide to Student Success* and other helpful resources can be found on the Bridges Educator site.

Even though most states have adopted the Common Core Standards, the pacing of instruction and assessment will continue to vary from one district to another, along with the methods, models, and strategies for helping students master the national standards. It will still be incumbent upon teachers to communicate with parents about how the standards are being taught and assessed. One of the more powerful ways we can accomplish this is through conferencing and writing reports. Although your district probably determines the form and content of your report cards, you may be free to supplement with written comments, checklists and the like. We have provided quarterly Math Progress Reports to help you report students' progress to parents in greater detail. Please note that the skills and concepts on these reports follow the sequence of instruction and assessment in Bridges and have been framed in family-friendly language. Also, those standards associated with the Critical Areas of Focus for Grade 2 may appear on more than one of the reports.

In addition to marking the Progress Report, there is room to write a note about each student's use of the CCSS Mathematical Practices, along with observations about any special strengths of weaknesses. During conferences, you can provide even more information for parents by sharing samples of students' work, including notable responses to items on unit and Number Corner assessments.

Having clearly defined goals helps families and teachers work together to ensure that students succeed. Standards help parents and teachers know when students need extra assistance or when they need to be challenged even more.

» National PTA

Grade 2 Math Progress Report: First Quarter

Assessment Schedule: September through late October/early November

CCSS	Needing	Meeting	Exceeding
2.OA.1		Solves addition and subtraction story problems to 20	
2.OA.2		Add and subtract to 20 using mental strategies	
2.OA.3		Tells whether a number is odd or even, and explains why	
2.OA.4		Uses addition to find the total number of objects arranged in a rectangular array with up to 5 rows and 5 columns	
2.NBT.1		Understands that the three digits of a 3-digit number represent amounts of hundreds, tens, and ones	
2.NBT.3		Reads and writes 3-digit numbers using numerals and expanded notation (726 = 700 + 20, + 6)	
2.NBT.5		Adds 2-digit numbers	
2.MD.6		Uses a number line to show and solve 2-digit addition problems	

Comments

Grade 2 Math Progress Report: Second Quarter

Assessment Schedule: November–January

CCSS	Needing	Meeting	Exceeding
2.OA.1		Solves one- and two-step addition and subtraction story problems to 100	
2.OA.2		Demonstrates fluency with addition facts to 20	
2.NBT.1		Understands that the three digits of a 3-digit number represent amounts of hundreds, tens, and ones	
2.NBT.2		Skip-counts by 5s, 10s, and 100s within 1,000	
2.NBT.3		Reads and writes 3-digit numbers using numerals, words, and expanded notation (726 = 700 + 20, + 6)	
2.NBT.5		Adds and subtracts 2-digit numbers	
2.NBT.6		Adds up to four 2-digit numbers	
2.NBT.8		Mentally adds and subtracts 10 or 100 to or from numbers 100–900	
2.MD.1		Uses appropriate tools to measure length in inches and feet	
2.MD.2		Understands that you get different answers when you measure the same object with different units (e.g., inches and feet)	
2.MD.3		Estimates length using units of inches and feet	
2.MD.4		Measures to find out how much longer one object is than another in inches or feet	
2.MD.5		Solves word problems involving lengths that are given in the same units	
2.MD.6		Locates numbers on a number line; adds and subtracts on a number line	
2.MD.10		Constructs and reads picture graphs and bar graphs, and solves problems using the information in a graph	

Comments

Grade 2 Math Progress Report: Third Quarter

Assessment Schedule: February–March

CCSS	Needing	Meeting	Exceeding
2.OA.1		Solves addition and subtraction story problems to 100	
2.OA.2		Demonstrates fluency with addition facts to 20	
2.OA.4		Uses addition to find the total number of objects arranged in a rectangular array with up to 5 rows and 5 columns	
2.NBT.1		Understands that the three digits of a 3-digit number represent amounts of hundreds, tens, and ones	
2.NBT.2		Skip-counts by 5s, 10s, and 100s to 1,000	
2.NBT.3		Reads and writes 3-digit numbers using numerals, words, and expanded notation (726 = 700 + 20, + 6)	
2.NBT.4		Uses symbols >, =, < to compare two 3-digit numbers	
2.NBT.5 2.NBT.9		Adds and subtracts 2-digit numbers accurately and efficiently, and explains strategies for doing so	
2.NBT.6		Adds up to four 2-digit numbers	
2.NBT.8		Mentally adds and subtracts 10 or 100 to or from numbers 100–900	
2.MD.8		Solves money word problems involving dollar bills, quarters, dimes, nickels, and pennies	
2.G.1		Recognizes and draws 2- and 3-D shapes, including triangles, quadrilaterals, pentagons, hexagons, and cubes	
2.G.2		Divides a rectangle into rows and columns of same-sized squares and counts to find the total	
2.G.3		Divides circles and rectangles into two, three, and four equal parts, and describes the parts using words like *halves, half of, thirds, a third of, fourths, quarters, a fourth of*	

Comments

Grade 2 Math Progress Report: Fourth Quarter

Assessment Schedule: April–May

CCSS	Needing	Meeting	Exceeding
2.OA.1		Solves two-step addition and subtraction story problems to 100	
2.OA.2		Adds and subtracts to 20; knows addition facts to 20 by memory	
2.OA.4		Uses addition to find the total number of objects arranged in a rectangular array with up to 5 rows and 5 columns	
2.NBT.3		Reads and writes 3-digit numbers using numerals, words, and expanded notation (726 = 700 + 20, + 6)	
2.NBT.4		Uses symbols >, =, < to compare two 3-digit numbers	
2.NBT.7		Adds and subtracts 3-digit numbers using models, sketches, and/or numbers, and explains strategies for doing so	
2.MD.1		Uses appropriate tools to measure length in centimeters and meters	
2.MD.3		Estimates length using units of centimeters and meters	
2.MD.4		Measures to find out how much longer one object is than another in centimeters or meters	
2.MD.5		Solves word problems involving lengths that are given in the same units	
2.MD.8		Solves money word problems involving dollar bills, quarters, dimes, nickels, and pennies, and uses the cents and dollars signs correctly	
2.MD.9		Measures lengths and displays the results on a line plot	
2.G.2		Divides a rectangle into rows and columns of same-sized squares and counts to find the total	
2.G.3		Divides circles and rectangles into two, three, and four equal parts, and describes the parts using words like *halves, half of, thirds, a third of, fourths, quarters, a fourth of*	

Comments