1st Grade

WCSD Curriculum Guides

Elementary Mathematics

Washoe County School District

Every Child, By Name And Face, To Graduation℠

Version 3: 2019/2020

About this guide

Curriculum is one component of a larger mathematics instructional program in Washoe County School District (WCSD) for Kindergarten through 5th grade students. The purpose of curriculum guides are to bridge the district's K-5 Philosophy of Mathematics Education with the Nevada Academic Content Standards (NVACS) through a connection of the Curriculum Pacing Frameworks, instructional materials (*Bridges in Mathematics* or ***enVision****math****2.0***), research based instructional practices and clarification of the standards when necessary. The following describes a course of study for the specified grade for one year. ***ALL*** students must receive quality instruction in ***ALL*** grade level standards in one instructional year.

This guide is designed to be **used with the instructional materials** during planning. *This guide is not meant to supplant any portion of the instructional materials*. Teachers will continue to read through Units/Topics during instructional planning.

Guide language:

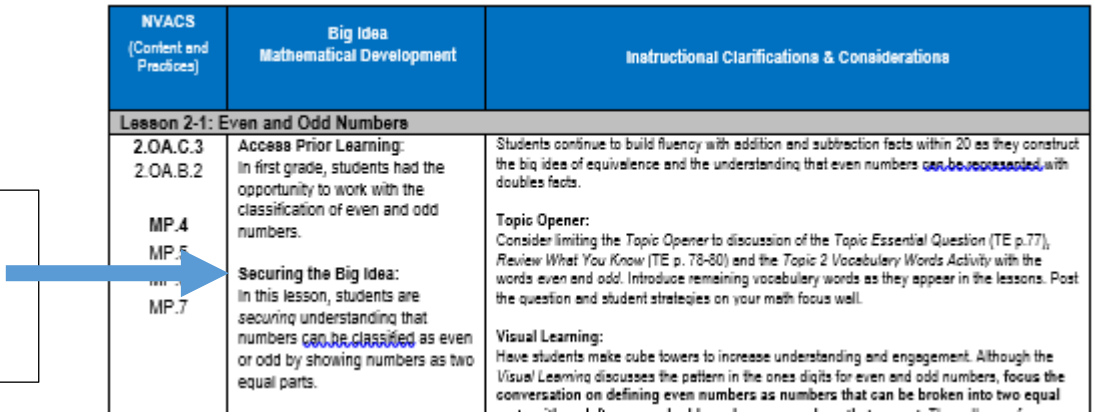
Throughout the guide the following language is used to describe the level of understanding expected at the lesson level. This language is found in the lesson-by-lesson section in the column labeled "Big Idea Mathematical Development".

Beginning: Indicates students initial explorations with the mathematical idea(s) explored in the lesson. ***Instruction continues*** *to the next lesson*.

Developing: Students have worked with the mathematical ideas in previous grades or previously during the year. The focus of the lesson is to connect and build student understanding. Teachers provide intensified support to students who may exhibit misconceptions, partial understanding, no or limited understanding. ***Instruction continues*** *to the next lesson*.

Secure: Indicates that students have worked previously with these ideas and are expected to be at a level of secure understanding. Students with secure understanding are able to make connections and use the mathematics in a variety of situations; yet may still struggle expanding the understanding to non-routine situations. Students who are secure may still make mistakes at times; yet these students demonstrate that they have mathematical understanding with limited if any misconceptions. Students not secure in the understanding by the end of that Unit/Topic might benefit from small group intensification on these ideas. Teachers may choose to use an **A/D/E** (**A**ssessment, **D**ifferentiation or **E**xtension) day to provide additional instructional opportunity; yet should be cautious to not spend too long exploring these ideas to ensure students have ample opportunity for instruction to ALL of the Nevada Academic Content Standards (NVACS) for mathematics.

This lesson indicates a level of secure understanding.



NVACS (Content and Practices)	Big Idea Mathematical Development	Instructional Clarifications & Considerations
Lesson 2-1: Even and Odd Numbers		
2.OA.C.3 2.OA.B.2 MP.4 MP.5 MP.7	**Access Prior Learning:** In first grade, students had the opportunity to work with the classification of even and odd numbers. **Securing the Big Idea:** In this lesson, students are securing understanding that numbers can be classified as even or odd by showing numbers as two equal parts.	Students continue to build fluency with addition and subtraction facts within 20 as they construct the big idea of equivalence and the understanding that even numbers can be represented with doubles facts. **Topic Opener:** Consider limiting the *Topic Opener* to discussion of the *Topic Essential Question* (TE p.77), *Review What You Know* (TE p. 78-80) and the *Topic 2 Vocabulary Words Activity* with the words even and odd. Introduce remaining vocabulary words as they appear in the lessons. Post the question and student strategies on your math focus wall. **Visual Learning:** Have students make cube towers to increase understanding and engagement. Although the *Visual Learning* discusses the pattern in the ones digits for even and odd numbers, focus the **conversation on defining even numbers as numbers that can be broken into two equal**

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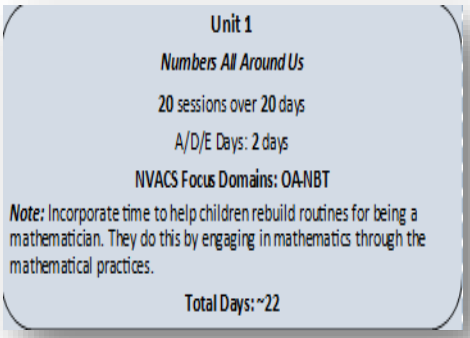
Note:

Please e-mail Denise Trakas (dtrakas@washoeschools.net) with any questions, concerns or potential correction suggestions.

First Grade Unit 1: Numbers All Around Us



1st Grade Curriculum Pacing Framework: Balanced Calendar

Big Conceptual Idea: K-5 Progression on Counting and Cardinality and Operations and Algebraic Thinking (pp. 1-7, 12-17), K-5 Progression on Number and Operations in Base Ten (pp. 1-4, 6-7), K-6 Progression on Measurement and Data (Measurement Part) (pp. 1-4, 8-11)

Read the Introducing Bridges in Mathematics section located in the beginning of the Unit 1 binder prior to unit instruction. This section provides an overview of the purposes and structure of the Bridges materials and includes Grade 1 specific characteristics of the Mathematical Practices.

Read the Bridges Unit Overview/Introduction for each Unit, the Module Overview for the week's sessions, and the Session Summary along with details for the teaching of each session. These Introduction/Overview/Summary sections provide focus, clarity, vocabulary, definitions, and examples that support the critical "big mathematical ideas and understandings". This information supports professional decision-making within the Sessions and Modules as needed.

Mathematical Background: Read Bridges Unit 1 Overview and Introduction (pp. i-viii)	Essential Questions for teacher consideration: In order to support students' prior understandings of number sense and combinations to 10, what classroom expectations aligned to previous routines and learning from Kindergarten can I reestablish throughout our exploration and communication around numbers? How will I support flexible and strategic use of the number rack and the five- and ten-frame models in problem solving? How will I support connections from what students already know to their new learning?

Instructional note:

> "If you learn something deeply, the synaptic activity will create lasting connections in your brain, forming structural pathways, but if you visit an idea only once or in a superficial way, the synaptic connections can "wash away" like pathways made in the sand." (Boaler, 2016, p. 1)

Aligned and cohesive quality instructional experiences across the elementary grades strengthen students' understandings and development. Therefore, continue to support a student-centered, problem solving, teacher-responsive model of mathematics instruction in which students are actively engaging in meaningful authentic encounters and doing much of the real thinking, working, and talking within the mathematics content. Provide meaningful, intentional, playful mathematics interactions that support the constructing of mathematical understanding from the first day of instruction!

Unit 1 continues students' prior understandings of early counting, number sense, and combinations to 10. Encourage strategic use of the number rack and 5- and 10-frames, moving beyond counting by 1s, and the use of subitizing. Reestablish math as a meaning-making time where students are able and expected to notice, think about, represent, and use numerals to solve problems. Consistently provide time for students to talk about their mathematics understandings, and explain and justify their own thinking.

Within the *Unit* students also have opportunity to extend their understanding of part/whole relationships (seeing and using both the whole and the parts), compose and decompose numbers, revisit length measurement, and continue to develop strong reasoning strategies. See *Unit 1* Introduction (pp. ii-iii) for clarifications on the use of the number rack and other tools strategically used in this *Unit*.

Reestablishing classroom management and routine:

Throughout *Unit 1* and during *Number Corner Workouts* (Problems and Investigations, Work Places, Calendar Grid, Calendar Collector, Computational Fluency, Days in School, and Number Line):

- Engage students in thinking about and understanding the big ideas of the mathematics content expected in 1st Grade.
- "Rigor" using the *Bridges* instructional material is dependent upon how the teacher engages students in the activities and conversations of the *Sessions*. The depth and focus of the interactions, aligned with understanding of individual student need, provides for intensification of teaching which drives the development of each student.
- Reestablish routines and patterns of student engagement for active learning using the materials and the mathematics in *Bridges Units*. These routines and behaviors become the critical structures for your classroom management and student interactions.
- Reteach routines to independence. Carefully monitor during free exploration times for materials care and use. Establish the behaviors you need and want from the beginning. Stop and reteach if necessary!
- Engage students continually in the *Mathematical Practices (*NVACS, 2010*, pp. 6-8)* - persevering in making sense, thinking relationally and mathematically, explaining and justifying, applying what they know to other meaningful situations, using tools

appropriately and efficiently, working and communicating precisely, using patterns, and working efficiently. *Bridges Math Practice Posters.*

- Engage in authentic conversations and problem solving around the content of the *Sessions* and *Workouts*.
- Use manipulatives, models, and representations to help make the mathematics visual, engaging, and fun for students.
- Support students' development of strategic behaviors/strategies for problem solving. What are students thinking in their own heads and doing to "work" at solving the problem? What behaviors do they show independently at a point of error or confusion?
- Watch for development of strategic behaviors within the mathematics content by child watching and using the formative and formal *Bridges* assessments.
- Expect all students to engage in problem solving and in explaining and justifying their thinking.
- Math instruction is required a minimum of 73 minutes every day (WCSD, Instructional Minutes). *Bridges* recommends 90 minutes of math instruction for *Bridges Unit* and *Number Corner* interactions.

On-going enrichment:
Take note of the "Skills Across the Grade Level" chart in the *Introduction* section to each unit. This chart shows the extent and expectation of the development of standards within the unit (example: see *Unit 1*, p. v), and within other units and *Number Corner Workouts* across the year. This information supports your professional decision-making for instruction, intensification, and intervention.

Each *Work Place Guide* page offers suggestions for "Assessment and Differentiation" for individual student and English-Language Learner support (example: see Unit 1 Module 1 p. T7). Many *Work Place Guide* pages also provide ideas for "Game Variations" (e.g., see Unit 1 Module 1 p.T18). Also within each session are suggestions for "Support" and "Challenge" (e.g., see Unit 1 Module 1 Session 3 p. 17).

Consider use of the "A Year's Worth of Assessments" chart (Assessment Guide, Assessment Overview *tab* pp.6-7) and the "Grade 1 Assessment Map" (Assessment Binder, Assessment Overview tab pp. 13-15) for assessment types and location throughout the year in *Bridges Units* and *Number Corner*. These assessments can be recorded and monitored on the "Class Checklist/Scoring Guide" provided in the:

- Assessment Guide (under the appropriate assessment tab)
- Teachers Guide (under the Teacher Masters tab)
- Number Corner binder (under the month)
- Or on the electronic spreadsheets available on the *Bridges Educator Site* website under the Implementation tab (see screen shot).

"Support & Intervention" information is also provided for all units in the *Assessment Guide* (e.g., see *Assessment Guide*, Bridges Unit Assessments tab, p. 3).

Family Letters and Overviews for each unit are also available on the Bridges Educator website in English and Spanish.

Consider using Catherine Fosnot's Landscape of Learning: Number Sense, Addition and Subtraction to identify where students are on the landscape of big mathematical ideas, strategies, and use of models. Provide interactions for intensification and acceleration to move students up the landscape.

Essential Academic Vocabulary Use these words consistently during instruction.		
New Academic Vocabulary: (first time explicitly taught) *indicates Word Resource Cards are available in the Bridges materials	Review Academic Vocabulary: (Vocabulary from Number Corner or previous units)	
Picture graph* More than information	*Add**	*Graph*
	Addition	*Subtraction*
	*Pattern**	*Nickel**
	*Less than**	*Penny**
	Tally	*Length**
	*Equal**	*Long/longer/longest**
	*Equation**	*Short/shorter/shortest**

Additional terminology that students may need support with: Number rack, hundreds grid, number words (zero, one, two…etc. to ten), skip-count, ten-frame, question

*Collaborative Team Conversations (CTC)

Consider using *one* of the following as part of the formative assessment process at the lesson level to **collect student work** to analyze for evidence of mathematical understanding:

Guiding questions: "What strategies are students using to recognize and represent quantities within 10?" (number rack to 10-frame recording sheet and/or 10-frame dot cards to numeral)
"What interactions will support intensification for early counting and number sense understanding, if needed?"

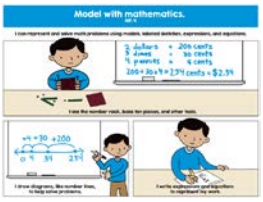
Lesson	Evidence	Look for
U1M2S4 *Work Place 1F* *Flip & Write* Observation TG pp. 15-18, T1-T3	*Flip & Write Record Sheet* (TG U1M2S4 p. T2-T3)	Focus CTC around conceptual understandings of the big idea and strategies used: • counting by 1s • subitizing • using 5 • counting on • recalling quantities and/or numerals quickly • starting at 1 to identify a numeral
U1M2S5 *Quick Count Checkpoint* TG pp. 19-23	*Quick Count Checkpoint* student record sheet (TG U1M2S5 p.T5) *Quick Count Checkpoint Scoring Guide* (AG Bridges Unit Assessments pp. 5-6)	Focus CTC around conceptual understandings of the big idea and strategies used: • counting by 1s • subitizing • using 5 • counting on • recalling quickly • representing by other than 1s • representing – placement and directionality

Learning Cycle Assessments (summative)	*Unit 1 Group Assessment* – U1M4S5 TG pp. 21-24, T6-T7; AG Bridges Unit Assessments pp. 7-8	Use *Unit 1 Group Assessment Scoring Guide* AG Bridges Unit Assessments p. 9

Standards listed in **bold** indicate a focus of the lesson.

NVACS (Content and Practices)	Mathematical Development of the Big Idea	Instructional Clarifications & Considerations
Module 1- Session 1: Popsicle Pattern Chart, Part 1		
1.OA 1.NBT MP.7 MP.8	Access Prior Learning: • Use discussion to find out students' schema about popsicles, specifically those with two sticks. You may want to find an image to show. Beginning the Big Idea and key Strategic Behaviors: • counting by 2s Developing: • exploring and communicating about patterns and numbers • understanding the structure of numbers	Guiding Questions: • What patterns do you notice in our popsicle display? • How do *Work Places* look and sound? Instructional Notes: • Allow time for the instruction of routines and procedures. Take the time needed during the sessions and the *Work Places* to create the classroom environment, procedures, and establish expectations for listening to others as they communicate about numbers. • Consider beginning Work Places by creating anchor charts for what they should look like and sound like. Add to these to support routines and behaviors. • Try the online tools on the Educator Site for the Pattern Blocks. This is the link to the Bridges Educator website or the Math Learning Center public website here: poster.  Enrichment: • See Step 10 in lesson (p. 7). • To support students' language development and discussion skills consider using the Work Place Sentence Frames on the Bridges Educator Site Bridges Educator website. Child Watching: • Begin identifying any students struggling with cardinality, identification of numbers, or counting by ones.

Module 1- Session 2: Popsicle Graph

1.MD.4 MP.4 MP.6	Access Prior Learning: • Kindergarten students used picture graphs frequently. Developing the Big Idea and key Strategic Behaviors: • exploring and communicating about patterns and numbers • understanding the structure of numbers • organizing, representing, and interpreting data	Guiding Question: • What information does the popsicle graph tell you? Instructional Notes: • Continue teaching procedures and routines with the new math manipulative, whiteboards and markers. • Consider creating "sticks" to use when calling on students, and set the expectation that students are expected to be listening and be able to share in the discussion. Create the environment that all students have the chance to be called upon. You may also strategically choose students to share to better develop mathematics concepts. Use the sticks to keep track for yourself who you have not yet acknowledged and build opportunities to incorporate all student's mathematical ideas. • Establish wait time before selecting a student to respond to ensure all students have an opportunity to think. • Lessons provide opportunities to engage in the math practices. Consider making this explicit to the students by explaining what they are doing as a mathematician. Pull out the math practice posters (found here). Read poster MP.4, and help them see the popsicle graph as modeling with mathematics. Hang the poster up to refer to in future lessons.  Enrichment: • See Steps 9 and 10 in lesson (p. 14.). Child Watching: • Identify students struggling with cardinality, identification of numbers, or counting by ones. • Watch for students who count by ones and students who are counting by groups.

Module 1- Session 3: Popsicle Party

1.NBT.1 MP.1 MP.7	Access Prior Learning: • The number line was used in kindergarten. Developing the Big Idea and key Strategic Behaviors: • understanding of structure and pattern of numbers to 120 • counting forward and backward on the number line	Guiding Questions: • How can you determine if you have enough popsicle sticks for everyone? • Will there be any left over? Instructional Notes: • Consider using the online Number Line tools from the Educator Site. • A geoboard app is also available through the Math Learning Center public website. Here is an App for a Geoboard. • This is the first lesson of the year that poses a specific problem to investigate. Allow students to grapple with the problem on their own for a bit. Encourage students to access math tools and manipulatives for support. Consider setting various tools out where they are readily accessible. Refrain from jumping right in and showing students what to do. After students get started, consider pausing work to highlight strategies students are using. This provides support for students who may be struggling with an entry point to the problem. Enrichment: • See Step 11 (p. 18). Child Watching: • This is a great opportunity for you to assess who attacks the problem. • Identify if students begin to use tools without prompting. • Begin noticing what strategies students are using. Strategies to watch for include: counting all popsicles, counting all students, separating the extras (they might want to match them up with unifix cubes to count all extras); counting all popsicles, then counting on from the number of students to the number of popsicles to determine the difference; using a subtraction method, or counting down from the largest number. • Be intentional in sharing student strategies. Choose a student to share the strategy with the least sophistication that many students are able to access. Next, choose a student with a more efficient strategy and discuss the two. Encourage students to try a new strategy learned.

Module 1- Session 4: Tally-Ho

1.NBT.1 MP.7	Access Prior Learning: • While students have worked with count by 5s previously, this is not an assessed outcome until 2nd grade.	Guiding Question: • How can using tally marks help you count? *-continues on next page-*

	Developing the Big Idea and key Strategic Behaviors: • understanding the structure and pattern of numbers • subitizing • counting forward and backward on the number line by 5s	Instructional Notes: • See Math Practices in Action (p. 24). Link for MP poster is here. • The Flash and Build game provides opportunities for students to subitize, a critical skill in the development of number sense. Give students many opportunities to visualize and build quantities quickly (within 2-3 seconds). • Consider creating and reviewing as necessary a "what it looks like, and sounds like" anchor chart for Work Place expectations. You might review this chart before going to work places every day for the first few days and have students model the expectations for the others. Release a few at a time and ask the others to evaluate using hand signals how students are doing.  Enrichment: • See Step 15 (p. 26). Child Watching: • Identify student able to subitize and recreate numbers 1, 2, 3, 4, 5 with tally marks. • Continue watching for counting on strategies. Do they count all by 1s? Do they start from 5 and count on?
Module 1- Session 5: Popsicle Pattern Chart, Part 2		
1.NBT.1 MP.7 MP.8 MP.3	Access Prior Learning: • Remind students of popsicle graph made earlier, and the hundreds grid used in kindergarten. Beginning the Big Idea and key Strategic Behaviors: • understanding the structure and pattern of numbers – hundreds grid	Guiding Question: • What patterns do you see on the popsicle chart? Instructional Notes: • Establish expectations for using student books. • Encourage students to use Accountable Talk stems such as "I notice…", "I believe…", "I agree with…", "I'd like to add onto…" etc. • Consider introducing the poster for MP.3 stating that mathematicians "talk and explain" while introducing Accountable Talk. Enrichment: • See Step 5 (p. 29). Child Watching: • Identify students who make connections to others' work or ideas. Foster this with your connections. "Jenny are you noticing the same thing Jose noticed? Can you tell us more?"
Module 2- Session 1: Show Me on the Number Rack		
1.OA.6 Supports 1.NBT MP.5 MP.7	Access Prior Learning: • Number racks were used in kindergarten to support understanding for KCC Standards. Developing the Big Idea and key Strategic Behaviors: • using 5 and 10 • composing 10	Guiding Question: • How can the number rack represent numbers? Instructional Notes: • Number rack materials are not replaced by the District but are available to order through Bridges, or can be created with red and white beads, pipe cleaners, and cardboard or paper plates. • Consider repeating steps 12 and 13 with the number 10 (p. 6). • Consider trying the online tools from the Educator Site such as the Number Rack Tool. • Establish the understanding that students can choose to use the number rack tool at any time and have the tools accessible for student use as needed. Enrichment: • See Step 10 (p. 6). Child Watching: • Identify students who may struggle with counting or cardinality and provide additional support as needed. • Identify students who are beginning to compose "a ten". • Identify students counting by 1's or able to slide over 5 and then count on when making numbers larger than 5.
Module 2- Session 2: Making Five & Ten		
1.OA.3 1.OA.6 MP.4 MP.5	Access Prior Learning: • Combinations within 5 were expected to be secure from kindergarten. Developing the Big Idea and key Strategic Behaviors: • composing 5 and 10	Guiding Question: • What are the different ways we can make 5 (10) on the number rack? Instructional Notes: • The first Home Connection appears. See the WCSD homework policy here. • Home Connection materials may be used in a variety of ways (small guided math group, additional math center activity, etc.) as is appropriate for your students' needs. *-continues on next page-*

	• solving for unknowns	Enrichment: • See Step 7 (p. 10). Child Watching: • Identify students struggling to represent combinations of 5. See support note (p.9).
Module 2- Session 3: Ten-Frame Flashes		
1.OA.6 MP.5 MP.7	Access Prior Learning: • Many students in kindergarten developed perceptual subitizing of small quantities. Developing the Big Idea and key Strategic Behaviors: • subitizing • composing 10	Guiding Question: • How do you "see" the dots on the ten-frame without counting them all? Instructional Notes: • From the K-5 Progression on Counting and Cardinality and Operations and Algebraic Thinking documents (p. 4) "The use of conceptual subitizing in adding and subtracting small numbers progresses to supporting steps of more advanced methods for adding, subtracting, multiplying and dividing single digit numbers." This lesson is opportunity to deepen subitizing skills and move from perceptual to conceptual subitizing. • Many lessons begin with a counting warm up. These daily counting practices are important to Numbers Base Ten development. You will notice that this warm up is a great precursor for the work on the number line in Unit 4. Enrichment: • See Step 7 (p. 14). Child Watching: • Identify students struggling with subitizing, meet with them in small group during Work Places. See support note (p. 14).
Module 2- Session 4: Introducing Work Place 1F Flip & Write		
1.NBT.1 1.MD.4 MP.4 MP.6	Access Prior Learning: • *Work Place* logs were optional in kindergarten. Securing the Big Idea and key Strategic Behaviors: • subitizing • recognizing and writing numerals	Guiding Questions: • How do you use your work place folder and log successfully? • Can you recognize a number without counting all the dots? Instructional Notes: • The Work Place Folder and Work Place Log are introduced today. The intention of the Work Place Log is to support independence and self-regulation. Ideas for structuring and managing Work Places can be found on the Educator Site. • Here is one idea in establishing routines such as how many students per workplace. Provide each student with a clothespin, when each circle has a clothespin on it, students know that workplace is closed. Instruct students to quickly find another workplace for that is still open. See picture to right. • Some teachers staple logs on to the back of the folder, adding one with each unit. Another idea is to use sleeves, with dry erase markers, and reuse logs each year. See picture.   Enrichment: • *Work Place Game Variations* (p. T2). Child Watching: • Identify students struggling with writing numerals accurately. Provide feedback and opportunities to practice. • Work Places are opportunities to observe and assess for student strengths and needs.
Module 2- Session 5: Quick Count Checkpoint		
1.OA.6 MP.5 MP.7	Access Prior Learning: • Students wrote numbers from 0 to 20 and represent a number of objects with a written numeral in kindergarten. Securing the Big Idea and key Strategic Behaviors: • subitizing • reproducing quantities to 10	Guiding Questions: • How are you doing with counting small sets of objects quickly (subitizing)? • What patterns do you see when you add 10 to a number? Instructional Notes: • The *Assessment Guide* under the *Bridges Unit Assessments* tab provides the scoring guide for this checkpoint. Enrichment: • Work Place Game Variation (p. T7). Child Watching: • Use the scoring guide to formatively assess 1.OA.6 and decide instructional next steps.

Module 3- Session 1: Two Parts, One Whole

1.OA.1
1.OA.6

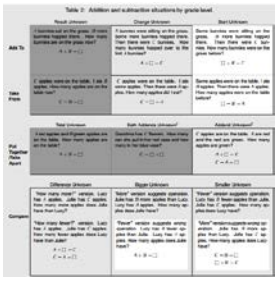
MP.4
MP.5

Access Prior Learning:
- Add to/Result Unknown problem types within 10 were explored verbally and with drawings in kindergarten.

Beginning the Big Idea and key Strategic Behaviors:
- recognizing number relationships
- understanding part/whole relationships
- solving for an unknown

Guiding Questions:
- What do you notice? How many are in each part?
- What happens when you put the two parts together?

Instructional Notes:
- Use the term "is the same as" simultaneously with "equals" (5 "is the same as" 4+1).
- This lesson provides opportunity for naming and explaining different strategies students use for counting two parts to determine the whole (counting all, counting on from a smaller a larger number, using a double, using 5 as a landmark, etc.). Record strategies on a class poster or anchor chart for students to reference during other problem solving. Strategically observe for and select students to explain their strategies from the most simple (counts all) to the more sophisticated. Encourage students to try a different strategy.
- Students will encounter 12 problem types in 1st Grade. *The K-5 Progression on Counting and Algebraic Thinking* (p. 13, linked above) states, "Students thus begin developing an algebraic perspective…They read to understand the problem situation, represent the situation and its quantitative relationships with expressions and equations, and then manipulate that representation if necessary, using properties of operations and/or relationships between operations. Linking equations to concrete materials, drawings, and other representations of problem situations affords deep and flexible understandings of these building blocks of algebra." (see Table 2 on page 9 for examples.).



Enrichment:
- See Step 7 (p. 7).

Child Watching:
- Identify students struggling to model and solve stories using the number rack. Try craft sticks instead, or encourage the compensation strategy. See support note (pp.6-7).

Module 3- Session 2: Show Me the Numbers

1.OA.6
1.OA.8

MP.4
MP.7

Access Prior Learning:
- In kindergarten, students counted to 100, wrote numbers 0-20, and explored number relationships and quantities.

Developing the Big Idea and key Strategic Behaviors:
- understanding the structure of number – counting by 10s
- subitizing
- composing to 10

Guiding Questions:
- How many ways can you make 10?
- How do you know it is 10?

Instructional Notes:
- Encourage students to show numbers in various ways, (6 can be 5 dots on top and 1 on bottom, 3 and 3, etc.).
- Model the language "parts and whole" during conversations to help students understand the relationships between the numbers.

Child Watching:
- Step 12 provides an opportunity for formative assessment of students' understandings (p. 13). Expect 100% of students to show you their thinking on their fingers. Consider having them hold their fingers over their heart to prevent students from waving fingers around. This will support all students' processing and thinking on their own.

Module 3- Session 3: Introducing Work Place 1H Which Coin Will Win?

1.NBT.1
1.MD.4

MP.4

Access Prior Learning:
- Kindergarten students classified objects into given categories, and counted the number of objects in each category.

Securing the Big Idea and key Strategic Behaviors:
- organizing, representing, and interpreting data
- comparing quantities

Developing the Big Idea and key Strategic Behaviors:
- counting by 5s

Guiding Questions:
- What do you know about pennies and nickels?
- How can a graph help you count?

Instructional Notes:
- In 1st grade, coins are used as tools for developing mathematical understanding. Activities in the *Problems and Investigations* and *Number Corner* expose students to coins and their names, and use them as a means to practice counting by or from ones, fives, and tens. Consider having real money for students to manipulate and explore.
- Working with money in contexts is explored further in 2nd grade (2.MD.8).
- Emphasize the guiding questions to encourage student focus on the math concepts of counting by 1s and 5s, and comparison of quantities, rather than a focus on coins.
- The Educator Site provides all digital tools needed, such as spinners, to model and introduce Work Place games.
- Consider using the Number Corner money poems from September (Penny Poem and Nickel Poem) also located on the Educator Site.

-continues on next page-

		Enrichment: • See challenge and Game Variations for Work Place 1H (pp. T2, T3). • Encourage student to count money at home in real life situations. Child Watching: • Identify students struggling to count and compare the coins on the graph.
Module 3- Session 4: Quick! Look!		
1.OA.5 1.OA.6 1.NBT.1 MP.4 MP.7	Access Prior Learning: • Perceptual subitizing and cardinality were dealt with extensively within the KCC Standards. Developing the Big Idea and key Strategic Behaviors: • subitizing • using 5 and 10 as landmark numbers	Guiding Question: • How do you "see" the number? Instructional Note: • Students may struggle with the conceptualization of 20. Deepen understanding of cardinality to ten by focusing on just the top 10 beads and covering the bottom row. Enrichment: • See Step 7 (p. 22). Child Watching: • Identify students using the strategy of 5 and 10 as a landmark number. Highlight the efficiency and effectiveness of using 5 as an anchor number to determine the total numbers of beads.
Module 3- Session 5: Measuring with Popsicle Sticks		
1.NBT.1 1.MD.1 1.MD.2 MP.4 MP.6	Access Prior Learning: • Kindergarten students discriminated between measureable attributes such as big, tall, long, or high. • Kindergarten students measured and compared two objects by the number of iterated units. Developing the Big Idea and key Strategic Behaviors: • measuring with nonstandard measure • organizing, representing, and interpreting data	Guiding Questions: • How can popsicle sticks be used to measure objects? • What rules could you make when using sticks to measure objects? Instructional Notes: • Highlight Math Practice 6 - attend to precision. Consider introduce the Math Practice 6 poster, which can be found on the Educator Site. • Common mistake students make when measuring: not lining up their measurement tool to the very beginning of the item being measure; not understanding that gaps in-between popsicle sticks will result in inaccurate measurement; having the tool curve around the shape being measured, as opposed to making a straight line. • Consider marking their height initially on the wall with a piece of tape, then creating a length of string as a truly "linear" length to represent the length of their body. Then measure the string on the floor, laying sticks in a straight line. Discussions about the differences between their original measurement and the new measurement might be used to bring out partial understanding of measurement. • Consider using standardized units for early measuring, such as popsicle sticks or cubes, which are consistently the same length. "Early use of many non-standard units may actually interfere with student's development of basic measurement concepts required to understand the need for standard units." See the clarifications in the *K-6 Progression on Measurement and Data (Measurement Part)* p. 9 linked above. Child Watching: • Identify students attending to precision with their measurement. • Identify students with gaps, overlays, or crooked measurement attempts.
Module 4- Session 1: Number Rack Detectives		
1.OA.4 1.OA.5 1.OA.6 1.OA.8 MP.2 MP.5	Access Prior Learning: • Students worked on missing addends in Module 3 Session 1. Connect back to the two parts, one whole lesson. Beginning the Big Idea and key Strategic Behaviors: • understanding part/whole relationships • solving for the unknown with addition and subtraction • subitizing	Guiding Questions: • What do you know and what do you want to find out? • What information are you missing? Instructional Note: • Attend to Math Practices in Action (p. 5), Consider introducing MP.2 poster. Enrichment: • See Step 12 (p. 7). Child Watching: • Identify students counting by 1s from the beginning. Encourage the strategy of subitizing the top row, conserving the number, and counting on.

Module 4- Session 2: Introducing Work Place 1l Measuring with Unifix Cubes		
1.MD2 MP.5 MP.6	Access Prior Learning: • Student measured with popsicle sticks. Developing the Big Idea and key Strategic Behaviors: • comparing lengths • measuring with units	Guiding Questions: • What do you know about measuring? • If you measure with different units do you get the same measurement? Instructional Notes: • Exploring the idea that measurement iterations will increase or decrease the quantity of units may come up in this session. Laying out copies of the same size unit and counting the units is called iteration (Van de Walle, et al., 2014, p. 272). • For clarification read the K-6 Progression on Measurement and Data (Measurement Part), p. 9. Enrichment: • See the Challenge on the Work Place Guide (p. T2). Child Watching: • Identify students attending to precision with their measurement. • Identify students with gaps, overlays, or crooked unifix trains and remind them to attend to precision.
Module 4- Session 3: How Long is the Jump Rope?		
1.NBT.1 1.MD.2 MP.4 MP.6	Access Prior Learning: • Connect to prior sessions measuring with popsicle sticks. Developing the Big Idea and key Strategic Behaviors: • comparing lengths • measuring with units	Guiding Questions: • How can you measure the jump rope using just your feet? • How long do you think the jump rope is using the teacher's foot to measure? Instructional Note: • This lesson uses the nonstandard unit of measurement of human feet, which are not consistently the same size. Using the same foot repeatedly can mimic a standardized unit, however, the concept that different size feet will result in different numbers of units may challenge some students' understandings. "First grade students can learn that objects used as basic units of measurement (e.g. "match-length") must be the same size." (K-6 Progression on Measurement and Data (Measurement Part), p. 9). Enrichment: • See the *Extensions* note in the lesson (p. 16). Have a student with a smaller foot count the length of the jump rope. Discuss why the results from the student foot measurement is different from the teacher foot. Child Watching: • Identify students attending to precision with their measurement • Identify students with gaps and overlays.
Module 4- Session 4: Quick! Look! Plus One, Minus One		
1.OA.5 1.OA.6 1.NBT.1 MP.4 MP.7	Access Prior Learning: • Connect to prior work with perceptual subitizing and cardinality (last word said represents the whole amount). • Refer to understanding developed in Quick! Look! Mod. 3 Session 4. Developing the Big Idea and key Strategic Behaviors: • recognizing the structure of numbers • using 5 and 10 as landmark numbers • using +1 or -1 strategies	Guiding Question: • How can you see the number of beads without counting each one? Instructional Note: • Powerful student conversations are critical throughout each session. Engage students in mathematically focused conversations. As Parrish (2010) states in her book *Number Talks*, "Accuracy denotes the ability to produce an accurate answer; efficiency refers to the ability to choose an appropriate, expedient strategy for a specific computation problem; and flexibility means the ability to use number relationships with ease in computation" (p. 5). Encourage these conversations by focusing on questions in step 9 (p. 20). Enrichment: • See Step 7 (p. 22). Child Watching: • Identify students using the strategy of 5 and 10 as a landmark number. Highlight the efficiency and effectiveness of using 5 as an anchor to determine the total numbers of beads.

Module 4- Session 5: Unit 1 Group Assessment		
1.OA.5 1.OA.6 1.NBT.1 MP.2 MP.7	Access Prior Learning: • Connect to prior work with subitizing, combinations to 5 and 10, counting by 1s and 10s, and reading and writing numbers. Securing the Big Idea and key Strategic Behaviors: • composing 5 Developing the Big Idea and key Strategic Behaviors: • composing 10 • using 5s and 10s as landmark numbers • recognizing the structure of number to 60 by 1s, and 10s	Guiding Question: • What strategies can you use when counting and adding numbers? Instructional Notes: • Optional: See the online Assessment Tools found here. Download the *Bridges Unit Assessments* to enter scores digitally and produce a color-coded spreadsheet. • When considering taking a grade note, none of these standards in their entirety is meant to be secure at this time (mastered). These ideas are still developing. Assessment Binder (pp. 13-15). • Note the Grade 1 Progress Report found in your Assessment Binder (p. 36) and identify how 1.OA.6 is broken down to "Adds and Subtracts to 10, and so on. This breakdown of the standards will support you in making decisions for grade collection.  Child Watching: • Refer to the Assessment Tool Scoring Guide • Refer to Assessment Binder Support and Intervention (p. 3). Watch for students struggling with: rote counting to 20 starting at numbers other than 1; one-to-one correspondence and cardinality to 20; quickly recognizing quantities to 5 or 6 in scattered formation; or quantities to 10 on a ten-frame; and/or reading and writing numerals.

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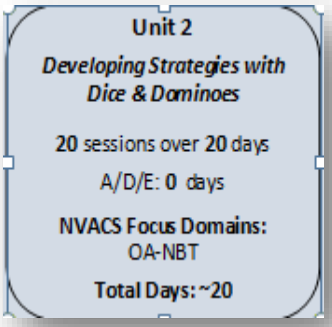
First Grade Unit 2: Developing Strategies with Dice & Dominoes



1st Grade Curriculum Pacing Framework: Balanced Calendar

Big Conceptual Idea: K-5 Progression on Counting and Cardinality and Operations and Algebraic Thinking (pp. 1-7, 12-17), K-5 Progression on Number and Operations in Base Ten (pp. 1-4, 6-7)

Read the Bridges Unit Overview/Introduction for Unit 2 pp. i-vi. Also, read each Module Overview for the current week's sessions, and the current Session Summary along with details for the teaching of each session as you work through Unit 2. These Introduction/Overview/Summary sections provide focus, clarity, vocabulary, definitions, and examples which support the critical "big mathematical ideas and understandings" for 1st Grade. This information supports professional decision-making within the Sessions and Modules as needed.

Mathematical Background: Read Bridges Unit 2 Overview pages (pp. i-viii)	Essential Question for teacher consideration: How will I support students' development of efficient, accurate, and flexible reasoning strategies for counting, adding, and subtracting single-digit numbers, and their use of a variety of mathematical models (dice, dot cards, dominoes, number racks, and coins)?

Instructional note:

> "If you learn something deeply, the synaptic activity will create lasting connections in your brain, forming structural pathways, but if you visit an idea only once or in a superficial way, the synaptic connections can "wash away" like pathways made in the sand." (Boaler, 2016, p. 1)

Throughout *Unit 1*, behaviors and routines have been reestablished so all students actively draw from their previous learning and engage in making connections, building upon what they already know, and making sense of the problems presented. This active connection-making and problem-solving mindset supports learning throughout all *Number Corner, Problems and Investigations*, and independent or partner *Work Place* interactions and games. It also supports choice and use of manipulatives and the ability to focus attention, notice details and patterns, make mathematical thinking visible, and express and explain thinking. These behaviors provide great opportunities for child watching throughout math instruction. The teacher understanding of the "big mathematical ideas" expected from the NVACS within each unit (clarified in the *Overview/Introduction/Summary* sections) provides expertise for child watching, and the ability to identify partial understandings as students engage in problem solving. These observations inform teacher instructional steps throughout each *Bridges* session, and provide the opportunities required to support and scaffold each students' learning.

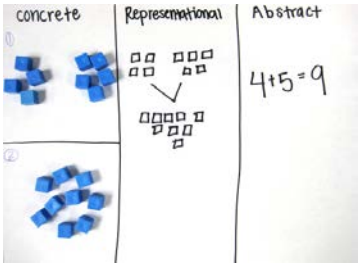
In *Unit 2*, students will be gaining confidence and security with efficient, effective, and sensible strategies for single-digit addition and subtraction. They will be engaging in strategies such as counting from, counting on, combining small groups of numbers within larger numbers, building from known facts, using doubles, using 5 and 10 as anchor numbers, counting by 5s and 10s, using the commutative property and the relationship between addition and subtraction to work with numbers and solve problems. The ability to subitize (to see and use smaller numbers within larger numbers without counting) leads to part/whole reasoning which is the basis for the development of algebraic reasoning.

Students will be transitioning from "calculating by counting" to "calculating by structuring" for both addition and subtraction. This transition encourages a deeper understanding of subtraction as "the difference" between two sets (compare problems vs. separate/take from problems). It also supports relational reasoning including the relational view of equality. See *Teaching Tips* in the *Introduction* of *Unit 2* (p. vi) for Number Rack clarifications and support for the careful selection of problems to help move student development through these transitions of learning.

There are 3 phases of learning that students must pass through to develop fluency and the flexible, efficient, appropriate, and accurate ability to "know from memory" expected by the end of 2nd grade. The three phases are 1) constructing meaning and counting strategies, 2) constructing reasoning strategies, and 3) working toward quick recall. First Grade students are building fluency by engaging in strategies predominantly in phases 1 and 2. Therefore, opportunities to direct model problem situations and equations and use counting strategies to find the unknown support student development. Research shows that, "…instruction must help students through these phases without rushing to know their facts from memory" (Van de Walle, Karp, Bay-Williams, 2013, p.171). As a caution, "…drill in the absence of accomplishing these phases has repeatedly been demonstrated as ineffective" (Van de Walle, et. al., 2014, p. 184). "Unfortunately many classrooms focus on math facts in unproductive ways, giving students the impression that math facts are the essence of mathematics, and, even worse that the fast recall of math fact is what it means to be a strong mathematics student. Both of these ideas are wrong and it is critical that we remove them from classrooms, as they play a large role in the production of math anxious and disaffected students" (Boaler, 2015, p. 1). With these arguments in mind, it is imperative the big idea of this unit remains constructing meaning and constructing reasoning, which involve the strategic behaviors mentioned above. The purpose is deepening student understanding of numbers and their relationships to one another. See the fluency resources on the district site, as well these direct links for further information.

https://bhi61nm2cr3mkdgk1dtaov18-wpengine.netdna-ssl.com/wp-content/uploads/2015/03/FluencyWithoutFear-2015.pdf
http://www.washoeschools.net/cms/lib08/NV01912265/Centricity/Domain/253/Math%20K-6/Basic%20Math%20Facts.pdf

As students move through phases of fluency, they will also be progressing through concrete, representational and abstract reasoning. While students are solving problems with concrete materials, provide ample opportunity for them to share their thinking with peers, through partner work, and whole class sharing/discussion. Invite students to share their models and thinking and have students discuss how models compare to each other. By listening to others' justifications for strategies used and critiquing others' reasoning, students can discover and correct their own misconceptions and partial understandings and extend their own understandings.



On-going enrichment:
The *Skills Across the Grade Level* chart in the *Introduction* section (*Unit 2* p. vi-vii) shows that all standards are only being introduced or developed throughout this *Unit*. This is important information for those day-to-day professional instructional decisions that have to be made within each session as to what discussions or activities to extend, cut short, emphasize, skip, or…etc.
Expect all students to engage in the math.

Continue to consider "Support" and "Challenge" options within each *Session*, and "Game Variations", "Differentiate", and "English-Language Learners" ideas in *Work Places*.

Essential Academic Vocabulary Use these words consistently during instruction.		
New Academic Vocabulary: (first time explicitly taught) *indicates Word Resource Cards are available in the Bridges materials	Review Academic Vocabulary: (Vocabulary from Number Corner or previous units)	
Even number* Odd number* Difference*	*Add** *Addition* *Doubles* *Equal** *Half** *Sum or Total** *Greater than**	*Less Than** *Column** *Row** *Equation** *Fact family** *Subtract** *Subtraction*

Additional terminology that students may need support with: minus, plus, problem solving, reasonable, strategies

Collaborative Team Conversations (CTC)
Consider using *one* of the following as part of the formative assessment process at the lesson level to **collect student work** to analyze for evidence of mathematical understanding:

Guiding questions: "What strategies are students using to solve and record addition combinations to 10?"
"How and when are they seeing and using the structure of the number system to help them solve the problem?"
"What interactions will support intensification of understanding for composing combinations to 10 if needed?"

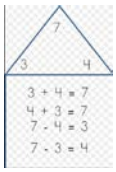
Lesson	Evidence	Look for
U2M2S5 *Domino Addition Checkpoint Part 1* TG pp.27-30	*Domino Addition Checkpoint Part 1* observation and student record sheet (TG U2M2S5 p. T12) *Domino Addition Checkpoint Part 1 Scoring Guide* (AG Bridges Unit Assessments pp.15, 17)	Focus CTC around conceptual understandings of the big idea and strategies used: • counting every dot • counting on from the smaller quantity • counting on from the larger quantity • using a known fact to help
U2M2S5 *Domino Addition Checkpoint Part 2* TG pp.31-32	*Domino Addition Checkpoint Part 2* observation and student record sheet (TG U2M2S5 p. T12) *Domino Addition Checkpoint Part 2 Scoring Guide* (AG Bridges Unit Assessments pp.16, 18)	Focus CTC around conceptual understandings of the big idea and strategies used: • counting every dot • counting on from the smaller or larger quantity • using a known fact to help • recalling quickly

Learning Cycle Assessments (summative)	*Number Corner Baseline Assessment* NC TG Vol. 1 September, pp. 47-50 *Baseline Interview Response Sheet & Baseline Written Assessment* NC TG Vol. 1 September, pp. T10-T12; AG Number Corner Assessments pp.7-9	Use *Baseline Assessment Scoring Guide* AG Number Corner Assessments p. 10

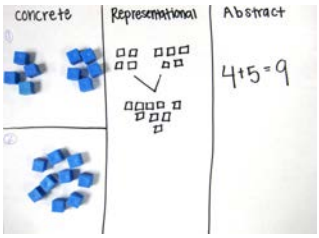
Standards listed in **bold** indicate a focus of the lesson.

NVACS (Content and Practices)	Mathematical Development of the Big Idea	Instructional Clarifications & Considerations
Module 1- Session 1: Introducing Dominoes		
K.CC.5 1.OA.5 1.OA.6 MP.7	Access Prior Learning: • Student built schema about dominoes in prior lessons. • Students experienced "count to answer how many" in kindergarten. Developing the Big Idea and key Strategic Behaviors: • subitizing • understanding part/whole relationships • counting on	Guiding Question: • What can you do with the dots on a domino? Instructional Notes: • You will need the Domino Addition by Lynette Long text (this book came in your materials). • Review the MP.7 poster and support student's natural inclination to look for structure when using dominoes. This strengthens subitizing skills, and helps them see the relationships between numbers. See Math Practices in Action (p. 4). Child Watching: • Identify students who count three times (3x) - count set 1, count set 2, and then count all to find the total. • Identify students who are subitizing smaller numbers (1-3) and counting on. • Identify students who are beginning conceptual subitizing (for example, subitizing a 1 and a pattern of 3 to determine a total of 4). This is a higher level of sophistication than just subitizing the typical pattern of four dots.
Module 1- Session 2: Introducing Work Place 2A Domino Top Draw		
K.CC.6 1.OA.5 1.OA.6 1.NBT.1 MP.7 MP.8	Access Prior Learning: • Students experienced "count to answer how many" in kindergarten. Developing the Big Idea and key Strategic Behaviors: • subitizing • understanding part/whole relationships • counting on	Guiding Questions: • What do you already know about comparing? • How can you compare dominoes? Instructional Notes: • Students may continue to count all the dots on the dominoes. Focus on using strategies that start with subitizing one part of the domino, and counting on from there. • Introduce *Math Practice 8*. Hang the poster with the others (found here). Enrichment: • See *Game Variations* on *Work Place Instructions* (p. T2). Child Watching: • Identify students who continue to count all the dots by 1s. Practice identifying groups of dots by Quick! Look! Methods from Unit 1 Module 3 Session 4. See Assessment and Differentiation chart on Work Place Guide (p. T1).
Module 1- Session 3: Domino Add & Compare		
1.OA.5 1.OA.6 1.OA.7 1.NBT.3 MP.2	Access Prior Learning: • Students identified greater than, less than, or equal in kindergarten. • Kindergarten students were exposed to the symbols, but were not expected in the standards to master these yet. Developing the Big Idea and key Strategic Behaviors: • subitizing • understanding part/whole relationships • counting on • comparing numerals <, >, =	Guiding Questions: • What does equal mean? • What symbols can you use to compare quantities? Instructional Notes: • Consider establishing a set of expectations for having students talk to each other (turn and talk procedures). This supports a culture of discussion where students feel comfortable with an equitable practice for sharing their thinking. Many teachers find success in assigning partners for math discussions such as partner A & B, peanut butter & jelly partners etc. Support the expectations by modeling how to turn quickly to "knee to knee and eye to eye" with their partner. Consider directing at first who speaks first to help partners manage the dynamics of one partner controlling the conversation, or one sitting back and letting others do the talking work. • During the game, have students share ideas with partners on finding the totals. • A numerical support for the greater than and less than symbols (<,>) is, between the 2 numbers, place 2 dots next to the larger number and 1 dot next to the smaller number. When the dots are connected, they form the correct symbol between the two numbers. The "alligator eats the biggest number" method is not recommended, as it is not consistent with mathematical thinking, but rather a gimmick. • See the Bridges Educator site for this online game to reinforce comparison. Enrichment: • See Step 8 (p. 14).  *-continues on next page-*

		Child Watching: • Identify students struggling with the symbols. Ask them to circle the greatest number as well, so you can determine if the concept of quantity is the struggle or if using the symbols correctly is the struggle.
Module 1- Session 4: Our Addition Strategies Chart		
1.OA.3 1.OA.5 1.OA.6 MP.2 MP.3	Access Prior Learning: • Review Domino Add and Compare game. Developing the Big Idea and key Strategic Behaviors: • subitizing • understanding part/whole relationships • counting on • using a known fact	Guiding Questions: • How many different strategies can you use to add two numbers? • What are advantages and disadvantages of different strategies? Instructional Notes: • Read the *Math Practices in Action*, and revisit MP.3 poster (p. 18). • In preparation, predict which strategies might be shared, and by whom, so you can strategically select which students you might have share with the class first, next and so on, based on the level of sophistication of strategy. Have students share strategies from the lowest sophistication to highest sophistication. Sharing a lower sophistication strategy will ensure that most students will have an entry point to the problem solving. Enrichment: • See game variations on the *Work Place Guide* (p. T5). Child Watching: • Identify students using strategies such as "I could see 3 & 3, and that's 6. Then if you put 1 more on, it is 7" (p. 17). These are indications of students moving into Phase 2 of fluency development, Reasoning Strategies [deriving a fact from a known fact (doubles).
Module 1- Session 5: Domino Magic Squares		
1.OA.3 1.OA.5 1.OA.6 MP.2 MP.4 MP.6	Access Prior Learning: • Exposure to this idea may have occurred in the context of classroom conversations in previous domino sessions. However, this was not a kindergarten standard. Developing the Big Idea and key Strategic Behaviors: • understanding the commutative property • subitizing • understanding part/whole relationships • counting on	Guiding Question: • If I have 2 dominoes, how many different combinations can you make? Instructional Notes: • Read *About This Session* (p. 22). • The commutative property of addition (numbers can be added in any order) is a big idea for students to grasp. This property states the same addends added in a different order still produce the same total. This relational understanding is useful for students for problem solving, building fluency, and mental mathematics. A common misconception for students is to attempt to overgeneralize the commutative property to subtraction. Teachers can use situations in context and story problems to confront this misconception. (Van de Walle, et al., 2014, pp. 138-139). Enrichment: • See Step 9 (p. 24). Child Watching: • Observe carefully student responses to the question (p. 24), "Do you think if we did this activity again with two new dominoes, the same thing would happen? Why or why not?"
Module 2- Session 1: Introducing Double-Flap Dot Cards		
1.OA.3 1.OA.4 1.OA.6 1.OA.8 MP.2 MP.4	Access Prior Learning: • Connect to previous day's work, and highlight any "ah-has" discovered around commutativity. Developing the Big Idea and key Strategic Behaviors: • understanding the commutative property • understanding part/whole relationships • solving for an unknown • writing equations	Guiding Question: • How many different equations can you make from three numbers? Instructional Notes: • The idea of "fact families" appears here. A culturally responsive practice is to relate this concept to students' real lives by stating that each family is made up of different members. Consider drawing a "structure" on the board, putting the three numbers in the corners of the roof's triangle, and writing the corresponding facts in the box. If you start with the largest number on the top of the house, it supports the subtraction equations. • Resources from the Educator site support these basic facts: Game http://www.abcya.com/addition.htm. Enrichment: • See Step 18 (p. 10). Child Watching: • Identify students' misconceptions with writing equations using numbers not on their cards (see Step 18). • Identify incorrect subtraction equations when students do not start with the largest quantity, which represents the whole in a part/part whole relationship. Do not look for student mastery in writing fact family equations, but rather an understanding of part/whole relationships between numbers. Use a concrete situational context to model their equation, and then ask, "Is this true". •



Module 2- Session 2: Double-Flap Picture Cards		
1.OA.1 1.OA.3 1.OA.4 1.OA.6 1.OA.8 MP.1 MP.2 MP.4	Access Prior Learning: • Connect to previous day's work with Double-Flap Dot Cards. Developing the Big Idea and key Strategic Behaviors: • understanding the commutative property • understanding part/whole relationships • solving for an unknown • writing equations	Guiding Questions: • How can you make a math story from pictures and equations? • How does your story change when the equation changes? Instructional Notes: • Note the *Math Practices in Action* (p. 13). • Consider making Math Practice 1 (make sense of problems and persevere in solving them) explicit in this lesson, although the materials do not call for it as an emphasis. • See the helpful blog titled *The Number Tree Model* on the Educator Site by searching under the Implementation Tab. Consider using the terms Number Tree and Fact Families in conjunction with the mathematical term part/part/whole to strengthen the understanding of different parts creating a whole. Child Watching: • Identify student misconceptions around writing equations with numbers not on their cards (see Step 18). • Identify incorrect subtraction equations when students do not start with the largest quantity, which represents the whole in a part/whole relationship. Do not look for student mastery in writing fact family equations, but rather an understanding of part/whole relationships between numbers. Use a concrete situational context to model their equation, and then ask, "Is this true".
Module 2- Session 3: Introducing Work place 2C Sort the Sum		
1.OA.5 1.OA.6 1.NBT.3 MP.7 MP.8	Access Prior Learning: • Connect to all previous places where students have worked with combinations within 10. Developing the Big Idea and key Strategic Behaviors: • understanding the commutative property • subitizing • understanding part/whole relationships • counting on	Guiding Question: • How many ways can you sort dominoes? Instructional Note: • Consider giving students time for an open sort with the dominoes. Students may sort by doubles, by a common sum, by greater than and less than, etc. Enrichment: • See the blog titled *Opportunities to Challenge Learners* (on the Educator Site under the Implementation tab) for ideas for those students who may have demonstrated mastery of given skills across Unit 2 and Unit 3. • See *Work Place Guide* (p. T7). Child Watching: • Identify students still counting domino dots by 1s.
Module 2- Session 4: Double-Flap Number Cards		
1.OA.3 1.OA.4 1.OA.6 1.OA.7 MP.2 MP.4	Access Prior Learning: • Connect to previous day's work with Double-Flap Dot Cards. • Connect to all previous places where students have worked with combinations within 10. Developing the Big Idea and key Strategic Behaviors: • understanding the commutative property • subitizing • understanding part/whole relationships • counting on	Guiding Questions: • What does equal mean? • How do you show if two quantities are equal? • Does the location of the equal sign change an equation? Instructional Notes: • A common misconception for students may be that the equal sign represents "the answer is," as hitting equals on the calculator creates the final answer. Look for opportunities to write equations with the sum/difference at the beginning. Also when asking for an equivalent equation (dot cards 3+3 and 5+1), consider showing them as 3+3=5+1 (Van de Walle, 2014, pp. 134 & 230). • See Step 5 for more explanation regarding the equal sign. • Consider using a balance scale to represent the idea that both sides of the equal sign are equivalent or "the same as". Enrichment: • See Step 18 (p. 25). • Ask students to represent equations in a variety of ways. Child Watching: • Observe students flexibility with using the equal sign.
Module 2- Session 5: Domino Addition Checkpoint		
1.OA.5 1.OA.6 1.NBT.3 MP.5 MP.7	Access Prior Learning: • Connect to previous day's work with Double-Flap Dot Cards. • Connect to all previous places where students have worked with combinations within 10.	Instructional Notes: • The *Assessment Guide* under the *Bridges Unit Assessments* tab provides the scoring guide for this checkpoint (p. 17). • Read the *About This Session* (p. 28). • In analyzing the data, consider how much of your class is moving towards Phase 2 of fluency development, Reasoning Strategies. *-continues on next page-*

	Developing the Big Idea and key Strategic Behaviors: • understanding the commutative property • subitizing • understanding part/whole relationships • counting on	Child Watching: • Use the scoring guide to formatively assess 1.OA.6 & 1.NBT.3.
Module 3- Session 1: Domino Flash		
1.OA.5 1.OA.6 MP.4 MP.5	Access Prior Learning: • Connect to previous work of subitizing. • Connect to all previous work and models for combinations within 10. Developing the Big Idea and key Strategic Behaviors: • using combinations to 12 • subitizing • counting on (from larger or smaller) • using doubles (including +1, -1) • writing equations	Guiding Questions: • How do you see the dots? • How many different ways can you see the dots? Instructional Notes: • Consider using the *Math Practices in Action* (p. 6). • When creating the strategies chart consider drawing a representation of the strategy, rather than just writing the equation (the abstract form). Modeling how to represent math thinking by drawing an illustration or using a manipulative will support students' development from concrete to the abstract.  Enrichment: • See Step 12 (p. 6). Child Watching: • Identify students struggling to model equations on the number rack or represent them with written equations. • Support students who may need another "flash" or a slightly longer "flash".
Module 3- Session 2: Dot Doubles		
1.OA.6 MP.2 MP.4 MP.7	Access Prior Learning: • Connect to all previous work with dominoes. Developing the Big Idea and key Strategic Behaviors: • using doubles • writing doubles equations	Guiding Questions: • What is alike about all these dominoes? • What is different? Instructional Note: • Read *About This Session* (p. 8). Enrichment: • *Game Variation* on *Work Place Instructions* (p. T5). Child Watching: • Identify students struggling to double the numbers (use unifix cubes, or practice counting on using the same dots).
Module 3- Session 3: Introducing Work Place 2E Spin & Add		
1.OA.5 1.OA.6 MP.4 MP.7 MP.8	Access Prior Learning: • Connect to all previous work and models for combinations within 10. Developing the Big Idea and key Strategic Behaviors: • counting on • collecting and graphing data • operating with fluency within 10	Guiding Question: • Do you think you might see any patterns in which sums appear more frequently? Enrichment: • See Step 11 (p. 14) and *Work Place Instructions Game Variations* (p. T7). Child Watching: • Identify students struggling with counting on.
Module 3- Session 4: Introducing Work Place 2F Spin & Subtract		
1.OA.5 1.OA.6 MP.4 MP.7 MP.8	Access Prior Learning: • Connect to all previous work and models for combinations within 10. • Connect to understanding developed yesterday with addition.	Guiding Question: • What patterns do you think we might see today in which sums appear more frequently? Instructional Note: • When using the counting back strategy with subtraction, students have to manage counting backwards while keeping track of how many counts back they have made (thus counting up simultaneously). Consider using a number line for support. Watch for students actually counting the starting number rather than the interval, which will result in an incorrect count. Students need to count the "hops" or the spaces in-between, rather than the numbers. See step 4 (p. 16). *-continues on next page-*

	Developing the Big Idea and key Strategic Behaviors: • counting back • collecting and graphing data • operating with fluency within 10	Enrichment: • See the *Work Place Instructions Game Variations* (p. T10). Child Watching: • Identify students counting the beginning number twice when counting backward. • Identify students struggling to count backward orally.
Module 3- Session 5: Unit 2 Assessment		
1.OA.1 1.OA.3 1.OA.4 1.OA.6 1.OA.8 MP.1 MP.4	Access Prior Learning: • Connect to all previous work and models for combinations within 10. Developing the Big Idea and key Strategic Behaviors: • counting on • counting back • operating with fluency with number combinations within 10	Instructional Notes: • See *Unit 2 Assessment Scoring Guide* in *Assessment Binder* under the *Unit Assessment Tab* (pp. 20-21). • Consider using the Grade 1 Math Progress Report: Quarter 1 documents (in your assessment binder (p. 36) under the *Assessment Overview* tab) as a tool for report cards. • Students may struggle with problem 2, which asks them to write a story problem to match an equation. Students have not had many opportunities to practice this independently. Use this formatively to identify student strengths and needs and support over time. Child Watching: • See *Support and Intervention* page in the *Assessment Binder* (p. 13). • Observe for and consider using intervention resources if you see students struggling with: counting forward to 30 from a number other than 1; counting backward to 0 from any number up to and including 10; representing addition and subtraction with objects, fingers, or drawings; solving addition and subtraction story problems within 10 by using objects or drawings. • Consider the *Bridges* intervention resources if you see any of the above (located on the Educator Site under the Curriculum tab).
Module 4- Session 1: Many Sea Stars Have Five Arms (optional)		
1.OA.8 1.G.2 1.G.3 MP.1 MP.6	Access Prior Learning: • Strategies were used throughout previous units and NC with 5-frames, 10-frames, and number racks. Developing the Big Idea and key Strategic Behaviors: • counting by 5 and 10 • using strategies with 5 and 10	Instructional Notes: • Sessions 1, 2, and 3 are optional sessions or time may be uses as A/D/E days. • Continue to provide opportunities to observe patterns, especially patterns of 5.
Module 4- Session 2: Assembling the Sea Star Quilt (optional)		
1.OA.8 1.NBT 1.G.2 MP.7	Access Prior Learning: • Strategies were used throughout previous units and NC with 5-frames, 10-frames, and number racks. Developing the Big Idea and key Strategic Behaviors: • counting by 5 and 10 • using strategies with 5 and 10	Instructional Notes: • Sessions 1, 2, and 3 are optional sessions or time may be uses as A/D/E days. • Continue to provide opportunities to observe patterns, especially patterns of 5, and counting by 5s. • Consider including the Home Connection, pp. 29-30, Addition & Subtraction Practice, during a different time (see Home Connections, U2M4S2 p. 11, for details).
Module 4- Session 3: Sea Star Counting by Fives (optional)		
1.OA.8 1.NBT MP.7 MP.8	Access Prior Learning: • Strategies were used throughout previous units and NC with 5-frames, 10-frames, and number racks. Developing the Big Idea and key Strategic Behaviors: • exploring multiples of 5	Instructional Notes: • Sessions 1, 2, and 3 are optional sessions or time may be uses as A/D/E days. • Continue to provide opportunities to observe patterns, especially patterns of 5, and counting by 5s. • Consider including the Student Book, p. 9, Counting to One Hundred Chart, during a different time (see steps 7 and 8, U2M4S3 p. 15, for questions to consider using this chart).

Module 4- Session 4: Who Has More Cents with Nickels & Pennies?		
1.OA.5 1.OA.8 1.NBT.3 MP.7 MP.8	Access Prior Learning: • Students worked with nickels and pennies previously. • Strategies were used throughout previous units and NC with 5-frames, 10-frames, and number racks. Developing the Big Idea and key Strategic Behaviors: • counting by 5 and 1 • building groups of 5 and 10 • counting strategies using 5 and 10	Guiding Questions: • What do you already know about nickels and pennies? • How are nickels and pennies like other tools you use? Instructional Note: • Money is used in Sessions 4 and 5 as a way to practice counting by 1, 5 and 10 in a new context. Money is not included in the NVACS until 2nd grade. Child Watching: • Observe for flexible understanding of groups of 5 and 10 using various models.
Module 4- Session 5: Who Has More Cents with Dimes, Nickels & Pennies?		
1.OA.5 1.OA.8 1.NBT.3 MP.7 MP.8	Access Prior Learning: • Strategies were used throughout previous units and NC with 5-frames, 10-frames, and number racks. Developing the Big Idea and key Strategic Behaviors: • counting by 1, 5 and 10 • counting strategies using 5 and 10 understanding • comparing	Guiding Questions: • What do you already know about dimes? • How are dimes the same and different from nickels and pennies? • How are dimes like other tools you use? Instructional Note: • Money is used in Sessions 4 and 5 as a way to practice counting by 1, 5 and 10 in a new context. Money is not included in the NVACS until 2nd grade. Child Watching: • Observe for flexible understanding of groups of 5 and 10 using various models.

References

Boaler, J. (2015*). Fluency without fear: Research evidence on the best ways to learn math facts.* Retrieved from: Youcubed at Stanford University https://bhi61nm2cr3mkdgk1dtaov18-wpengine.netdna-ssl.com/wp-content/uploads/2015/03/FluencyWithoutFear-2015.pdf.

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Van de Walle, J., Karp, K., & Bay-Williams, J. (2013). *Elementary and middle school mathematics teaching developmentally* (8th Edition). New York, NY: Pearson.

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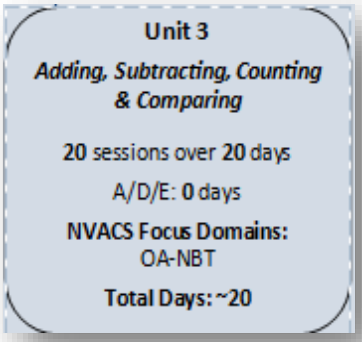
First Grade Unit 3: Adding, Subtracting, Counting & Comparing



Big Conceptual Idea: K-5 Progression on Counting and Cardinality and Operations and Algebraic Thinking (pp.1-7, 12-17), K-5 Progression on Number and Operations in Base Ten (pp.1-4, 6-7)

Read the Bridges Unit Overview/Introduction for Unit 3 pp. i-vi. Also, read each Module Overview for the current week's sessions, and the current Session Summary along with details for the teaching of each session as you work through Unit 3. These Introduction/Overview/Summary sections provide focus, clarity, vocabulary, definitions, and examples for the "big mathematical ideas and understandings" critical to 1st Grade. This information will support your professional decision-making within the Sessions and Modules as needed.

Mathematical Background: Read Bridges Unit 3 Overview pages (pp. i-viii)	Essential Question for teacher consideration: How will I support students' development of fluency of key number facts within 10, and deepen understanding of relationships between numbers so students will be able to use flexibly a variety of strategies in their problem solving within 20?

1st Grade Curriculum Pacing Framework: Balanced Calendar

Instructional note:

> "If you learn something deeply, the synaptic activity will create lasting connections in your brain, forming structural pathways, but if you visit an idea only once or in a superficial way, the synaptic connections can "wash away" like pathways made in the sand." (Boaler, 2016, p. 1)

Van de Walle et al., (2014) quotes Howden (1989) describing *number sense* as a "good intuition about numbers and their relationships. It develops gradually as a result of exploring numbers, visualizing them in a variety of contexts, and relating them in ways that are not limited by traditional algorithms" (p. 11). This unit's big mathematical idea focuses on the 2nd phase of fluency development and supports the development of reasoning strategies to help students work towards security of key number facts up to 10, and begin to form number understanding of number relationships to 20. Students will be able to "see" subsets of numbers within larger numbers (hierarchical inclusion), and deepen conceptual understanding of part/whole reasoning.

The *Nevada Academic Content Standards (NVACS)* describe procedural fluency as the ability to apply procedures flexibly, accurately, efficiently, and appropriately; to transfer reasoning strategies to different problems and contexts; to build or modify procedures from other procedures; and to recognize when one strategy or procedure is more appropriate than another (2010, p. 6). Developing this flexibility and deep understanding of relationships between numbers, students are more likely to have accurate and flexible recall of all single-digit number facts. The expectation for Phase II fluency is using a strategy to determine a solution for a problem within about 3 seconds, not "just memorizing the facts" and being able to recall them instantly. Research indicates that teaching "drill and kill" procedures implemented with speed and accuracy is not successful for fact fluency for most children. "For some people, learning mathematics as procedures has been successful; but for the majority of our nation, knowledge of mathematical rules has not allowed them to use math confidently in their daily lives" (Parrish, 2010, p. 4). This also causes math anxiety, as discussed in the research introduced in *Unit 2* (Boaler, 2016).

Students' ability to visualize the relationship of the numbers within various interactions is key. Intentional support and child watching for the development of flexible relational understanding of number is the intention in *Unit 3* and of *Mathematical Practices 7* and *8* (NVACS, 2010, p. 8). Continue use of the instructional materials to engage students in authentic conversations around solving meaningful problems in real world contexts. Also, use the manipulatives and the *Work Place* games as support for students to visualize, work out, demonstrate, explain, and practice their understanding of the relationships and the connections within the mathematics as they move toward fluency within 10.

Unit 3 develops students' understanding of the commutative property (numbers can be added in any order) which has been explored in kindergarten. Eventually this understanding will extend to, "Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20" (NVACS, 2010, 1.OA.2). As students develop reasoning strategies, the power of the property becomes more evident when they are faced with 3 addends. Students also find that rearranging the 3 addends (applying the associative property), lends itself to making anchors of 5 or 10. Keep this trajectory of learning in the forefront of your mind to capitalize on opportunities to support this student understanding. Several lessons throughout this unit will have suggestions to extend this work.

Discussions with students and with the class are powerful tools to support and drive students' mathematical development. Support a culture where students are listening to each other and sharing-and-comparing their thinking and their work as opposed to just showing their work and then moving on. "Mathematical discourse includes the purposeful exchange of ideas through classroom discussion, as well as through other forms of verbal, visual and written communication" (NCTM, 2014, p. 29).

Unit 3 also reinforces and extends important place value understandings introduced in kindergarten as ten ones and some more ones. As stated in the Progression Documents, "In first grade, students learn to view ten ones as a unit called a ten. The ability to compose and decompose this unit flexibly and to view the numbers 11 to 19 as composed of one ten and some ones allows development of efficient, general base-ten methods for addition and subtraction. Students see a two-digit numeral as representing some tens and they add and subtract using this understanding." (K-5 Progression on Number and Operations in Base Ten, p. 6). Students will struggle with addition of two 2-digit numbers if unitizing understanding of 10 is not secure.

This unit's child-watching opportunities provide space to observe for students' secure understanding and identify those who are struggling with the kindergarten standard K.NBT.1 in order to provide intervention as necessary. The Standard load of this unit may feel heavy, however, as Van de Walle, Karp, Lovin, & Bay-Williams state, "There is no need to separate place-value instruction from computation instruction. Children's efforts with the invention of their own computation strategies will both enhance their understanding of place value and provide a firm foundation for flexible methods of computation." (2014, p.176).

On-going enrichment:
Continue noting the *Skills Across the Grade Level* chart in the *Introduction* section (*Unit 3* pp. iv-v). All 1.OA and most 1.NBT Standard are still being developed throughout this unit. The details of this chart are important for day-to-day professional instructional decisions made within each session as to what discussions or activities to extend or cut short or emphasize or skip or, etc.

Continue to consider "Support" and "Challenge" options within each *Session*, and "Game Variations", "Differentiate", and "English-Language Learners" ideas in *Work Places*.

Expect all students to engage in the math. For specific help or ideas for any unit *Module* or *Number Corner* routine the best place to look first is on the *Educator Site* under the *Resources* tab. Click on the numbers to the right of any particular *Module* or *Number Corner* month and it will give you specific supports and answers to many questions: https://bridges.mathlearningcenter.org/user.

Key Questions for *Number Corner* routines are a great resource for going deeper into the mathematical content through discussion! They are on this link under the *Resources* tab – *Number Corner* – November (or any desired month): https://bridges.mathlearningcenter.org/user.

Consistent motor strokes, gestures and using words and actions together support student understanding (E.g. for 5 - sweep under and across, for 10 - circle around).

Essential Academic Vocabulary Use these words consistently during instruction.	
New Academic Vocabulary: (first time explicitly taught) *indicates Word Resource Cards are available in the Bridges materials	Review Academic Vocabulary: (Vocabulary from Number Corner or previous units)
(No new vocabulary for Unit 3)	*Add** *Addition* *Compare** *Difference** *Double* *Equal** *Equation** *Even* *Graph* *Greater than** *Half** *Less than** *Odd* *Ones** *Subtract** *Subtraction* *Sum or Total** *Tens*

Additional terminology that students may need support with: strategies, minus, plus, combinations, problem solving

Collaborative Team Conversations (CTC)
Consider using *one* of the following as part of the formative assessment process at the lesson level to **collect student work** to analyze for evidence of mathematical understanding:

Guiding questions:
"What strategies are students using to solve addition and subtraction problems with combinations of 10?"
"How are students developing fluency with addition and subtraction combinations for 10 (flexibility, accuracy, efficiency and appropriateness)?"
"How are students seeing and understanding 10 and some more?"
"What interactions will support intensification for understanding of composing combinations to 10 if needed?"

Lesson	Evidence	Look for
U3M2S4 *Combinations of Ten Checkpoint* TG pp.20-21	*Combinations of Ten Checkpoint* observation and student record page (TG U3M2S4 p. T4) *Combinations of Ten Checkpoint Scoring Guide* (AG Bridges Unit Assessments pp.28-29)	Focus CTC around conceptual understandings of the big idea and strategies used: • adding combinations within 10 with flexibility, accuracy, efficiency and appropriateness • subtracting combinations within 10 with flexibility, accuracy, efficiency and appropriateness • using strategic behaviors (counting on, counting back, using known numbers or facts, recalling quickly) • identifying and using needed tools
U3M3S4 *Work Place 3F Fifty or Bust!* Observation TG pp.19-22, T3-T4	*Fifty or Bust! Record Sheet* observation and student record sheet (TG U3M3S4 p. T6)	Focus CTC around conceptual understandings of the big idea and strategies used: • grouping and counting objects by 10s and 1s • understanding that a 10 can be thought of as a new unit of 10 ones • understanding that numbers from 11-19 are composed of a 10 and some more 1s • coloring in cubes one by one, or an entire ten-train, or coloring in ones by using known combinations to make 10

Learning Cycle Assessments (summative)	*Unit 3 Assessment* - U3M3S5 TG pp. 23-26, T7-T8; AG Bridges Unit Assessments pp. 30-31	Use *Unit 3 Assessment Scoring Guide* AG Bridges Unit Assessment p. 32

Standards listed in **bold** indicate a focus of the lesson.

NVACS (Content and Practices)	Mathematical Development of the Big Idea	Instructional Clarifications & Considerations
Module 1- Session 1: Introducing Work Place 3A Drop the Beans		
1.OA.3 1.OA.6 1.OA.8 1.MD.4 MP.4 MP.7	Access Prior Learning: • Connect to all previous work and models for combinations within 10. Developing the Big Idea and key Strategic Behaviors: • understanding the commutative property • operating with fluency with combinations within 10 • collecting and graphing data	Guiding Question: • What information can you get from a graph? Instructional Notes: • Accurate vocabulary use of the terms "expression" and "equation" will support students. An expression is just the addends (3+4), whereas an equation includes the equal sign and the sum (3+4=7). • Consider utilizing the Work Place Sentence Frames found on the Educator Site to support students' communication. Enrichment: • Students may choose different target sums of 7, 8, 9, or 10. If you have students far beyond this in their math fluency, increase the target sum appropriately, and have them create their own game board. Child Watching: • The *Work Place Differentiation* chart found on page 26 in your *Assessment Binder* under the tab "Bridges Unit Assessment" may be a helpful tool for your *Work Place* Child Watching. • This *Work Place* supports perceptual and conceptual subitizing. Consider covering the beans after a short time (3 seconds), then asking students to tell what they saw. Uncover the beans and discuss how they might see groups of beans without counting (perceptual subitizing), and how they might combine groups together to reach a total (conceptual subitizing).
Module 1- Session 2: Introducing Work Place 3B Make the Sum		
1.OA.3 1.OA.5 1.OA.6 MP.2 MP.7	Access Prior Learning: • Connect to all previous work and models for combinations within 10. Developing the Big Idea and key Strategic Behaviors: • understanding the commutative property • understanding the associative property • counting on	Guiding Questions: • What are different ways can you compare numbers? • Does the order of numbers change the sum? Why? Why not? Instructional Notes: The big idea of the commutative and associative properties appears in this lesson. Support students in seeing that changing the order of numbers while adding (commutative property) does not change the total. We can also add any two adjacent numbers together (associative property) without changing the sum. Help students connect these properties to the benefit of grouping numbers in easier-to-add groups. For example, if they pull a 2, 4, 6, & 2, they can move the 2 cards next to each other and have a double, 2+2. Then students will have 4+4, which is another double. Capitalize on this instructional opportunity to discuss the commutative and associative properties deeply. *-continues on next page-*

	• operating with fluency with combinations within 10	• Some students may need support noticing that a sum can be created using more than two cards. Enrichment: • See *Game Variations* A, B, C & D on the *Work Place Guide* (p. T9). Child Watching: • Identify students who are still counting each dot on the cards. Ask them if they have to count them all in order to know how many dots there are. Practice with a few quick flash looks to help them subitize. • Identify students who move cards around (applying the commutative and associative property) to add. Highlight this strategy to other students.
Module 1- Session 3: Doubles, Evens & Odds		
1.OA.3 1.OA.6 MP.2 MP.7	Access Prior Learning: • Make connections to doubles understanding. Developing the Big Idea and key Strategic Behaviors: • understanding the number structure – odd and even • using doubles • operating with fluency with combinations within 10	Guiding Question: • What do you already know about doubles? Instructional Notes: • Read the *Math Practices in Action* in the margin (p. 16). • The idea of even and odd numbers is not a 1st grade but 2nd grade standard. The point of this lesson is to focus on the strategic use of doubles plus one, and doubles minus one as a reasoning strategy in the development of math fluency. • Research supports the use of fingers to create perception and representation of numbers as the somatosensory finger area, a specific region of our brain, is developing. "It is important to remove the stigma from counting on fingers and to see this activity as inherently important and valuable" (Boaler, n.d.). Encourage continued use of finger representations to develop this finger perception. Refrain from developing a climate where the use of fingers for problem solving is seen in a negative way. "6-year old's finger representation was a better predictor of future mathematics success than their scores on tests of cognitive processing" (Boaler, n.d.). Enrichment: • See Step 16 (p. 18) and *Game Variations A* on the *Work Place Guide* (p. T12). Child Watching: • Identify students who are struggling to double numbers or add 1 or subtract 1. Support them using the differentiation ideas (p. T11).
Module 1- Session 4: Introducing Work Place 3C Doubles Plus or Minus One		
1.OA.5 1.OA.6 MP.2 MP.7	Access Prior Learning: • Make connections to doubles understanding. Developing the Big Idea and key Strategic Behaviors: • understanding the number structure – odd and even • using doubles plus 1 and minus 1 • operating with fluency with combinations within 10	Guiding Question: • What happens when you add 1 or subtract 1 from a number? Enrichment: • See Step 5 (p. 21). Child Watching: • Watch for strategic behaviors - who is counting all by 1s; who starts from a number and counts on by 1s; who makes a 10 (5); who is counting back. • Have students share strategically, gradually building up from a lower strategic level of sophistication to a higher level. • Students may be confused with the two steps of the game because this is the first game that has two-step directions. Help students notice that if their answer is not on the board they missed a step. Be prepared to reteach this game. Offer peer support as needed.
Module 1- Session 5: Number Rack Story Problems		
1.OA.1 1.OA.4 1.OA.7 1.OA.8 MP.1 MP.4	Access Prior Learning: • Make connections to doubles understanding. Developing the Big Idea and key Strategic Behaviors: • making meaning of story problems • using doubles plus 1 and minus 1 • operating with fluency with combinations within 10	Guiding Questions: • How do math tools help you in solving problems in math? • How can the number rack help you solve story problems? Instructional Notes: • Revisit the poster for MP.1 and encourage a focus on making sense of a problem. • Read the *About This Session* note in the margin (p. 24). • This lesson is a great opportunity to reinforce the meaning of the equal sign meaning "the same as" and not "is the answer to". A balance scale and cubes can help students visualize this. Consider showing how 5+3 cubes on one side balances with 4+4 cubes on the other side. *-continues on next page-*

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- Refer to page 88 in the 2010 NVACS (right). This chart shows how the complexity of problems increases from left to right and top to bottom. Your students may struggle with the quick increase in complexity with the problems in this lesson. Consider framing your own problems, such as a Take From Result Unknown type, between problems 1 & 2. For example, *Amber gathered 20 acorns and put them by a tree, a squirrel ran away with 7. How many were left?* Then continue with problem 2. You might also scaffold support from left to right across the top. Do problem 1, followed with your own creation for Add To Change Unknown, *(11 acorns fell off the tree onto the ground. The wind picked up and more fell. Now there are 19 acorns. How many fell to the ground after the wind blew?)* Then try problem 4. Use this chart to help you create your own problems to support students.

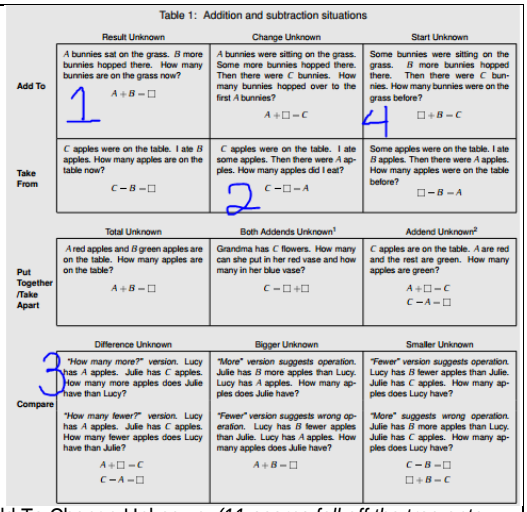
Table 1: Addition and subtraction situations

	Result Unknown	Change Unknown	Start Unknown
Add To	A bunnies sat on the grass. B more bunnies hopped there. How many bunnies are on the grass now? $A + B = \square$ (1)	A bunnies were sitting on the grass. Some more bunnies hopped there. Then there were C bunnies. How many bunnies hopped over to the first A bunnies? $A + \square = C$	Some bunnies were sitting on the grass. B more bunnies hopped there. Then there were C bunnies. How many bunnies were on the grass before? $\square + B = C$ (4)
Take From	C apples were on the table. I ate B apples. How many apples are on the table now? $C - B = \square$	C apples were on the table. I ate some apples. Then there were A apples. How many apples did I eat? $C - \square = A$ (2)	Some apples were on the table. I ate B apples. Then there were A apples. How many apples were on the table before? $\square - B = A$
	Total Unknown	Both Addends Unknown[1]	Addend Unknown[2]
Put Together /Take Apart	A red apples and B green apples are on the table. How many apples are on the table? $A + B = \square$	Grandma has C flowers. How many can she put in her red vase and how many in her blue vase? $C = \square + \square$	C apples are on the table. A are red and the rest are green. How many apples are green? $A + \square = C$ $C - A = \square$
	Difference Unknown	Bigger Unknown	Smaller Unknown
Compare	*"How many more?" version.* Lucy has A apples. Julie has C apples. How many more apples does Julie have than Lucy? *"How many fewer?" version.* Lucy has A apples. Julie has C apples. How many fewer apples does Lucy have than Julie? $A + \square = C$ $C - A = \square$ (3)	*"More" version suggests operation.* Julie has B more apples than Lucy. Lucy has A apples. How many apples does Julie have? *"Fewer" version suggests wrong operation.* Lucy has B fewer apples than Julie. Lucy has A apples. How many apples does Julie have? $A + B = \square$	*"Fewer" version suggests operation.* Lucy has B fewer apples than Julie. Julie has C apples. How many apples does Lucy have? *"More" suggests wrong operation.* Julie has B more apples than Lucy. Julie has C apples. How many apples does Lucy have? $C - B = \square$ $\square + B = C$

Enrichment:

- Increase the complexity of problem types or quantities within the problem for students who need more of a challenge.

Child Watching:

- Help students act out the problems if they struggle with understanding what the problem is asking. Consider having students' direct model with concrete manipulatives.
- Watch for strategies students are using.
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<tr>
<td colspan="3">Module 2- Session 1: Introducing Work Place 3D Tower Race</td>
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<tr>
<td>1.OA.6
1.OA.8

1.MP.2
1.MP.7</td>
<td>Access Prior Learning:

- Students worked with decomposing numbers less than or equal to 10 into pairs in more than one way in kindergarten.

Developing the Big Idea and key Strategic Behaviors:

- operating with fluency with combinations within 10
- decomposing numbers less than 10 in multiple ways
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<td>Guiding Question:

- What many different combinations can you make from a set of cubes?

Instructional Note:

- The big idea of this game is to give students the opportunity to engage in decomposing numbers to support their fluency with combinations within 10. Modify rules as needed.

Enrichment:

- See the Work Place Guide Assessment & Differentiation Chart (p. T1).

Child Watching:

- Identify students struggling to see different combinations within numbers.
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<td colspan="3">Module 2- Session 2: Flash Attack</td>
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<tr>
<td>1.OA.6

MP.5
MP.7</td>
<td>Access Prior Learning:

- Connect with prior subitizing.

Developing the Big Idea and key Strategic Behaviors:

- subitizing
</td>
<td>Guiding Question:

- What parts can you see within a number?

Instructional Note:

- If students need a second flash, show them again. However, refrain from just showing them the beads for a longer time. This encourages them to count, which is the behavior you want them to change. Rely on other students sharing their strategies for "seeing" the numbers to support those who may be struggling.

Enrichment:

- See the extensions in the margin and consider increasing the quantity of beads within 20 if your students are ready for this (p. 13).

Child Watching:

- Identify students still counting all beads by ones. See the support note (p. 13).
</td>
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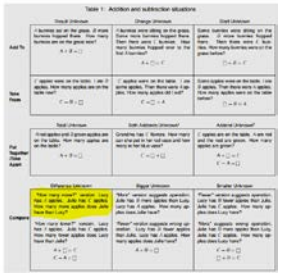
</table>

Module 2- Session 3: Make Ten		
1.OA.1 1.OA.3 1.OA.6 1.OA.8 1.NBT.4 MP.7 MP.8	Access Prior Learning: • Students decomposed numbers less than or equal to 10 into pairs in more than one way in kindergarten. Developing the Big Idea and key Strategic Behaviors: • operating with fluency with combinations within 10 • decomposing numbers less than 10 in multiple ways	Guiding Question: • What do you know about the number 10? Instructional Notes: • Read the About this Session in the margin (p. 16). • Encourage students to write their equations horizontally as well as vertically on the student workbook pages 13-14. • Consider choosing a few students who showed their work on #4 to share. This will help other students see ideas on communicating their thinking in writing. Enrichment: • See Step 3 - extend to combinations of 15, then 20 (p. 16). • See the Challenge problem # 5 of student book (p. 14). Child Watching: • Identify students struggling with combinations within 10. Adjust the quantity to within 5, if needed.
Module 2- Session 4: Hot Air Balloons		
1.OA.1 1.OA.3 1.OA.6 1.OA.7 1.OA.8 MP.1 MP.7	Access Prior Learning: • Connect back to Module 1 Session 5, Number Rack Stories. • Identify existing schema about hot air balloons. Developing the Big Idea and key Strategic Behaviors: • understanding of part/whole relationships • counting on • counting back	Guiding Questions: • What do you know about finding the total? • What do you know about finding the parts of a whole? • How many different ways can you think of? Instructional Notes: • The Assessment Binder under the Bridges Unit Assessment Tab provides the scoring guide for the Combinations of Ten Checkpoint (p. 29). • Continue to provide more learning opportunities around 1.OA.3, by using the "Hot Air Balloon" problem to create another story problem that includes 3 addends. For example, "*There are 10 hot air balloons. Some are black, some are white, but others are red. Create an equation representing the possible numbers of each color. Explain your equation with objects, drawings and equations.*" Other variations of this problem could include providing students with the numbers of each color balloon and asking students to find the sum. *There are 3 red, 5 white, and 2 black balloons. How many balloons are there in total?* Choose numbers that encourage students to find anchors of 5 and 10, and order them in ways that encourage rearrangement. • Consider having students model multiple ways to show equations for each discussed balloon race problem. 10- ?= 8, 10-2= ?, 10= 2 +8 and so on. • Consider having multiple tools available for students to choose. Students may find working with unifix cubes or number racks helpful. Students should regularly be given choices for tool selection. • Remind students of Math Practice 1. Help them understand that mathematicians make sense of a problem by visualizing, acting out, or modeling problems in mathematics. Enrichment: • See the *Work Place Game Variations* (in each *Work Place Guide*). Child Watching: • Any students who does not demonstrate security in their working knowledge of key number facts and fact strategies for single-digit addition and subtraction may need extra teacher support. See the *Support and Intervention* page under the *Bridges Unit Assessment* tab (p. 35). • Use the *Combinations of Ten Checkpoint* to formatively assess students.
Module 2- Session 5: Number Rack Subtraction		
1.OA.1 1.OA.6 1.NBT.3 1.MD.3 1.MD.4 MP.4 MP.5	Access Prior Learning: • Solving addition and subtraction word problems, and adding and subtracting within 10 were addressed in kindergarten. Developing the Big Idea and key Strategic Behaviors: • understanding part/whole relationships • comparing to find the difference	Guiding Question: • How does the number rack help you see number relationships? *-continues on next page-*

		Instructional Notes: • The Number Rack Subtraction problems delve directly into Compare Difference Unknown problem types, as seen again in the NVACS (2010, p. 88) or in K-5 Progression on Counting and Cardinality and Operations and Algebraic Thinking (p. 7). • These are some of the most difficult problem types for students to work with, as there is no action to model. "The challenge of comparison problems comes from the fact that two quantities are being described by language that can be complex for children. Fewer, less than, more, bigger and greater than are the terms typically used to describe the relationships in comparison problems." (Van de Walle, 2014, p. 131).  • Support students by connecting to comparison situations they are familiar with, such as siblings comparing the number of cookies, or toys. Children understand the idea of "who has more" in this context. • Consider using the question "how many more to catch up" as another way of understanding comparison problems. • Use the Number Rack app to modify the bead string to use only one string if needed. • Consider making explicit use of the *Difference Word Resource Card* and posting this vocabulary in an easy access location. Enrichment: • See the *Work Place Game Variation* (p. T7).
Module 3- Session 1: Ten & Some More		
1.OA.6 1.NBT.1 1.NBT.2 1.NBT.2a 1.NBT.2b 1.NBT.3 1.NBT.4 MP.5 MP.6	Access Prior Learning: • Students in kindergarten worked with knowing number names and counting the sequence. • Kindergarten students also worked with numbers 11-19 to gain foundations for place value. Developing the Big Idea and key Strategic Behaviors: • understanding 10 and some more • understanding place value • writing equations	Guiding Question: • What do you know about teen numbers? Instructional Note: • It is important to refer to numbers by their quantity and by their numeral names. For example, frequently refer to thirteen as both 13 and "one ten and 3 ones." As indicated in the K-5 Progression on Number and Operations in Base Ten, "The number words continue to require attention at first grade because of their irregularities. Many decade numbers sound much like teen number words. For example, 'fourteen' and 'forty' ……and because the number words 'eleven' and 'twelve' do not cue students that they mean '1 ten and 1 one'" (pp. 6-7). Enrichment: • See game variations on *Work Place Guides.* Child Watching: • Identify students who may be struggling with identifying 10s and 1s, or representing numbers with 10s and 1s separately. Support them by having them make the number in ones only, and physically construct a tower of 10.
Module 3- Session 2: Fifty or Bust! Day 1		
1.OA.6 1.NBT.1 1.NBT.2a 1.NBT.2b 1.NBT.3 1.NBT.4 MP.5 MP.6	Access Prior Learning: • Students in kindergarten worked with knowing number names and counting the sequence. • Kindergarten students also worked with numbers 11-19 to gain foundations for place value. Developing the Big Idea and key Strategic Behaviors: • understanding 10 and some more	Guiding Questions: • If you have an older brother or sister, how many years older are they than you are? • How many years would it take you to catch up to how old they are now? • How can what you know about 10 help you? Instructional Note: • Continue to ask students, "How many more do you have?" and "How many more do you need to get to 50?" and/or "How many to catch up?" Model this language so students will also ask these questions during this independent Work Place. Enrichment: • Ask students to record the equations as they answer the questions throughout game play. Child Watching: • Identify students operating on 10s and 1s separately. Do they count by 10s then add on by 1s, or are they counting every cube individually by 1s? Do students color in the next 10 train each time, even if it means leaving holes to fill in later? (See Step 9).

Module 3- Session 3: Fifty or Bust! Day 2		
1.OA.6 1.NBT.1 1.NBT.2a 1.NBT.2b 1.NBT.3 1.NBT.4 MP.5 MP.6	Access Prior Learning: • Students in kindergarten worked with knowing number names and counting the sequence. • Kindergarten students also worked with numbers 11-19 to gain foundations for place value. Developing the Big Idea and key Strategic Behaviors: • understanding 10 and some more	Guiding Questions: • How do you know when to stop so you do not go over 50? • How can what you know about 10 help you to figure it out? Instructional Notes: • Carefully model aloud your thinking and strategy as you play the game. • See this game from the resources on the Bridges Educator site as another tool. • See Math Practices in Action, p. 17. Enrichment: • For more challenge, play with cards face down in the pocket chart. Child Watching: • Identify students operating on 10s and 1s separately. Do they count by 10s then add on by 1s, or are they counting every cube individually by 1s? Do the students color in the next 10 train each time, even if it means leaving holes to fill in later? (See session 2, Step 9).
Module 3- Session 4: Introducing Work Place 3F Fifty or Bust!		
1.OA.6 1.NBT.1 1.NBT.2 1.NBT.2a 1.NBT.2b 1.NBT.3 1.NBT.4 MP.5 MP.6	Access Prior Learning: • Students in kindergarten worked with knowing number names and counting the sequence. • Kindergarten students also worked with numbers 11-19 to gain foundations for place value. Developing the Big Idea and key Strategic Behaviors: • understanding 10 and some more	Guiding Questions: • How do you know when to stop so you do not go over 50? • How can what you know about 10 help you to figure it out? Enrichment: • See game variations on *Work Place Guide* (p. T5). Child Watching: • Identify students operating on 10s and 1s separately. Do they count by 10s then add on by 1s, or are they counting every cube individually by 1s? Do the students color in the next 10 train each time, even if it means leaving holes to fill in later? (See session 2, Step 9).
Module 3- Session 5: Unit 3 Assessment		
1.OA.6 1.OA.8 1.NBT.2 1.NBT.2a 1.NBT.2b MP.2 MP.6	Access Prior Learning: • Students in kindergarten worked with knowing number names and counting the sequence. • Kindergarten students also worked with numbers 11-19 to gain foundations for place value. Developing the Big Idea and key Strategic Behaviors: • understanding 10 and some more • using direct modeling • using counting strategies • using reasoning strategies	Instructional Notes: • The *Assessment Guide* under the *Bridges Unit Assessments* tab provides the scoring guide for the Unit 3 Assessment (p. 32). • This is the teacher's opportunity to formatively assess students' use of reasoning strategies, and determine what phase students are working towards for fluency development. • There may be confusion in the practice problem because 5 beads are showing and 5 beads are hidden. Consider doing an additional practice problem to confirm students understand they are determining the beads hidden rather than the amount shown. • Section 2 of the assessment asks students to draw a line indicating the last answer they were able to complete within 3 minutes. The purpose of this is to help teachers determine who is using counting strategies rather than using reasoning strategies. Throughout the unit, teachers have been child watching and likely have a strong idea through anecdotal observations of the strategies used by students. If your child watching observations have provided you with enough information to determine student strategy use, it may not be necessary for this section of the assessment. Child Watching: • Observe how students are using tools. • Observe students drawing the missing beads on the assessment, and then counting them by 1s. • Are students using the unifix cubes with 10s and 1s separately? Are they trusting in the ten (using conservation) and counting on? Are they recounting by 1s? If you see students are recounting the 10, provide support by developing concept of conservation.
Module 4- Session 1: Equivalent Names: Sixes & Sevens		
1.OA.3 1.OA.6 1.OA.7 MP.2 MP.4	Access Prior Learning: • Several standards in Kindergarten call for "drawing an equation" (NVACS, 2010, K.OA.3, K.OA.4, K.NBT.1). Developing the Big Idea and key Strategic Behaviors: • understanding the commutative property	Guiding Questions: • How can cubes help you find different combinations for numbers? • How can they help you write different expressions and equations? *-continues on next page-*

	• understanding the associative property • writing equivalent expressions for 6 and 7	Instructional Notes: • Focus on the big idea that there are multiple equivalent names, and that the equal sign means "the same as." • Use the term expression (5+2) to show the operation, but the term equation (5+2=7) to represent the idea of equivalence. Phrases such as "the same number as" and "becomes" can help solidify the understanding of the equal sign definition. • Consider pulling out a balance scale again to represent how each side is the same. • Use trains with both two and three colors. Continue to develop students' understanding of the commutative and associative properties by having students rearrange the colors in different order(s) and record different possible equations for each train. • Class discussion can center on the orders that are easier to add. Child Watching: • Identify students who understand and utilize the idea of commutativity (3+4, 4+3). • Identify students exploring 3 addends and using associativity.
Module 4- Session 2: Equivalent Names: Nines & Tens		
1.OA.3 1.OA.6 1.OA.7 MP.2 MP.4	Access Prior Learning: • Several standards in Kindergarten call for "drawing an equation" (K.OA.3, K.OA.4, K.NBT.1). • Connect to the work done in the previous lesson with 6s and 7s. • Review terms true and false. Developing the Big Idea and key Strategic Behaviors: • understanding the commutative property • understanding the associative property • writing equivalent expressions for 9 and 10	Guiding Questions: • How can cubes help you find different combinations for numbers? • How can they help you write different expressions and equations? Instructional Notes: • Having students examine equations and identify true/false statements encourages them to evaluate the equations. You may need to discuss the meaning of true and false beforehand. • The balance scale can be helpful again to determine true/false. • This online resource suggested on the Bridges Educator Site provides a useful digital scale (Select the "Number Balance Activity"). • Use trains with both two and three colors. Continue to develop students' understanding of the commutative and associative properties by having students rearrange the colors in different orders and record different possible expressions and equations for each train. • Class discussion can center on the orders that are easier to add. Enrichment: • Using 3 colors to create 3 addends is more challenging. Child Watching: • Observe for misconceptions regarding the meaning of the equal sign, specifically if the sum is presented first in an equation. • Identify students who understand and utilize the idea of commutativity (3+4, 4+3). • Identify students exploring 3 addends and using associativity.
Module 4- Session 3: Comparing Cube Trains		
1.OA.1 1.OA.7 1.OA.8 1.NBT.3 MP.2	Access Prior Learning: • Connect to students' previous learning utilizing the comparison symbols (<, >, =) from the 50 or Bust Work Place. Developing the Big Idea and key Strategic Behaviors: • understanding numbers and their relationships • comparing quantities • writing inequality equations	Guiding Question: • What do you already know about comparing quantities? Instructional Notes: • Utilize dots for support for drawing the greater than and less than symbols rather than the "alligator gimmick". This keeps the focus on the mathematics and not on remembering gimmicks in order to do math. The larger quantity of dots (2) is nearer the greater number. The smaller number of dots (1) is nearer the smaller number. • Have unifix cube trains available for students who need to compare actual quantities using concrete materials.   Enrichment: • See Step 13 in the lesson (p. 17). Child Watching: • Identify students' strategies for determining "How many to catch up?" Are they counting on from the larger number or the smaller number, or counting back? Are any students using their knowledge of fact families? Encourage students to share responses and rationale.

Module 4- Session 4: Comparing Cube Towers		
1.OA.1 1.OA.7 1.OA.8 MP.2 MP.4	Access Prior Learning: • Remind students of previous learning utilizing the comparison symbols (<, >, =) from the last session. Developing the Big Idea and key Strategic Behaviors: • comparing quantities • finding the difference • solving for an unknown	Guiding Question: • What do you already know about comparing quantities? Instructional Notes: • Explicitly use the vocabulary resource card for *difference.* Note that difference in this lesson is comparison, not the action of removing or "taking away" although it is represented with a minus symbol. • Directly modeling compare problems supports students as they develop this understanding. Comparison/difference unknown problems are some of the most difficult problem types 1st graders will encounter. See page 88 in the NVACS for this table (2010). Enrichment: • See Step 14 (p. 22). Child Watching: • Identify students struggling with problem solving with larger quantities and reduce the quantity to 6 or less. Provide opportunities to match or directly compare with connecting cubes (match, match, match, leftovers).
Module 4- Session 5: Number Rack Detectives		
1.OA.6 1.OA.7 1.OA.8 MP.2 MP.4	Access Prior Learning: • Students have used a variety of strategies (direct modeling, counting strategies, and using a known fact) previously. • They are also familiar with solving for an unknown. Developing the Big Idea and key Strategic Behaviors: • understanding part-whole relationships • solving for an unknown • using reasoning strategies	Guiding Questions: • What do you already know about the parts of numbers • How do you find a missing part? Enrichment: • See Step 8 (p. 26). Child Watching: • Note as utilize the support suggestions in Step 8 (p. 26) as needed.

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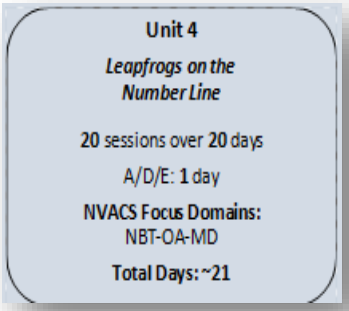
First Grade Unit 4: Leapfrogs on the Number Line



[1st Grade Curriculum Pacing Framework: Balanced Calendar]

Big Conceptual Idea: [K-5 Progression on Counting and Cardinality and Operations and Algebraic Thinking] (pp.1-7, 12-17), [K-5 Progression on Number and Operations in Base Ten] (pp.1-4, 6-7), [K-6 Progression on Measurement and Data (Measurement Part)] (pp.1-4, 8-11)

Read the Bridges Unit Overview/Introduction for Unit 4 pp. i-vi. Also, read each Module Overview for the current week's sessions, and the current Session Summary along with details for the teaching of each session as you work through Unit4. These Introduction/Overview/Summary sections provide focus, clarity, vocabulary, definitions, and examples for the "big mathematical ideas and understandings" critical to 1st Grade. This information will support your professional decision-making within the Sessions and Modules as needed.

Mathematical Background: Read Bridges Unit 4 Overview pages (pp. i-vi)	Essential Questions for teacher consideration: How will I extend students' understandings of reasoning skills and the structure of our number system in order to explore addition and subtraction and determine unknown values? How will I support students' connections to what they know, and their transition from reasoning with numbers and structure to reasoning with length measurement, comparison, and order?

Instructional note:

> "If you learn something deeply, the synaptic activity will create lasting connections in your brain, forming structural pathways, but if you visit an idea only once or in a superficial way, the synaptic connections can "wash away" like pathways made in the sand." (Boaler, 2016, p. 1)

Unit 4 extends students' understanding and use of structure for problem solving rather than counting for problem solving. The number line provides a model of our number system and a model for beginning operations with addition and subtraction from 0-120. Strategies include skip jumping in multiples of 5 and 10 with 5s and 10s as landmark numbers, moving forward and backward, using numbers both on and off the decade, and finding differences between two numbers. The number line helps students visualize number relationships and use these visualizations to count and calculate. This work supports greater flexibility in mental arithmetic. The open number line is a very beneficial tool both visually and conceptually as students bring meaning to it and act upon it in a variety of ways. Problem contexts are critical as they determines the model or strategy to consider.

Students are able to develop understanding of compare problem situations, representing and solving for unknowns in any location for all problem types, and solving addition and subtraction problems within 20. They come to see addition as "a process of increasing or putting together" and subtraction as "taking away or finding the difference". Fluency development in this unit continues to build into larger numbers (up to 120) by applying reasoning strategies developed in previous units. Students use the number line to explore counting by 1s, 5s, and 10s. Just as in *Unit 3*, *Numbers Base Ten* and *Operations and Algebraic Thinking Standards* are worked on simultaneously throughout this unit building place value understanding and deepening students' understanding of number relationships (part/whole). Students also write inequality statements.

Unit 4 also addresses the critical measurement standards. The *Progressions for the Common Core State Standards in Mathematics - K-5, Progression on Geometric Measurement* states on p.2, "Geometric measurement connects the two most critical domains of early mathematics, geometry and number, with each providing conceptual support to the other." *Module 4* extends students' understanding of the structure of the number line by turning it vertically to apply to the continuous attribute of length measurement. Students continue to explore comparison problem types using measurement as the number context and use reasoning strategies of counting up and down, by 1s, 5s, and 10s. Attend to *Unit 4 Introduction* (pp. ii-iii) for clarification of the open number line and how it supports skip-counting reasoning (pp. ii-iv).

Transitivity becomes a focus for 1st grade using length measurement, comparison, and ordering. Students continue use of direct comparison, but they also "…should be able to use indirect comparison and explanations that draw on transitivity (MP3)…If A is longer than B and B is longer than C, then A must be longer than C as well." (The Progressions for the Common Core State Standards in Mathematics - K-5, Progression on Geometric Measurement p.8). This also transfers to number comparison, ordering, and reasoning. Students may benefit from additional learning opportunities in the *Measurement and Data* cluster, specifically in "ordering three objects by length; compare the lengths of two objects indirectly by using a third object" (NVACS, 2010, 1.MD.1).

Your child watching may indicate you have a wide range of student levels of sophistication represented in your class at this time. According to Battista (2012), "…the more students describe their thinking, the better they will become at explaining that thinking, especially if you guide them toward providing increasingly accurate and detailed descriptions of their reasoning" (p. xiii). Utilize questioning techniques to push for student descriptions that will help you understanding student strategies and reasoning. If they say, "I counted," you might return with, "How did you count?" "Can you show me?" "Tell me more."

More connections between *Number Corner* and the sessions will start to become evident. Up to this point, the two components may have felt isolated from each other; however, teachers have the opportunity to use one as a launching point for creating common experiences and common schema for the other. This creates a strong foundation for future lessons. In *Unit 4* sessions, Tad and Polli, the frog characters from the September *Number Corner* return. Additionally, in *Number Corner* students have had opportunity to engage successfully with the open number line, moving forward and backward on the number line and using it as a model for computation.

On-going enrichment:
Continue noting the *Skills Across the Grade Level* chart in the Introduction section (Unit 4 pp. iv-v). 1.OA.5 is the only standard to be secure by the end of this *Unit*. All other standards continue to be introduced or developed. This is important information for those day-to-day professional instructional decisions you have to make within each session as to what discussions or activities to extend or cut short or emphasize or skip or, etc. Expect all students to engage in the math.

Continue to consider "Support" and "Challenge" options within each *Session*, and "Game Variations", "Differentiate", and "English-Language Learners" ideas in *Work Places*.

Essential Academic Vocabulary Use these words consistently during instruction.		
New Academic Vocabulary: (first time explicitly taught) *indicates Word Resource Cards are available in the Bridges materials	Review Academic Vocabulary: (Vocabulary from Number Corner or previous units)	
Data*	*Add**	*Less than**
Inch*	*Addition*	*Long/Longer/Longest**
Information	*Compare**	*Multiple*
Measure	*Decade*	*Number line**
More than	*Difference**	*Scale*
Open number line*	*Double*	*Short/Shorter/Shortest**
	*Equal**	*Subtract**
	*Equation**	*Subtraction*
	Graph	*Sum or Total**
	*Half**	*Tens**
	*Height**	*Taller than*

Additional terminology that students may need support with: strategies, minus, plus, predict, prediction, skip-jump problem

*Collaborative Team Conversations (CTC)

Consider using *one* of the following as part of the formative assessment process at the lesson level to collect student work to analyze for evidence of mathematical understanding:

Guiding question: "What strategies are students using to solve addition and subtraction problem to 10 using the number line?
"What evidence do student demonstrate to show mental manipulation of combinations with 10?
"If needed, what intensification interactions will support the understanding and use of a variety of tools and strategies to solve for combinations to 10?"

Lesson	Evidence	Look for
U4M2S5 *Numbers on a Line Checkpoint #3 & 4* TG pp. 23-25	*Numbers on a Line Checkpoint #3 & 4* observation of student record sheet (TG U4M2S5 p. T5) *Numbers on a Line Checkpoint Scoring Guide #3 & 4* (AG Bridges Unit Assessments pp. 38-39)	Focus CTC around conceptual understandings of the big idea and strategies used: • adding combinations within 10 on the number line (counting on) with flexibility, accuracy, efficiency and appropriateness • subtracting combinations within 10 on the number line (counting back) with flexibility, accuracy, efficiency and appropriateness • visualizing the number structure • visualizing and using quantities and number combinations
U4M3S5 *Unit 4 Assessment #4 & 5* TG pp.25-28	*Unit 4 Assessment #4 & 5* observation and student record sheet (TG U4M3S5 p. T18) *Unit 4 Assessment Scoring Guide #4 & 5* (AG Bridges Unit Assessments pp. 41, 43-44)	Focus CTC around conceptual understandings of the big idea and strategies used: • adding combinations within 10 on the number line (counting on) with flexibility, accuracy, efficiency and appropriateness • subtracting combinations within 10 on the number line (counting back) with flexibility, accuracy, efficiency and appropriateness • visualizing and using number structure (the number line) • visualizing and using quantities and number combinations

Learning Cycle Assessments (summative)	*Number Corner Checkup 1 #1, 2, 3* NC TG Vol. 1 October Assessment pp. 49-51, T10; AG Number Corner Assessments pp. 11, 14	Use *Number Corner Checkup 1 Scoring Guide* AG Number Corner Assessments p. 14

Standards listed in **bold** indicate a focus of the lesson.

NVACS (Content and Practices)	Mathematical Development of the Big Idea	Instructional Clarifications & Considerations
Module 1- Session 1: The Life-Sized Number Line		
1.NBT.1 MP.2 MP.4	Access Prior Learning: • Kindergarten students utilized the closed and open number line in both *Number Corner* and *Problems and Investigations*. • Kindergarten students worked with the count sequence and comparing numbers. Developing the Big Idea and key Strategic Behaviors: • understanding the number structure • exploring addition and subtraction • using the relationship between addition and subtraction Securing the Big Idea and key Strategic Behaviors: • counting on • counting back	Guiding Question: • Where does a number line start? Instructional Notes: • The number line is a critical tool in 1st grade for understanding and visualization of number structure. Consider creating a more permanent option for a number line by affixing a retractable clothesline to a location at child's eye level. Tips and ideas are provided on the Bridges Educator Site. • The digital tool for the number line may be useful throughout this unit. Found here. • Read the About This Session in the margin (p. 4). • As students are coming to understand the structure of our number system, resist the urge to provide too much support (for example, calling them up by numerical order) instead of letting them discover and problem solve. • Watch for students' thinking that zero has to be all the way to the left on the line, that the amount of space between numbers must be exactly equal, and that cards cannot be moved to change the scale. • Discuss the term "scale" to help children understand that the amount of space needed between numbers can change based on the two endpoints (or the measure). • Consider purposely placing the cards in the wrong order on the number line to extend students problem solving. Enrichment: • See Step 9 (p. 6). Child Watching: • Identify students struggling with counting, identifying numerals, or determining the order and cardinality of numbers. Provide intensification work with a range of numbers appropriate to their instructional level.
Module 1- Session 2: What's in the Box?		
1.OA.6 1.OA.8 MP.2 MP.4	Access Prior Learning: • Kindergarten students utilized the closed and open number line in both *Number Corner* and *Problems and Investigations*. • Kindergarten students worked with the count sequence and comparing numbers. Developing the Big Idea and key Strategic Behaviors: • understanding the number structure • understanding part/whole relationships • solving for an unknown	Guiding Questions: • What do you know about numbers? • How can a number line help you determine missing numbers? Instructional Notes: • Read the *About This Session* in the margin (p. 8). • Students may struggle with the concept of finding a number "in the middle" if the number line does not start at zero. For example: if a number line shows 10 and 20 with a box in the middle, students must understand that "half" or "in the middle" is not based on the 20 alone, but on the midway point between the two identified numbers. This misconception can be a great classroom discussion. Enrichment: • See Step 7 (p. 11). Child Watching: • Identify students struggling with counting, identifying numerals, or determining the order and cardinality of numbers. Provide appropriate numbers for intensification work. • Identify students having trouble justifying their reasoning and provide extra support.

Module 1- Session 3: Hopping Along the Number Line to Ten

1.OA.1 1.OA.5 1.OA.6 MP.2 MP.4	Access Prior Learning: • Kindergarten students utilized the closed and open number line in both *Number Corner* and *Problems and Investigations.* • Kindergarten students worked with the count sequence and comparing numbers with both discreet and interval counting. • Connect to previous sessions' number line work. Developing the Big Idea and key Strategic Behaviors: • understanding the number structure • exploring addition and subtraction • using the relationship between addition and subtraction Securing the Big Idea and key Strategic Behaviors: • counting on • counting back	Guiding Question: • What different things can you do on our number line math tool? Instructional Notes: • A misconception on the number line might be counting the lines (ticks) or numbers rather than counting the spaces or intervals between the ticks. Confirm understanding of the difference between interval counting and discreet counting of objects. • For students who struggle to understand interval counting, consider having them actually hop along a life size number line. Enrichment: • Consider challenging some students by increasing the number quantities in the stories and adjusting the number line accordingly. Child Watching: • Identify students who mistakenly count the starting number instead of the first hop, which will result in the answer being off by one number.

Module 1- Session 4: Introducing Work Place 4A The Frog Jump Game

1.OA.1 1.OA.5 1.OA.6 MP.2 MP.4	Access Prior Learning: • Kindergarten students utilized the closed and open number line in both *Number Corner* and *Problems and Investigations.* • Kindergarten students worked with the count sequence and comparing numbers with both discreet and interval counting. • Connect to previous sessions' number line work. Developing the Big Idea and key Strategic Behaviors: • using the relationship between addition and subtraction • comparing quantities • counting all Securing the Big Idea and key Strategic Behaviors: • counting on • counting back	Guiding Question: • What math stories can you show on a number line? Instructional Notes: • Online digital tools with the add and subtract spinner and cards are available on the *Bridges Educator* site. • See the *Work Place Sentence Frames* for Unit 4 here. • Arranging the cards to model a subtraction equation is an important part of this session. Consider focusing the conversation around what makes sense. • After students have acted out problems concretely on the life size number line, consider moving into the representational phase by drawing a number line on the board and having students model thinking on it. Enrichment: • See the *Game Variations on Work Place Instructions* (p. T4). Child Watching: • Identify which students are counting by 1s and which students are counting on. You will want this information for tomorrow's lesson. • Identify students being confused about directions on the number line for addition and subtraction. • Identify students struggling to identify a story with an addition or subtraction operation. Use *Work Place Guide* for suggestions to support (p. T2).

Module 1- Session 5: Add & Subtract on the Number Line

1.OA.5 1.OA.6 MP.4 MP.5	Access Prior Learning: • Kindergarten students utilized the closed and open number line in both *Number Corner* and *Problems and Investigations.* • Kindergarten students worked with the count sequence and comparing numbers with both discreet and interval counting. • Connect to previous sessions number line work.	Guiding Question: • What different ways can you solve problems on a number line? Instructional Notes: • Read the *Math Practices in Action* in the margin (p. 22). • Observe students using the strategies of counting-by-1s and counting-on. Have one students share a counting all strategy, and name the strategy. Then strategically choose another student to share the counting-on strategy, and name that strategy. Discuss with students which is more efficient and why. • Pay close attention to the recommendation in Step 9 (pp. 23-24). *-continues on next page-*

	Developing the Big Idea and key Strategic Behaviors: • using relationship between addition and subtraction • comparing quantities • using combinations to 10 Securing the Big Idea and key Strategic Behaviors: • counting on • counting back	Enrichment: • Ask students to try more than one strategy on each problem. Child Watching: • Identify and document which strategies students are using (for example - counting all, counting on, and counting back).
Module 2- Session 1: The Number Line to 120		
1.NBT.1 1.NBT.5 1.MP.2 1.MP.8	Access Prior Learning: • Kindergarten students utilized the closed and open number line in both *Number Corner* and *Problems and Investigations.* • Connect to previous sessions number line work to 10, and then to 20. Developing the Big Idea and key Strategic Behaviors: • understanding number relationships to 120 • understanding the count sequence to 120 • determining an unknown number • using multiples of 5 and 10	Guiding Questions: • What patterns do you see on the number line? • How can you use the patterns to identify different numbers on the number line? Instructional Notes: • Read the *About This Session* in the margin (p. 4). • Highlight the relationship between 5 and 50 and 10 and 100 and their placement on the number line. • As stated in the K-5 Progression on Number and Operations in Base Ten, "The number words continue to require attention at first grade because of their irregularities. The decade words "twenty, thirty, forty" must be understood as indicating 2 tens, 3 tens etc. Many decade number words sound much like teen number words. For example, "fourteen" and "forty" sound very similar" (pp. 6-7). • When providing opportunities for students to find the "half way point" students need many opportunities to experience using the anchor of 5 (for example: halfway between 20 and 30 which would be 25). Enrichment: • See Step 6 (p. 6). Child Watching: • Identify students struggling with these scenarios with higher numbers. Provide experiences with instructionally appropriate number quantities if need be, and then make the explicit connection and relationship between 5 and 50 etc.
Module 2- Session 2: Find the Value		
1.NBT.1 1.NBT.5 1.MP.2 1.MP.8	Access Prior Learning: • Kindergarten students utilized the closed and open number line in both *Number Corner* and *Problems and Investigations.* • Connect to previous sessions' number line work to 10, and then to 20. Developing the Big Idea and key Strategic Behaviors: • understanding number relationships to 120 • understanding number count sequence to 120 • determining an unknown number	Guiding Question: • How does the placement of a card on the number line determine the value of the card? Enrichment: • See *Support* and *Challenge* in Step 6 (p. 11). Child Watching: • For students who may be struggling with these scenarios, encourage use of tools to support their understandings.
Module 2- Session 3: Hopping Along the Number Line to One Hundred		
1.NBT.1 1.NBT.4 1.NBT.6 1.MP.7 1.MP.8	Access Prior Learning: • Connect to previous sessions' number line work to 10, and then to 20. Developing the Big Idea and key Strategic Behaviors: • understanding number relationships to 120 • making sense of story problems	Guiding Question: • Do you always count the same way (by 1s) when hopping on the number line? Instructional Notes: • Read the *Math Practices in Action* in the margin (p. 16). • Make the explicit connection and relationship between 5 and 50 etc. Enrichment: • Extend number quantities past 120. • Have students record the equations. *-continues on next page-*

	• counting forward and backward • adding and subtracting with multiples of 10 • recording equations	Child Watching: • Identify students struggling with counting by tens, or struggling to determine which direction to move on the number line. Have students act out the problem if needed. • Watch for the misconception of counting the first number (discreet vs. interval counting).
Module 2 Session 4: Introducing Work Place 4B Super Frogs		
1.NBT.1 1.NBT.2c 1.NBT.4 1.NBT.6 1.MP.2 1.MP.7	Access Prior Learning: • Connect to previous sessions' number line work to 10, and then to 20. Developing the Big Idea and key Strategic Behaviors: • understanding number relationships to 120 • counting forward and backward by multiples of 10 • writing addition and subtraction expressions	Guiding Question: • How can you compare expressions on a number line? Instructional Note: • See the digital tools for this *Work Place* on the Bridges Educator Site. Enrichment: • *Work Place Game Variations* (p. T3). Child Watching: • Identify students struggling with counting by 10s, or struggling to determine which direction to move on the number line. Have students act out the problem if needed. • Watch for the misconception of counting the first number (discreet vs. interval counting).
Module 2- Session 5: Add & Subtract on the Number Line to One Hundred		
1.NBT.2c 1.NBT.4 1.NBT.6 MP.2 MP.7	Access Prior Learning: • Connect to previous sessions' number line work to 10, and then to 20. Developing the Big Idea and key Strategic Behaviors: • understanding number relationships to 120 • adding and subtracting by 10s • counting on • counting back	Guiding Question: • How do you show your thinking on a number line? Instructional Notes: • See the online Digital Display materials on the Bridges Educator Site. All student work pages are also available on this site. • The *Assessment Binder* under the *Bridges Unit Assessment* tab provides the scoring guide for this checkpoint (p. 39). Child Watching: • Use the scoring guide for assessing students and informing your instruction. Watch for students struggling to count forward and particularly backward by 1s.
Module 3- Session 1: Lily Pads		
1.NBT.1 1.NBT.2c 1.NBT.5 MP.2 MP.7	Access Prior Learning: • Connect to previous sessions of number line work focusing on number system structure. Developing the Big Idea and key Strategic Behaviors: • understanding the number structure - decades • comparing "how many more" • counting on • counting back	Guiding Questions: • How does the structure of the number line help you to solve problems? • How do you move on the number line to show addition and subtraction? Instructional Notes: • Several of the recommended questions suggest counting how many leaps. Ensure that when students are communicating about the number of leaps in this scenario, each leap represents 10, not 1. Pair the language "three leaps" with "3 leaps equal 30 inches" continuously. • Note that although the term "inches" is used here to represent the amount of space between each lily pad, inches as a unit of measure are not a first grade, but 2nd grade, standard. Focus on the intended mathematical understanding of counting forwards and backward by 10s, and using the inches for creating a setting for the story line. • See the digital tools for *Frog Path 4C Work Place* on the Educator Site. Enrichment: • *See the Work Place Game Variations* (p. T9). Child Watching: • Identify students struggling to determine whether they move forward or backward on the number line. • Identify students struggling with counting by 10s. • Watch for the misconception of counting the first number (discreet vs. interval counting).
Module 3- Session 2: Chase the Fly		
1.NBT.1 1.NBT.2c 1.NBT.3 1.NBT.5 MP.2 MP.7	Access Prior Learning: • Connect to previous sessions of number line work focusing on number system structure. Developing the Big Idea and key Strategic Behaviors: • understanding number structure to 100	Guiding Question: • What do you already know about skip counting using 5s or 10s? Instructional Notes: • You can use the digital number line rather than drawing your own. Use the tools on the bottom of the number line to change the count to 5s. You can also adjust the spacing of the number ticks as well. • Read the *Math Practices in Action* in the margin (p. 11). • Utilize accountable talk and classroom discourse throughout the discussions. *-continues on next page-*

	• counting by 5s and 10s • comparing "how many more" • counting up • counting back	• Step 3 asks you to have students come up and place their number card on the line. The power of this task comes from random ordering. Refrain from the "who has 0? Who has 5? Who has 10?" method of placement. Instead, use the phrasing, "Johnny says he has 10. Where on the line do you think it should be placed?" Enrichment: • See Step 13 (p. 13). Child Watching: • Identify students struggling to determine 10 less or 10 more. • Students may struggle connecting the chart to the number line. Have a child point to the chart simultaneously while another points to the number line.
Module 3- Session 3: Frog Races		
1.OA.5 1.NBT.4 1.NBT.5 MP.7 MP.8	Access Prior Learning: • Connect to previous sessions of number line work focusing on number system structure. • The previous sessions focused on counting forward and backward by 5 & 10 consistently on a decade number. Developing the Big Idea and key Strategic Behaviors: • understanding number structure to 100 • counting by 1s, 5s, and 10s on and off the decade • counting up • counting back	Guiding Question: • How does skip counting change when you start at various numbers? Instructional Notes: • Read the *Math Practices in Action* in the margin (p. 16). • This lesson addresses counting by 10s off the decade (34, 44, 54). • See this game from the Bridges Educator site to support counting by groups. • You can use the digital number line rather than drawing your own. Use the tools on the bottom of the number line to change the count to 10s. • Provide students many opportunities to work with closed and open number lines to develop understanding of counting off the decades. The number line provides support for a stronger mathematical trajectory as opposed to the hundreds grid. The linear model of the number line provides students the opportunity to use the model flexibly to support thinking strategies. A hundreds grid can actually limit strategies, and create a more "procedures" based approach by "just moving down one." This can prevent students from developing flexible understanding of the relationships between numbers. Enrichment: • Extend the counting sequence beyond 120. Child Watching: • Identify students struggling to determine 10 less or 10 more on and off the decade.
Module 3- Session 4: Hit the Pad		
1.NBT.4 1.NBT.5 1.NBT.6 MP.2 MP.7	Access Prior Learning: • Connect to previous sessions of number line work focusing on number system structure. • Previous sessions focused on counting forward and backward by 5 & 10 consistently on a decade number. Developing the Big Idea and key Strategic Behaviors: • understanding number structure to 100 • counting by 1s, 5s, and 10s on and off the decade • counting up • counting back	Guiding Question: • Does skip counting change when you go forward or backward? Instructional Notes: • See the online Digital Display materials https://bridges.mathlearningcenter.org/digital-materials/session-4-hit-pad • Read the *About This Session* in the margin (p. 22). Enrichment: • This game is very challenging and students may need multiple times playing it with the teacher. Child Watching: • Identify students struggling with determining 10 less or 10 more on and off the decade. • Identify students struggling to determine whether they move forward or backward on the number line. • Identify students struggling with counting by 10s. • Identify students counting the numbers rather than the spaces resulting in an inaccurate answer.
Module 3- Session 5: Unit 4 Assessment		
1.NBT.4 1.NBT.5 1.NBT.6 MP.2 MP.7	Access Prior Learning: • Connect to previous sessions of number line work focusing on number system structure. • Previous sessions focused on counting forward and backward by1s, 5s, & 10 consistently on and off the decade.	Instructional Notes: • The *Assessment Guide* under the *Bridges Unit Assessments* tab provides the scoring guide for the *Unit 4 Assessment* (p. 43). • See the digital tools for this *Work Place* on the Educator Site. *-continues on next page-*

	Developing the Big Idea and key Strategic Behaviors: • understanding number structure to 100 • counting by 1s, 5s, and 10s on and off the decade • counting up • counting back	Child Watching: • Provide extra support for students struggling with one or more of the following (see *Assessment Binder, Bridges Unit Assessment* tab, p. 35 for more information): counting to 100 by 10s; counting backward from various numbers between 1-100; counting to 120 starting from any number less than 120; counting on and counting back to solve addition and subtraction combinations to 20; understanding that 10 can be thought of as a bundle of 10 ones; and understanding that the numbers from 11 to 19 are composed of a ten and 1-9 ones.
Module 4- Session 1: Going to Antarctica		
1.NBT.1 1.NBT.3 1.MD.2 1.MD.4 MP.5 MP.6	Access Prior Learning: • Kindergarten students worked with describing and comparing measurable attributes of objects such as length and weight. • Kindergarten students also directly compared two objects with a measurable attribute in common to see which object had "more of"/" less of" the attribute and described the difference. Developing the Big Idea and key Strategic Behaviors: • understanding the relationships between numbers • ordering numbers • measuring height	Guiding Questions: • What do you notice about a measuring strip? • How is it similar to a number line? Instructional Notes: • Inches and feet are part of the story context for this session. The focus, however, is using the number lines vertically as a measuring tool. • It is valuable to provide the time for students to construct their own measuring strips. The act of constructing this tool will aide in the development of understanding about measuring tools, how they work, and how iterated unit lengths are connected together. It also presents opportunities to observe for misconceptions around measurement. Some common misconceptions include leaving gaps between units, overlapping units, and using units that are not of equal size. Students learn the importance of attending to precision through experience. If a student's constructed measuring strip has many overlaps in the gluing, allow this to be discovered by having two students measure the same student using their two different tools. When they arrive at different answers, they can question why that might be. • Consider making a measuring strip (prior either to the session or by cutting and putting together with class input) that can be taped to a wall area and used as a common measure for all students. This class measuring can be done while students are building their own measuring strips. • A blog titled A Penguin Proposal provided on the Educator Site contains ideas to enrich this module. Child Watching: • Identify students who leave gaps, glue with overlaps, or cut off too much paper creating a shorter length of unit when they are creating their measuring strips. • Identify students who do not make the connection between their string and their measuring strip.
Module 4- Session 2: Rockhopper Penguins		
1.NBT.1 1.NBT.2c 1.NBT.3 1.NBT.4 1.NBT.6 1.MD.2 MP.5 MP.6	Access Prior Learning: • Kindergarten students worked with describing and comparing measurable attributes of objects such as length and weight. • Kindergarten students also directly compared two objects with a measurable attribute in common to see which object had "more of"/" less of" the attribute and described the difference. Developing the Big Idea and key Strategic Behaviors: • measuring height • comparing measurements (greater than and less than)	Guiding Question: • How does gathering and organizing information help you? Instructional Notes: • Use the students' strings from the previous session to create the "Rockhopper" string length. • Utilize the instructional note for the previous session. • The Rockhopper Penguin poem can also be found on the Educator Site. • The act of creating a length of string to compare measurement length is an action that supports the idea of transitivity, which is developed throughout the year. (See K-6 Progression on Measurement and Data (Measurement Part, p. 3). • The use of strings allows students to understand length as a straight line between two points. This addresses misconception of measuring around an object, which results in an inaccurate length measurement. • Consider making a life-sized cutout of the penguin for this session (and all the penguins in the following sessions also) from black butcher paper. This give the students a visual representation for the height of the penguin if needed. Enrichment: • Students can explore measuring other objects. Child Watching: • Identify students not keeping the length of string straight and students not lining the beginning of their string up with the beginning of their measuring tool. These actions lead to inaccurate measurements and measurement misconceptions. Highlight the misconception by having two students compare their length of strings and discover they are not the same and revisit their measuring strategies to flesh out the misconception.

Module 4- Session 3: King Penguins		
1.OA.8 1.NBT.1 1.NBT.2c 1.NBT.3 1.NBT.4 1.NBT.6 1.MD.2 MP.5 MP.6	Access Prior Learning: • Connect to understanding developed in the previous sessions. Developing the Big Idea and key Strategic Behaviors: • measuring height • comparing measurements (greater than and less than)	Guiding Question: • How does gathering and organizing information help you? Instructional Note: • See Session 1 and Session 2 Instructional Notes. Enrichment: • See Step 5 in the lesson (p. 16). Child Watching: • Identify students not keeping the length of string straight and students not lining the beginning of their string up with the beginning of their measuring tool. These actions lead to inaccurate measurements and measurement misconceptions. Highlight the misconception by having two students compare their length of strings and discover they are not the same and revisit their measuring strategies to flesh out the misconception.
Module 4- Session 4: Comparing Rockhopper & King Penguins		
1.OA.1 1.OA.8 1.NBT.1 1.NBT.2c 1.NBT.3 1.NBT.4 1.MD.2 MP.1 MP.5	Access Prior Learning: • Connect to understanding developed in the previous sessions. Developing the Big Idea and key Strategic Behaviors: • determining difference • understanding part/whole relationships • counting up • counting back	Guiding Question: • What can you find out by comparing measurements? Instructional Notes: • Comparison and difference unknown problems are some of the most difficult problem types 1st graders will encounter. See page 88 in the NVACS for this chart. • See Step 4 for suggestions if students struggle with understanding what the problem is asking (p. 21). • Encourage students to access multiple tools, such as unifix cubes and number lines, to support their thinking and reasoning. Some students will want to construct 18 and 36, match up the towers, snap off the difference and count them. If students using cubes attempt to match their measurement with the measuring strip they will find that the cubes are not each an inch in length, resulting in 18 cubes being less than 18 inches. • Various strategies may be used: counting up by 1s from 18 to 36, counting by 1s to 20 then hopping from 20 to 30, counting by 10s from 18 to 28 then by 1s from 28 to 36, counting off the decade (18, 28, 38) then hopping back 2 to compensate. • Resist associating counting by 1s as a negative strategy, as it remains an appropriate strategy when numbers are close together (ex: 18 to 20). Engage in conversations about when it is an efficient and appropriate strategy. • Consider permanently posting the penguins' strings next to the labeled measuring strip. This will support students who need a concrete model, allowing them to connect the concrete string to the abstract label on the measuring strip, and support further direct comparisons. Enrichment: • See Step 8 (p. 22). Child Watching: • Students still counting by 1s should be encouraged to move to a more efficient strategy. • During student sharing, strategically order student justifications from the lowest sophistication to the highest sophistication in order to highlight this progression. This give all students an entry point into the problem solving and challenges all students to try a different strategy than they are using.
Module 4- Session 5: Me & the Penguins		
1.OA.1 1.OA.8 1.NBT.1 1.NBT.3 1.NBT.4 1.MD.1 1.MD.2 MP.1 MP.5	Access Prior Learning: • Connect to understanding developed in the previous sessions. Developing the Big Idea and key Strategic Behaviors: • determining difference • understanding part/whole relationships • counting up • counting back • ordering three numbers • writing inequality statements	Guiding Question: • What do you find out when you compare three different things? Instructional Notes: • Read the *About This Session* in the margin (p. 26). • Seriation, ordering a set on objects by length (MD.1), is explored in this lesson. "Such sequencing requires multiple comparisons. Initially, students find it difficult to seriate a large set of objects that differ only slightly in length" (K-6 Progression on Measurement and Data (Measurement Part, p. 6). • Transitivity (if a is longer than b, and b is longer than c, then a must be longer than c also) is a big idea for students in 1st grade and may require class discussion for understanding. *-continues on next page-*

		Enrichment: • See Step 2 (p. 26). • See Step 10 (p. 28). • Transition routines offer opportunities for providing students with continuous experiences comparing heights (for example, excusing students to line up based on how their height compares to a chosen student's height). Child Watching: • Continue to observe student strategies for comparing lengths as noted in the previous session.

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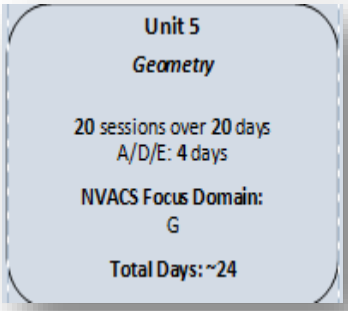
First Grade Unit 5: Geometry



Big Conceptual Idea: K-6 Progression on Measurement and Data (Measurement Part) (pp. 1-4, 8-11), K-5 Progression on Geometry (pp. 1-5, 8-9)

Read the Bridges Unit Overview/Introduction for Unit 5 pp. i-vi. Also, read each Module Overview for the current week's sessions, and the current Session Summary along with details for the teaching of each session as you work through Unit 5. These Introduction/Overview/Summary sections provide focus, clarity, vocabulary, definitions, and examples for the "big mathematical ideas and understandings" critical to 1st Grade. This information will support your professional decision-making within the Sessions and Modules as needed.

Mathematical Background: Read Bridges Unit 5 Overview pages (pp. i-xi)	Essential Questions for teacher consideration: What experiences and discussions will I provide to support students' understanding of identifying, describing, constructing, drawing, comparing, composing, and sorting two- and three-dimensional shapes? Using pattern blocks, Polydrons, shape-sorting cards, and paper shapes how will I support understandings of components and properties of geometric shapes, composing and decomposing such shapes, and spatial structuring and spatial relations?

1st Grade Curriculum Pacing Framework: Balanced Calendar

Instructional note:

> "If you learn something deeply, the synaptic activity will create lasting connections in your brain, forming structural pathways, but if you visit an idea only once or in a superficial way, the synaptic connections can "wash away" like pathways made in the sand." (Boaler, 2016, p. 1)

The big idea for *Unit 5* is deepening students' understandings of the attributes of two-dimensional and three-dimensional shapes, and beginning reasoning about the relationships of shapes to one another and parts of shapes to the whole. Descriptions of the Van Hiele levels of sophistication for geometric thinking are included in the *Bridges Unit 5 Introduction* (pp. 2-3). Students advance through the levels of geometric understanding as they have experiences and explore with shapes. For most of elementary school instruction students are involved with recognizing shapes, discussing shapes in terms of geometric properties, making comparisons between shapes, and beginning to reason about shapes based on their attributes. "All teachers should be aware that the experiences they provide are the single most important factor in moving children up this developmental ladder" (Van de Walle, Karp, Lovin, & Bay-Williams, 2014, p.304).

Distinction between defining and non-defining properties for two-dimensional and three-dimensional shapes are a major instructional target for 1st grade. Teachers utilize tasks or activities involving shapes to clarify the geometric terms or vocabulary students use, and continue to introduce new and more precise understanding of geometric content. Encourage students to use terminology such as edges, faces, surfaces, vertices, etc. (see definitions below), as they talk and write about their experiences with shapes. These terms are not expected to be mastered by students, but used to exposure students to precise academic terminology, thus supporting development of academic vocabulary and geometric concepts including shape attributes and properties.

Seeing relationships is a focus throughout all mathematics instruction. Developing the big idea of part-whole relationships occurred throughout the previous units. Geometry continues to support this idea of "building understanding of part-whole relationships as well as the properties of the original and composite shapes. Note that the process of combining shapes to create a composite shape is much like combining 10 ones to make 1 ten" (K-6 Progression on Geometry, 2013, p. 8). "Geometry instruction in grades pre-K-2 helps children learn more about the world they live in while also playing a significant role in supporting the development of number concepts" (Van de Walle et al., 2014, p. 299). Geometry instruction also develops "…the background for measurement and for initial understandings of properties such as congruence and symmetry" (NVACS, 2010, p. 13). Clements and Sarama state "…spatial sense can be defined as an intuition about shapes and the relationships between shapes and is considered a core area of mathematical study in the early grades" (as cited in Van de Walle et al., 2013, p. 299). For this reason, *NVACS* also identifies geometrical reasoning as one of the four critical content areas in mathematics for first grade and includes three important goals for elementary geometry: 1) geometric shapes, components, and properties; 2) composing and decomposing shapes; and 3) spatial relations and spatial structuring. These foci also include the idea, "Shapes can be moved in a plane in space without changing the shape's properties, and these movements can be described in terms of translations (slides), reflections (flips) and rotations (turns)" (Van de Walle et al., 2014, p. 299).

Support and instruct to the developmental understanding of:

> **Circle**- a two-dimensional (flat) shape made by drawing a curve that is always the same distance from a point called the center.

Triangle- a two-dimensional (flat) shape with 3 sides.
Rectangle- a two-dimensional (flat) shape with 2 pairs of parallel sides (4 sides total) and 4 right angles.
Square- a two-dimensional (flat) shape with 4 congruent sides and 4 right angles.
Hexagon- a two-dimensional (flat) shape with 6 sides.
Trapezoid- a two-dimensional (flat) shape with 4 sides, exactly 1 pair of which are parallel.
Rhombus-a two-dimensional (flat) shape with 4 congruent sides.
Cube- a three-dimensional shape (solid) whose 6 faces are all squares.
Cone- a three-dimensional shape (solid) with a circular or elliptical base and a curved surface that tapers to the vertex.
Sphere- a three-dimensional shape (solid) constructed so that every point of the surface is the same distance from a point called the center.
Cylinder- a three-dimensional shape (solid) with one curved surface and two congruent flat ends that are circular or elliptical.
Vertex/corner– the point at which the sides of a polygon, or the edges of a polyhedron meet.
Edge– (1) Any side of a polyhedron's faces. (2) A line segment or curve where two surfaces of a geometric solid meet. (e.g. The edge is the circular portion or circumference of the base of a cone).
Face– a flat surface on a 3-dimensional figure. Some special faces are called bases. More generally, any 2-dimensional surface on a 3-dimensional figure.
Surface– the boundary of a 3-dimensional object. The part of an object that is next to the air. Common surfaces include the top of a body of water, the outermost part of a ball, and the topmost layer of ground that covers the earth.
Pyramid– a polyhedron made up of any polygonal region for a base, a vertex (apex) not in the plane of the base, and all of the line segments with one endpoint at the apex and the other on an edge of the base. All faces, except perhaps the base, are triangular. Pyramids get their name from the shape of their base.
Rectangular prism– a prism with rectangular bases. The four faces that are not bases are either rectangles or parallelograms. For example, a brick models a rectangular prism in which all sides are rectangles.
Triangular prism– a prism whose bases are triangles.

Students explore 2-dimensional and 3-dimensional shapes and fractions (partitioning shapes into equal parts – halves and fourths and able to talk about the whole in relationship to the parts and the parts in relationship to the whole). Over time, with supportive and scaffolded instruction and interactions, students come to more precise understandings of shapes, as well as develop appropriate precision with geometric content and vocabulary. Consider the following possible misconceptions throughout the Unit:

- A trapezoid is always red (trapezoids in pattern blocks are red).
- Triangles are always equilateral (triangles in pattern blocks and on many pre-made posters are often equilateral).
- Size and orientation change the shape (triangles must be oriented with the horizontal base parallel to the bottom of the page; students consider a triangle with a horizontal base parallel to the top of the page as "upside down").
- A rhombus can be called a diamond (a diamond is not a shape, but a gemstone).
- Pattern blocks or attribute blocks are 2-D shapes (pattern blocks have thickness and are precisely 3-D; 2-D shapes can be constructed by tracing the footprint or outline of the pattern block resulting in the 2-D shape).

Consider using shapes of various colors, sizes, and orientations so students focus on defining attributes and characteristics rather than non-defining attributes.

Students also engaged in geometric activities in the October and December *Number Corner* activities. These prior experiences support students' continued work with geometry understandings during this *Unit.* Further experiences will also be continued in February *Number Corner*.

On-going enrichment:
Continue noting the *Skills Across the Grade Level* chart in the Introduction section (Unit 5 p. ix). All geometry standards for first grade are expected to be secure at the end of this *Unit*. This is important information for those day-to-day professional instructional decisions you have to make within each session as to what discussions or activities to extend or cut short or emphasize or skip or, etc. Expect all students to engage in the math.

Continue to consider "Support" and "Challenge" options within each *Session*, and "Game Variations", "Differentiate", and "English-Language Learners" ideas in *Work Places*.

Essential Academic Vocabulary Use these words consistently during instruction.	
New Academic Vocabulary: (first time explicitly taught) *indicates Word Resource Cards are available in the Bridges materials	Review Academic Vocabulary: (Vocabulary from Number Corner or previous units)
Side* Net Fraction*	*Attribute** *Add** *Addition* *Circle** *Compare** *Cone** *Cube** *Cylinder** *Edge** *Equal*/the same as* *Equation** *Face** *Flat* *Fourth** *Half** *Hexagon** *Parallel Lines* *Pyramid** *Quarter (one fourth)* *Rectangle** *Rectangular prism** *Rhombus** *Rotate/Turn* *Solid* *Sphere** *Square** *Tally* *Third** *Trapezoid** *Triangle** *Triangular prism** *Two-Dimensional shape (2-D)** *Three-Dimensional shape (3-D)** *Vertex or Corner*

Additional terminology that students might need support with: actual, actually, curved, identify, information, problem solving, strategies, plus, predict, prediction, slide (move over)

*Collaborative Team Conversations (CTC)

Consider using *one* of the following as part of the formative assessment process at the lesson level to **collect student work** to analyze for <u>evidence of mathematical understanding</u>:

Guiding question:
"What language are students using to identify, describe, and justify their understandings of 2-D and 3-D shapes (names, defining attributes)?"
"How are students able to compare and decompose shape compositions to identify shapes that are not included?"
"How are students partitioning shapes into smaller portions?"
"How are students composing smaller shapes to make a new shape?"
"If needed, what intensification interactions will support the understanding geometry vocabulary, concepts and/or spatial reasoning skills?"

Lesson	Evidence	Look for
U5M2S5 *Shapes Checkpoint* TG pp. 22-24	*Shapes Checkpoint* observation and student record sheet (TG U5M2S5 p. T6-T7) *Shapes Checkpoint Scoring Guide* (AG Bridges Unit Assessments pp. 49-51)	Focus CTC around conceptual understandings of the big idea and strategies used: • understanding and using precise names of 2-D and 3-D shapes (see Essential Academic Vocabulary table above) • understanding and using precise and defining attributes of 2-D and 3-D shapes (see Essential Academic Vocabulary table above) • comparing and visually recognizing differences groups of shapes
U5M3S5 *Unit 5 Assessment, Part 1 & Part 2 #5, 6, 7, 8* TG. pp. 27-29, 33-34	*Unit 5 Assessment, Part 1 & Part 2 #5, 6, 7, 8* observations and student record sheet (TG U5M3S5 p. T12-T13) *Unit 5 Assessment, Part 1 & Part 2 #5, 6, 7, 8 Scoring Guide #5, 6, 7, 8* (AG Bridges Unit Assessments pp. 54-55, 57)	Focus CTC around conceptual understandings of the big idea and strategies used: • using precision and accuracy in identifying attributes • identifying fourths and halves • understanding the size of parts gets smaller with more parts • composing a shape with smaller shapes • using a variety of shapes in different placements

Learning Cycle Assessments (summative)	*No other assessment at this time*	

Standards listed in **bold** indicate a focus of the lesson.

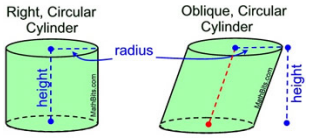
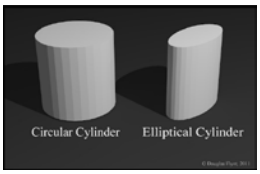
NVACS (Content and Practices)	Mathematical Development of the Big Idea	Instructional Clarifications & Considerations
Module 1- Session 1: What's in the Box?		
1.MD.4 1.G.1 MP.1 MP.7	Access Prior Learning: • Kindergarten student worked on correctly naming shapes regardless of their orientations or overall size. Securing the Big Idea and key Strategic Behaviors: • identifying 2-D shapes • analyzing and describing 2-D shapes by defining and non-defining attributes	Guiding Questions: • What are shapes? • How can you organize shapes? • How can you describe shapes? Instructional Notes: • Consider sending the *Family Letter* home. Find it here. • Consider starting a KWL chart to pre-assess the misconceptions that students might have about shapes. Do not correct these misconceptions at this time but use this chart to inform classroom discussions and discoveries throughout the unit. • The pattern block web app can be useful throughout this unit. • Although the teacher's guide appears to have "scripted" responses, the sessions are not intended to be taught as a scripted lesson. The suggested conversations are to showcase how student misconceptions about shapes might be dealt with through student discourse. They are also a guide of how to respond to student misconceptions while protecting the class culture of inquiry-based learning and risk taking. • This lesson addresses two student misconceptions: size and color, which are non-defining attributes. • Pay particular attention to the note on page 6 in regards to rectangles and squares. Child Watching: • Identify students who think that a shape's color or size is a defining attribute. Address this through questioning and classroom discourse techniques.
Module 1- Session 2: Shape Sorting with Attribute Cards		
1.MD.4 1.G.1 MP.4 MP.7	Access Prior Learning: • Kindergarten student worked on correctly naming shapes regardless of their orientations or overall size. • Connect to previous geometry discussions. Securing the Big Idea and key Strategic Behaviors: • identifying 2-D shapes • analyzing and sorting 2-D shapes by defining and non-defining attributes	Guiding Questions: • What are shapes? • How can you organize shapes? • How can you describe shapes? Instructional Notes: • Some students might believe triangles need to be equilateral or have a horizontal base parallel to the bottom of the page. Expose students to a variety of triangles, such as isosceles and scalene triangles, and in various orientations. Students do not need to know the terms isosceles and scalene. • This lesson adds geometry vocabulary to describe shapes by straight and curved sides and closed shapes with no holes or gaps. • Allow misconceptions to present themselves for rich classroom discussion. Making a statement like "color doesn't matter" before students have a chance to discuss their thoughts can limit discussion and student growth. Discovery through experience and classroom discussion fosters growth, as opposed to direct explanation. "Students with a growth mindset have more positive brain activity when they make mistakes, with more brain regions lighting up and more attention to and correcting of errors." (Moser et al., 2011, pp. 1484-1489). Enrichment: • See *Extension* in the margin (p. 16). Child Watching: • Observe for the following misconceptions about shapes: color, size, orientation, leaving gaps or curved edges on drawings, only equilateral triangles are triangles.
Module 1- Session 3: Last Shape in Wins		
1.G.1 1.G.2 MP.1 MP.7	Access Prior Learning: • Kindergarten student worked on correctly naming shapes regardless of their orientations or overall size. • Connect to previous geometry discussions.	Guiding Question: • How can you make shapes from other shapes? Instructional Notes: • The online digital *Work Place* game: Last Shape In Wins is provided on the Educator Site. • See the *Work Place Sentence Frames* for Unit 5 here. • These sessions contain critical geometry vocabulary. Utilize, post and review the Vocabulary Resource Cards. • Read the Math Practices in Action in the margin (p. 22). • Students may discover that some of the pattern block shapes take up more area than others which supports understanding of composing or decomposing shapes. *-continues on next page-*

	Securing the Big Idea and key Strategic Behaviors: • identifying 2-D shapes • analyzing 2D shapes • composing new shapes using 2-D shapes	Enrichment: • See the *Game Variations* on *Work Place Instructions* (p. T5). Child Watching: • Identify students unsure of the names of the shapes or having difficulty telling them apart (see p. T4 for support).
Module 1- Session 4: Pattern Block Puzzles: How Many Ways?		
1.G.1 1.G.2 MP.7	Access Prior Learning: • Kindergarten student worked on correctly naming shapes regardless of their orientations or overall size. • Connect to previous geometry discussions. Securing the Big Idea and key Strategic Behaviors: • identifying 2-D shapes • analyzing 2D shapes • composing new shapes using 2-D shapes	Guiding Question: • How can you make shapes from other shapes? Instructional Notes: • The online digital Work Place game: Pattern Block Puzzles is provided on the Educator Site. • The idea of 3 triangles fitting into a trapezoid shape begins building the idea of parts and wholes. Enrichment: • See the *Assessment and Differentiation Chart* on *Work Place Guide* (p. T6). Child Watching: • Identify students unsure of the names of the shapes or having difficulty telling them apart (See p. T6 for support).
Module 1- Session 5: There's a Shape in My Pocket		
1.G.1 1.G.2 MP.1 MP.7	Access Prior Learning: • Kindergarten student worked on correctly naming shapes regardless of their orientations or overall size. • Connect to previous geometry discussions. Securing the Big Idea and key Strategic Behaviors: • identifying 2-D shapes • analyzing and sorting 2-D shapes by defining and non-defining attributes	Guiding Question: • How do attributes help you identify and sort shapes? Instructional Notes: • Address the misconception that a rhombus is a diamond by reinforcing that a diamond is a type of rock and not a shape. • A square is both a rhombus and a rectangle. • Every rhombus is a kite, however, not every kite is a rhombus. A rhombus is an equilateral with all four sides equal in length. A kite has two pairs of adjacent side equal in length, but not equal to each other. Enrichment: • See the *Extension* activity in margin (p. 38). Child Watching: • Observe how students are describing shapes. Are they beginning to use vocabulary such as sides and vertices? Are they beginning to gain confidence in naming shapes?
Module 2- Session 1: Shape Detectives		
1.G.1 MP.7	Access Prior Learning: • Kindergarten students described 2-D and 3-D objects in the environment using names of shapes regardless of size or orientation. • Connect to all previous geometry discussions. Securing the Big Idea and key Strategic Behaviors: • identifying 3-D shapes • analyzing 3-D shapes by defining and non-defining attributes • locating 3-D shapes in the environment	Guiding Question: • Where do you find 3-D shapes? Instructional Notes: • Read the *About This Session* in the margin (p. 4). • A two-dimensional shape is the line segments which form the shape lying in a plane. When you cut out a shape from paper, mathematically that shape then has depth and is three-dimensional. Consider for this lesson just drawing a circle (or rectangle) on a piece of paper as opposed to actually cutting it out. • In early development students may confuse many actual three-dimensional shapes with narrow depth as "flat" or two-dimensional. Bridges actually uses pattern blocks in Kindergarten as 2-dimensional shapes. To clarify, if you trace around these shapes the "footprint" that results will actually be the two-dimensional shape. • Conversation around the image of the three dimensional shape on the card might need to occur. Show how the artist tries to represent all the sides in the image but address the fact that an artist cannot show all the sides at one time on the paper, just as your eyes cannot see all sides of the solid cube at one time either, but the sides are still there. Also, the artist shows a sphere as 3-dimensional by drawing or shading a shadow to show depth. Enrichment: • See the *Extension* activity in margin (p. 6). Child Watching: • Are students beginning to use more precise vocabulary and gaining confidence with shapes?

Module 2- Session 2: Mystery Bag Sorting

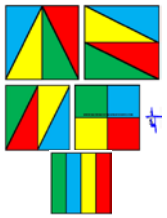
1.G.1 1.MD.4 MP.7 MP.8	Access Prior Learning: • Kindergarten students identified and described shapes by attributes. • Connect to all previous geometry discussions. Securing the Big Idea and key Strategic Behaviors: • identifying 3-D shapes • analyzing 3-D shapes by defining and non-defining attributes • locating 3-D shapes in the environment	Guiding Questions: • What do you see that is the same or different? • What attributes do you already know about? Instructional Notes: • Read the *Math Practices in Action* in the margin (p. 9). • Encourage the use of accurate and precise geometry vocabulary. • Consistently expose students to precise vocabulary by repeating what students might say with precise language. Enrichment: • See the *Extension* activity in margin (p. 10). Child Watching: • Identify students using accurate vocabulary to describe the shape attributes.

Module 2- Session 3: Shape Walk

1.G.1 1.MD.4 MP.7 MP.8	Access Prior Learning: • Kindergarten students described 2-D and 3-D objects in the environment using names of shapes regardless of size or orientation. • Connect to all previous geometry discussions. Securing the Big Idea and key Strategic Behaviors: • identifying 3-D shapes • analyzing 3-D shapes by defining and non-defining attributes	Guiding Questions: • What 3-D shapes do you see around you? • What do you notice that is the same or different?  Instructional Notes: • Model precise mathematical language for students to hear. Students, however, are not expected to use formal names such as "right circular cylinder." • Students are likely to generalize shapes in the real world which could result in misconceptions. For example, they might select a water bottle as a cylinder. Mathematically a plastic water bottle with hourglass curved face and/or ridges is not truly a cylinder. Use students' generalizations as an opportunity to discuss the precise attributes by posing a question such as, "What attributes does this water bottle have that make you say it is a cylinder?" Honor student thinking and discovery, while pointing out the attributes (such as the lip on the lid, or the ridges) that make it a non-example.  • Place 3-dimensional solids next to the object for comparison. There are many types of water bottles in a school setting. Some of them will be true (right circular) cylinders and some may not be. See pictures.  • A *straw is another non-example of a cylinder because it does not have bases*. Other non-examples of right circular cylinders include soda cans and some containers of canned food. • The standard states: 1.G.2- Compose 2-D or 3-D shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) (NVACS, 2010). There are other types of cylinders and cones. It is not necessary to name them or have students identify them. It is only necessary for them to distinguish the attributes that make a true right-circular cylinder and identify when a solid is a non-example.  • Non-examples for right circular cones include: traffic cones (it has a lip), ice cream cones (it has no base), party hat (it has no base), and teepee (no base and not a culturally responsive example). • Validate students reasoning of approximate objects but provide accurate and precise language and concepts within the discussion. Spend time addressing why a shape doesn't meet the criteria. Perhaps the Shape Walk becomes more of a "Finding the Rare Shape Hunt" and a celebration occurs if an accurate example is found. Enrichment: • See the *Extension* activity in margin (p. 13). Child Watching: • Identify students using imprecise vocabulary to describe the shape attributes and extend precise vocabulary when appropriate. • Identify students finding non-examples of the solids help them discover the different attributes that make it a non-example.

Module 2- Session 4: Cube Studies		
1.G.1 1.G.2 MP.4 MP.7	Access Prior Learning: • Kindergarten students composed simple 2-D shapes to form larger shapes. • Connect to all previous geometry discussions. Securing the Big Idea and key Strategic Behaviors: • identifying 3-D shapes • analyzing 3-D shapes by defining and non-defining attributes • constructing 3-D shapes	Guiding Question: • What does a cube look like and feel like? Instructional Notes: • Consider including an orange pattern block in this session. Although an orange pattern block is actually a rectangular prism, it has two square faces and can be easily confused with a cube. Capitalize on the opportunity to discuss the differences. • A unifix cube is a non-example of a cube due to the protruding affixation feature and the open face. Enrichment: • *Work Place Guide Assessment & Differentiation* chart (p. T1). Child Watching: • Identify students using imprecise vocabulary to describe the shape attributes and extend precise vocabulary when appropriate.
Module 2- Session 5: Four Triangles & One Square		
1.G.1 1.G.2 MP.4 MP.7	Access Prior Learning: • Kindergarten students composed simple 2-D shapes to form larger shapes. • Connect to all previous geometry sessions. Securing the Big Idea and key Strategic Behaviors: • identifying 3-D shapes • analyzing 3-D shapes by defining and non-defining attributes • constructing 3-D shapes	Guiding Question: • How do you make a 3-D shape? Instructional Notes: • Although students will be building pyramids with 4 triangles and a square, pyramids can be made with other shapes as the base. • Polydrons are mathematically not 3-D shapes themselves. Support students with any confusions with this use of materials. • The *Assessment Binder* under the *Bridges Unit Assessment* tab provides the scoring guide for this checkpoint (p. 51). • Read the *Math Practices in Action* in the margin (p. 26). • Kindergarten students had limited exposure to pyramids, so this content will be new information. Enrichment: • See the *Extension* activity in margin (p. 26). Child Watching: • Use the scoring guide to assess students and inform your instruction.
Module 3- Session 1: Nine-Patch Inventions		
1.OA.6 1.G.1 1.G.2 MP.2 MP.7	Access Prior Learning: • Activate prior knowledge about quilts, by perhaps bringing in an example, or showing images. Developing the Big Idea and key Strategic Behaviors: • composing a new pattern from shapes • understanding part/whole relationship • writing equations	Guiding Questions: • How can a grid represent an equation? • How many equations do you think you can make from the same grid colored differently? Instructional Notes: • Make a deliberate connection to part/whole relationships with addition and subtraction equations and the idea that shapes can also be composed of parts that can make a whole shape when put together, or when decomposed can be parts of a whole shape. This supports the part/part/whole reasoning students are developing. • There are various suggested literature connections listed on p. 4 that can be read to the class to build background knowledge of quilting. Child Watching: • Identify students making connections to the parts and wholes (e.g. 3 and 6 both parts of 9).
Module 3- Session 2: Nine-Patch Mini-Quilts		
1.G.2 MP.6 MP.7	Access Prior Learning: • Activate prior knowledge about quilts, perhaps bring in an example, or show images. Developing the Big Idea and key Strategic Behaviors: • composing a new pattern from shapes • using and making sense of structure	Guiding Questions: • How many different patterns do you think we can make with our quilt squares? • What happens when you change the pattern around? Instructional Notes: • Read the *About This Session* in the margin (p. 8). • Emphasize Math Practice 7 in this lesson and support students in looking for and making use of structure. • "As students combine shapes, they continue to develop their sophistication in describing geometric attributes and properties and determine how shapes are alike and different, building foundations for measurement and initial understandings of properties such as congruence and symmetry" (K-5 Progression on Geometry, pp. 8-9). Child Watching: • Identity students experimenting with and seeing results of combined shapes.

Module 3- Session 3: Sandwich Fractions

1.G.1 1.G.3 MP.6 MP.7	Access Prior Learning: • Kindergarten students were not exposed to fractional parts, only the idea of composing shapes with smaller shapes. Securing the Big Idea and key Strategic Behaviors: • partitioning shapes into smaller equal fractional pieces – halves and fourths • understanding part/whole relationship	Guiding Questions: • What do you know about sharing? • Do you ever have to share? Instructional Notes: • Read the *Math Practices in Action* in the margin (p. 15). • "…students learn to intentionally compose and decompose plane and solid figures building an understanding of part-whole relationships as well as the properties of the original and composite shapes" (K-5 Progression on Geometry, p. 8). • Precision is important when thinking about parts having to be exactly the same. • In 2nd grade students will explore that halves do not need to be the same shape to represent the same area. Halves shaped like triangles and halves shaped like rectangles are both still the same amount if the whole is the same. • Research suggests "…starting work with fractions using words and not symbols…This approach of using words rather than symbols emphasizes that *one half* or *one fourth* is one number. This is an important foundation for ensuring that subsequent work in fractions is well grounded" (Small, 2014, p. 8). Therefore, when labeling and naming fractions, use the word labels (one-fourth, one half) and do not introduce the symbol (1/4 or 1/2). It is not necessary at this time for students to understand fraction notation. "Fraction symbolism represents a fairly complex convention that can be misleading to children. That is why it is important in grades pre-K-2 to use fraction words and postpone introducing fraction symbolism. Let children first focus on making sense of fractions without the complication of also trying to make sense of the symbolism" (Van de Walle et al., 2014, p. 256). • A common misconception occurs when attempting to help students make sense of fractions by teaching them to think of one fourth as 1 "out of" 4. This creates the idea that 1 and 4 are two separate numbers and that there are 4 wholes, when a fraction represents parts of a one whole. The standards state, "…describe the shares using the words halves, fourths, and quarters, and use the phrases half of, fourth of, and quarter of. Describe the whole as two of, or four of the shares" (NVACS, 2010, 1.G.3). The term "shares" reinforces the idea that it is a piece of a whole. • Even though the materials suggest labeling the parts with ½ or ¼, consider labeling these with just the words one-half or one-fourth, not the symbols. Reinforce the idea of fractions as numbers by counting them using the language one-fourth, two-fourths, three-fourths, four-fourths. Enrichment: • Ask students to find as many ways as they can to represent fourths. There are several ways students can do this beyond the typical squares and triangles. Consider the possibilities of mixing these ideas as well; perhaps one side is cut into bars, and the other side is cut into squares. This online game, Thirteen Ways of Looking at a Half would be a great tool to enrich as suggested by the Bridges educator site.  Child Watching: • Identify students' struggling with precision resulting in sizes that are not equal.

Module 3- Session 4: Paper Pizzas

1.G.1 1.G.3 MP.4 MP.7	Access Prior Learning: • Kindergarten students were not exposed to fractional parts, only the idea of composing shapes with smaller shapes. Securing the Big Idea and key Strategic Behaviors: • partitioning shapes into smaller equal fractional pieces – halves and fourths • understanding part/whole relationship	Guiding Question: • How can you equally share a pizza? Instructional Notes: • See the notes above about fraction labeling. Even though the materials suggest labeling the parts with ½ or ¼, consider labeling these with the words "one-half" or "one-fourth," not the symbols. • Reinforce the idea of fractions as numbers by counting them using the language one-fourth, two-fourths, three-fourths, four-fourths. • Encourage students to attend to precision as they cut. • Pieces of pizza are not triangles due to the curved edge. If this comes up, consider showing students a triangle shape and compare it with the slice of pizza to highlight the differences. Reinforce "one-fourth" as the label you have given the piece, a one-fourth slice. Enrichment: • See Step 12 (p. 20). Child Watching: • Observe for students' use of precise language.

Module 3- Session 5: Fraction Bingo		
1.G.3 MP.2 MP.7	Access Prior Learning: • Kindergarten students were not exposed to fractional parts, only the idea of composing shapes with smaller shapes. Securing the Big Idea and key Strategic Behaviors: • partitioning shapes into smaller equal fractional pieces – halves and fourths • understanding part/whole relationship	Guiding Question: • What patterns do you notice? Instructional Note: • The fraction bingo cards do have the symbol (½, etc.) written on the cards. This is appropriate for student exposure, however, consider adding the fraction words (*one-half* or *halves, etc.)* to support the standard expectation. Enrichment: • See the *Extensions* in the margin (p. 24). Child Watching: • Identify students' use of precise language. Are they counting fractional parts with the terms one-half, two-halves? • Observe for understanding of the "whole." You can assess this by frequently asking, "What is the whole?"
Module 3- Session 6 & 7: Unit 5 Assessment, Part 1 & Part 2 (spread over 2 days)		
1.G.1 1.G.2 1.G.3 MP.1 MP.2 MP.7	Access Prior Learning: • Kindergarten students were not exposed to fractional parts, only the idea of composing shapes with smaller shapes. Securing the Big Idea and key Strategic Behaviors: • identifying 2 and 3-D shapes • composing and decomposing shapes • partitioning shapes into smaller equal fractional pieces – halves and fourths • understanding part/whole relationship	Instructional Notes: • The *Assessment Guide* under the *Bridges Unit Assessmentst* tab provides the scoring guide for *Unit 5 Assessment* (p. 56). • The *Grade 1 Assessment Map* in the *Assessment Binder* under the Overview tab (pp. 13-15) identifies the Geometry Standards targeted for mastery (secure understandings). If students are still struggling, consider using the next module as time to provide intensification, and support. *April Number Corner* will also revisit these standards. Child Watching: • Use the Scoring Guide to inform your instruction. If any students are not secure, consider pulling for small group support throughout the next week.
Module 4- Session 1: Shape Riddles		
1.G.1 MP.1 MP.7	Access Prior Learning: • The previous sessions have provided students with many shape experiences that they will draw upon during this lesson. Securing the Big Idea and key Strategic Behaviors: • identifying 2-D shapes • analyzing 2-D shapes by defining attributes	Guiding Questions: • What do you know about these shapes? • How are they the same and different? • What does eliminate mean? Instructional Note: • The online digital resource for this work place, Shape Riddles is provided on the Educator Site. Enrichment: • See *Assessment & Differentiation Chart* on the *Work Place Guide* (p. T3). Child Watching: • Observe for the language students use when discussing shapes. Begin thinking about which students are in Van Hiele Level 0 and describing shapes as "boxes" or "icicles." Observe which students are in Van Hiele Level 1 and are using the language of geometry, describing shapes by their attributes. • Observe student reasoning and deduction skills as they eliminate shapes that don't fit the clue. • Identify students who are confused with the language and possibly eliminate triangles when the prompt is "My shape has 3 straight sides."
Module 4- Session 2: Shape Sorting & Graphing		
1.G.1 1.MD.4 MP.1 MP.7	Access Prior Learning: • The previous sessions provided students with many shape experiences that they will draw upon during this lesson. • Students engaged in sorting and graphing in the previous unit with their height measurements.	Guiding Question: • How many different ways can you sort shapes? Instructional Notes: • Read the *Math Practices in Action* in the margin (p. 9). • Consider asking students to do an open sort of their shapes before using the Shape Sorting & Graphing Record Sheet which limits their sorting to only 2 categories. Enrichment: • *See Work Place Game Variations* (p. T8). *-continues on next page-*

	Securing the Big Idea and key Strategic Behaviors: • analyzing and sorting shapes by defining attributes • analyzing graphs and data	Child Watching: • Observe for the language students use when discussing shapes. Begin thinking about which students are in Van Hiele Level 0 and describing shapes as "boxes" or "icicles." Observe which students are in Van Hiele Level 1 and are using the language of geometry, describing shapes by their attributes. • Observe student reasoning and deduction skills as they label the columns and generate sorting categories.
Module 4- Session 3: More Shape Riddles		
1.G.1 MP.1 MP.7	Access Prior Learning: • The previous sessions provided students with many shape experiences that they will draw upon during this lesson. • Connect to Session 1. Securing the Big Idea and key Strategic Behaviors: • analyzing 2-D shapes by defining attributes • sorting shapes by defining attributes	Guiding Questions: • What do you know about these shapes? • How are they the same and different? • What does eliminate mean? Enrichment: • Encourage students to create their own riddles for others. Child Watching: • Observe the language students use when discussing shapes. Begin thinking about which students are in Van Hiele Level 0 and describing shapes as "boxes" or "icicles." Observe which students are in Van Hiele Level 1 and are using the language of geometry, describing shapes by their attributes. • Observe student reasoning and deduction skills as they eliminate shapes that don't fit the clue.

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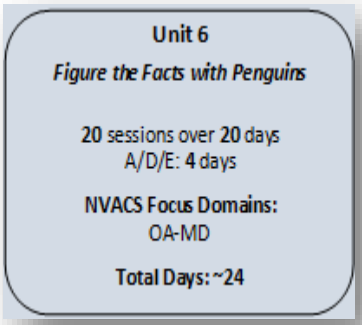
First Grade Unit 6: Figure the Facts with Penguins



1st Grade Curriculum Pacing Framework: Balanced Calendar

Big Conceptual Idea: K-5 Progression on Counting and Cardinality and Operations and Algebraic Thinking (pp. 1-7, 12-17), K-5 Progression on Number and Operations in Base Ten (pp. 1-4, 6-7), K-6 Progression on Measurement and Data (Measurement Part) (pp. 1-4, 8-11)

Read the Bridges Unit Overview/Introduction for Unit 6 pp. i-vi. Also, read each Module Overview for the current week's sessions, and the current Session Summary along with details for the teaching of each session as you work through Unit 6. These Introduction/Overview/Summary sections provide focus, clarity, vocabulary, definitions, and examples for the "big mathematical ideas and understandings" critical to 1st Grade. This information will support your professional decision-making within the Sessions and Modules as needed.

Mathematical Background: Read Bridges Unit 6 Overview pages (pp. i-vi)	Essential Questions for teacher consideration: How will I support students' development of addition and subtraction to fluency with facts from 0-10 and to flexibly with use of robust strategies for problem solving facts to 20? How will I support students' broader and deeper understandings of operations so they can see and use the relationship between addition and subtraction within a given context to solve a problem? How will I extend this problem solving to writing equations with unknowns in any position, encouraging the use of context to determine and confirm the problem?

Instructional note:

> "If you learn something deeply, the synaptic activity will create lasting connections in your brain, forming structural pathways, but if you visit an idea only once or in a superficial way, the synaptic connections can "wash away" like pathways made in the sand." (Boaler, 2016, p. 1)

The big mathematical idea for Unit 6 picks up where Unit 4 left off in OA and NBT Standards using the Number Rack and Double-Flap Dot Cards. The work continues to support fluency development (flexibly, efficiency, accuracy, and appropriateness) by extending reasoning strategies used with numbers within 10 to solve basic number combinations within 20. Students develop a broader understanding of addition and subtraction operations by applying strategies to word problems of all types. They use the number rack as a tool to make sense of problems that involve unknowns in all positions. Understanding of numbers and the relationship between the operations of addition and subtraction support the big idea of part-part-whole relationships.

Table 1: Addition and subtraction situations

	Result Unknown	Change Unknown	Start Unknown
Add To	A bunnies sat on the grass. B more bunnies hopped there. How many bunnies are on the grass now? $A + B = \square$	A bunnies were sitting on the grass. Some more bunnies hopped there. Then there were C bunnies. How many bunnies hopped over to the first A bunnies? $A + \square = C$	Some bunnies were sitting on the grass. B more bunnies hopped there. Then there were C bunnies. How many bunnies were on the grass before? $\square + B = C$
Take From	C apples were on the table. I ate B apples. How many apples are on the table now? $C - B = \square$	C apples were on the table. I ate some apples. Then there were A apples. How many apples did I eat? $C - \square = A$	Some apples were on the table. I ate B apples. Then there were A apples. How many apples were on the table before? $\square - B = A$
	Total Unknown	**Both Addends Unknown[1]**	**Addend Unknown[2]**
Put Together /Take Apart	A red apples and B green apples are on the table. How many apples are on the table? $A + B = \square$	Grandma has C flowers. How many can she put in her red vase and how many in her blue vase? $C = \square + \square$	C apples are on the table. A are red and the rest are green. How many apples are green? $A + \square = C$ $C - A = \square$
	Difference Unknown	**Bigger Unknown**	**Smaller Unknown**
Compare	*"How many more?" version.* Lucy has A apples. Julie has C apples. How many more apples does Julie have than Lucy? *"How many fewer?" version.* Lucy has A apples. Julie has C apples. How many fewer apples does Lucy have than Julie? $A + \square = C$ $C - A = \square$	*"More" version suggests operation.* Julie has B more apples than Lucy. Lucy has A apples. How many apples does Julie have? *"Fewer" version suggests wrong operation.* Lucy has B fewer apples than Julie. Lucy has A apples. How many apples does Julie have? $A + B = \square$	*"Fewer" version suggests operation.* Lucy has B fewer apples than Julie. Julie has C apples. How many apples does Lucy have? *"More" suggests wrong operation.* Julie has B more apples than Lucy. Julie has C apples. How many apples does Lucy have? $C - B = \square$ $\square + B = C$

In *Table 1. Common addition and subtraction situations* of the *Nevada Academic Content Standards* (NVACS), twelve different problem types appropriate for first grade development are defined (2010, p.88). "This classification of problem types is based on years of research on how children think about addition and subtraction" (Carpenter, Fennema, Loef Franke, Levi, & Empson, 2015, p. 13). Note that the "add to result unknown" in top left box of the table is the most accessible problem type for students as they can directly model the action in the problem. The problem types in the table increase in complexity from left to right and from top to bottom, intentionally designed to support student's early learning. "In each grade, the situations, representations, and methods are calibrated to be coherent and to foster growth from one grade to the next." (Progressions for the Common Core State Standards in Mathematics - K, Counting and Cardinality; K-5, Operations and Algebraic Thinking p. 6 - Table 1, above. The same document showing this coherent progression for addition and subtraction by grade level is found in Table 2: Addition and subtraction

situations by grade level, p.9). Working with all problem types, representing all situations with equations, and solving for unknowns in all situations lays foundations for extending arithmetic to negative rational numbers and algebra.

First Grade students extend their understandings into solving addition and subtraction problems within 20, representing and solving for unknowns in any location for all problem types, and moving into compare problem situations. Context is always critical in solving story problems, especially as students engage in compare problems in first grade. Compare problems allow for multiple representations and can be stated as either a "more" or a "less" statement. Within the language of comparison, "…students need experience hearing and saying a separate sentence for each of the two parts in order to comprehend and say the one-sentence form." Comparison problems also require students to conceptualize and construct a representation of a part of the problem situation (the difference) that is not physically present in the problem. "Extensive experience with a variety of contexts is needed to master these linguistic and situational complexities." (Progressions for the Common Core State Standards in Mathematics - K, Counting and Cardinality; K-5, Operations and Algebraic Thinking, p.12). Teachers can easily differentiate all problem types by changing the number quantities within the problems or the problem contexts. Security in the more difficult Compare Problems is not expected until the end of 2nd Grade.

Students use a variety of strategies for solving different problem types - direct modeling the actions and relations in the problem, using a counting strategy, or using a derived number fact. When direct modeling the actions, students physically represent all three quantities in a problem and the action or relationship involving those quantities before counting the resulting set. Using a counting strategy, students will abstract one number, typically by holding a number in their head or conserving it, and work from there. Using a derived fact students use a familiar fact or strategy to help them problem solve an unknown fact. "All of the strategies described come naturally to young children. Children do not have to be taught that a specific strategy goes with a particular type of problem. With opportunity and encouragement, children construct for themselves strategies that model the action or relationship in a problem. Similarly, they do not have to be shown how to count on or be explicitly taught specific Derived Facts. In an environment that encourages children to use procedures that are meaningful to them, they will construct these strategies" (Carpenter et al., 2015, p. 4).

"In all mathematical problem solving what matters is the explanation a student gives to relate a representation to a context, and not the representation separated from its context." (Progressions for the Common Core State Standards in Mathematics - K, Counting and Cardinality; K-5, Operations and Algebraic Thinking, p.13). It is important to watch how students solve problems and explain their thinking using the context of the problem, and not just follow a procedure of identified steps. To promote classroom collaboration and rigor, select students to share their thinking and strategy use in a staircase of complexity model by choosing a student who used *direct modeling* to share first, then select someone who used a *counting strategy* next, then a student who may have used a *derived fact or recall* to share last. This creates an equal opportunity for all students to access the thinking of others. When another student shares a strategy and others on the cusp of that level of thinking are encouraged to attempt that strategy next time, challenge and rigor come into play. Rigorous instruction is happens when students are provided the appropriate scaffolding through discussion and strategy sharing, and allowed multiple entry points for engaging in the problem.

Key-word strategies for problem solving are not recommended. Such strategies are ineffective in dealing with the complexity of problem situations and discourage children from using meaning when thinking about problem solving. In the article, "13 Rules That Expire" (Bush and Dougherty, 2014; click hyperlink to access the complimentary article from NCTM) describes challenges that occur when keywords lead students to "grab" the numbers from the problem, performing a computation without attending to the meaning of the entire problem. The *NVACS* recommends the development of the above thinking strategies and problem solving mindsets rather than the direct teaching of rote methods for problem solving. Fluency using the standard algorithms for addition and subtraction is not expected by the *NVACS* until the end of 4th grade. "Use of the standard algorithms can be viewed as the culmination of a long progression of reasoning about quantities, the base-ten system, and the properties of operations." (Progressions for the Common Core State Standards in Mathematics – K-5, Number and Operations in Base Ten, p.3).

Also incorporated in *Unit 6* is Geometrical Measurement with direct comparisons, indirect comparisons, and ordering objects by length. This includes the understanding of transitivity defined in the *Progressions for the Common Core State Standards in Mathematics – K-6 – Measurement and Data (Measurement Part) (*p. 8), "If A is longer that B and B is longer than C, then A must be longer than C as well." See the *K-6 Progression on Measurement and Data (Measurement Part)* link above for information and clarifications on the use of standard and nonstandard units of measure for emergent learners. "Emphasizing nonstandard units too early may defeat the purpose it is intended to achieve. Early use of many nonstandard units may actually interfere with students' development of basic measurement concepts required to understand the need for standard units. In contrast, using manipulative standard units, or even standard rulers, is less demanding and appears to be a more interesting and meaningful real-world activity for young students.... Instead, students might learn to measure correctly with standard units, and even learn to use rulers, before they can successfully use nonstandard units and understand relationships between different units of measurement" (K-6 Progression on Measurement and Data (Measurement Part) p. 9). Students in this Unit are performing direct comparisons, connecting a number to

length, and comparing the results of direct measurements to indirect measurements. These measurement opportunities develop reasoning and logic and extend to equality and inequality statements.

Throughout the school year, in October and January, *Number Corner* provided other opportunities for students to engage in computation through word problems. These are powerful connections to point out to students during *Unit 6* instruction.

On-going enrichment:
Continue noting the *Skills Across the Grade Level* chart in the Introduction section (Unit 6 p. v). Please note that many OA Standards are expected to be secure by the end of this *Unit* (see table p. v). This is important information for those day-to-day professional instructional decisions you have to make within each session as to what discussions or activities to extend or cut short or emphasize or skip or, etc. Expect all students to engage in the math.

Continue to consider "Support" and "Challenge" options within each *Session*, and "Game Variations", "Differentiate", and "English-Language Learners" ideas in *Work Places*.

Essential Academic Vocabulary Use these words consistently during instruction.			
New Academic Vocabulary: (first time explicitly taught) *indicates Word Resource Cards are available in the Bridges materials	Review Academic Vocabulary: (Vocabulary from Number Corner or previous units)		
Count on*	*Add**	*Double ten-frame*	*More than*
Foot*	*Addition*	*Equal**	*Pattern**
Join	*Add nine fact*	*Equation**	*Separate*
Missing addend	*Add ten fact*	*Even number**	*Shorter than*
Whole*	*Closest to*	*Fact family**	*Story problem*
	Combination	*False*	*Subtract**
	Combine	*Greater than**	*Subtraction*
	*Compare**	*Height**	*Sum or Total**
	*Difference**	*Inch**	*Triangle**
	Double	*Join*	*True*
	Doubles fact	*Less than**	*Ten frame*
	Doubles plus or minus one fact	*Make ten fact*	*Taller than*
		measure	*Unknown Number*

Additional terminology that students might need support with: *chart, strategy, take-away, minus, observation, plus, pair, partner*

*Collaborative Team Conversations (CTC)

Consider using ***one*** of the following as part of the formative assessment process at the lesson level to **collect student work** to analyze for <u>evidence of mathematical understanding</u>:

Guiding question:
"What strategies and tools are students using to solve addition and subtraction problem to 20?"
"What evidence shows understanding and use of landmark numbers such as 5, 10, or some known quantity in problem solving?"
"What evidence is observed to demonstrate fluent understanding of 5 and/or 10?"
"How do students show they are making sense of the problems?"
"If needed, what intensification interactions will support the use of a variety of strategies and tools to support problem solving for combinations to 20?"

Lesson	Evidence	Look for
U6M2S5 *Combinations & Stories Checkpoint* TG p. 32	*Combinations & Stories Checkpoint* observation and student record sheet (TG U6M2S5 pp. T12-T13) *Combinations & Stories Checkpoint Scoring Guide* (AG Bridges Unit Assessments pp. 63-65)	Focus CTC around conceptual understandings of the big idea and strategies used: • using strategies for adding and subtracting within 20 (subitizing, counting strategies, derived facts, known combinations, recall) • using tools for problem solving combinations within 20 (number rack, fingers, number line, manipulatives, frames, drawings, equations, numeric representations) • sense making (joining sets, separating sets, comparing sets, solving for missing parts) *-continues on next page-*

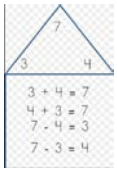
		• working with combination within 10 with flexibility, accuracy, efficiency, and appropriateness
U6M3S5 *U6 Assessment #5* TG pp. 25-29	*U6 Assessment #5* observation and student record sheet (TG U6M3S5 pp. T11-T12) *U6 Assessment #5 Scoring Guide* (AG Bridges Unit Assessments pp. 68-70)	Focus CTC around conceptual understandings of the big idea and strategies used: • sense making (joining sets, separating sets, putting together and taking apart sets, comparing sets, solving for missing parts) • using strategies for adding and subtracting within 20 (subitizing, counting strategies, derived facts, known combinations, recall) • using tools for problem solving combinations within 20 (number rack, fingers, number line, manipulatives, frames, drawings, equations, numeric representations) • working with combination within 10 with flexibility, accuracy, efficiency, and appropriateness

Learning Cycle Assessments (summative)	*U6 Assessment #1, 2, 3, 4* U6M3S5 TG pp. 25-29, T9-T10; AG Bridges Unit Assessments pp. 66-67	Use *U6 Assessment Scoring Guide #1, 2, 3, 4* AG Bridges Unit Assessments p. 70

Standards listed in **bold** indicate a focus of the lesson.

NVACS (Content and Practices)	Mathematical Development of the Big Idea	Instructional Clarifications & Considerations
Module 1- Session 1: Penguins on Ledges		
1.OA.1 1.OA.5 1.OA.6 1.NBT.2 MP.2 MP.7	Access Prior Learning: • Kindergarten students solved addition and subtraction word problems, within 10, by using objects or drawings to represent the problem. • Unit 4 Module 4 set the stage for this work. Developing the Big Idea and key Strategic Behaviors: • understanding part/whole relationships • using 5 and 10 as landmark number • counting on • solving for the unknown – result unknown • writing equations	Guiding Question: • What do you notice about the penguins? • How is a picture the same as an equation? Instructional Notes: • Send home the *Family Letter* found here. • This teacher tool by Visnos, suggested on the Bridges Educator site, animates penguins on icebergs. Use the round sliding toggles at the bottom to select the number of penguins on each iceberg. • Read the *Math Practices in Action* in the margin (p. 5). • These are "add to, result unknown" problem type which are the easiest problem type for students. Students may use various strategies to problem solve these problems such as: **direct modeling** using their number rack - counting out 10 by 1s, then sliding and counting another 2, or starting over from 1 and counting all 12 beads by 1s; **counting strategies** - sliding over 10 beads without counting individual beads and count on saying "11, 12."; or the anchor of 10 as a **landmark number** and easily add 2 mentally. Enrichment: • See Step 10 (p. 6). Child Watching: • Identify students who are direct modeling with cubes or number racks. Challenge students to conserve numbers by holding a number in their head and count on.
Module 1- Session 2: Penguin Huddles & Penguin Pals		
1.OA.1 1.OA.5 1.OA.6 1.OA.7 1.OA.8 1.NBT.2 MP.2 MP.7	Access Prior Learning: • Kindergarten students solved addition and subtraction word problems, within 10, by using objects or drawings to represent the problem. • Unit 4 Module 4 set the stage for this work.	Guiding Questions: • How do you figure out what the story is asking? • How do you figure out which part is missing? • How is a picture the same as an equation? Instructional Notes: • The first problem is an "add to change unknown" problem type, which is more difficult than the previous lesson. • Introduce the new "count on" vocabulary card as well as discuss "missing addend" (no card). Enrichment: • See Step 11 (p. 11). *-continues on next page-*

	Developing the Big Idea and key Strategic Behaviors: • understanding part/whole relationships • making sense of addition story problems within 20 • using 10 as a landmark number • solving for the unknown within 20 – change unknown	Child Watching: • Many students may need to directly model this problem type since it is more difficult. Students using a number rack may count out 10 on the top, and then add by 1s to the bottom until they get to 14. Then students go back and count the four on the bottom they added to find the missing addend. 10 + ___ = 14. • Identify students using the counting on strategy, conserving the first number in their head and counting up until they arrive at the result. • Some students might mentally derive the fact without using manipulatives or counting strategies. • Support students who are directly modeling problems consistently toward trying other more efficient strategies they see modeled by other students.
Module 1- Session 3: Penguin Egg Doubles		
1.OA.6 1.NBT.1 MP.2 MP.7 MP.8	Access Prior Learning: • Kindergarten students represented addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations. • Connect to Session 1 & 2 and experiences counting by 2s. Developing the Big Idea and key Strategic Behaviors: • understanding number structure • using doubles	Guiding Questions: • What patterns do you see? • What do you know about doubles? Instructional Notes: • Read the *Math Practices in Action* in the margin (p. 17). • This lesson will support repeated reasoning abilities and the transition into using doubles as a reasoning strategy for fluency development. Enrichment: • Using two dice will increase the number to double, leading to sums beyond 20. Child Watching: • Watch for students who struggle and encourage the use of just one die.
Module 1- Session 4: Nine Fish, Ten Fish		
1.OA.1 1.OA.6 MP.4 MP.5 MP.7	Access Prior Learning: • Kindergarten students solved addition and subtraction word problems, by using objects or drawings to represent the problem. • Connect to previous sessions. Developing the Big Idea and key Strategic Behaviors: • understanding part/whole relationships • using 10 as a landmark number • using 9 + or - 1	Guiding Question: • How can you use the number rack to model stories and solve problems? Instructional Notes: • See the *Work Place Sentence Frames* for Unit 6 here. • These strategy posters for addition might be useful to support students in using +10 and +9 facts. • Read the *About This Session* in the margin (p. 20). Child Watching: • Identify students who are having difficulty using the add 10 or add 9 strategy while playing Spin to Win Bingo. Use *Work Place Guide* for suggestions to support (p. T8). • Take notes on which students are counting by 1s and which students are counting on to inform tomorrow's lesson.
Module 1- Session 5: Fishing for Subtraction Strategies		
1.OA.1 1.OA.4 1.OA.6 MP.2 MP.5 MP.8	Access Prior Learning: • Kindergarten students solved addition and subtraction word problems, by using objects or drawings to represent the problem. • Connect to previous sessions. Developing the Big Idea and key Strategic Behaviors: • understanding part/whole relationships • making sense of subtraction story problems within 20 – taking from and finding the difference	Guiding Questions: • What do you know about subtraction? • How many strategies do you know to solve story problems? Instructional Notes • Read the *About This Session* in the margin (p. 26). • In step 3, the introductory problem is a "take from, result unknown" problem type. In step 7, a "compare, difference unknown" problem type is posed which is more challenging. "Comparison problems involve comparing two quantities. The third quantity in these problems does not actually exist but is the difference between the two amounts" (Van de Walle et al., 2014, p. 129). "The challenge in comparison problems comes from the fact that two quantities are being described using language that can be complex for children. Fewer, less than, more, bigger, and greater than are the terms typically used to describe the relationships in comparison problems" (Van de Walle et al., 2014, p. 131). • For the "count up" strategy suggested on p. T13 the student makes a set of objects for each quantity, matches and counts up the remaining set, or the student models 9 and counts up (without the larger model) to 12 and determines 12 is 3 more than 9. *-continues on next page-*

		• Step 16, Problem 1 is another "compare, difference unknown" problem type. In this problem type there is no physical action to model or act out. Students must determine the relationship between the quantities and compare the two sets. A common direct modeling strategy is matching objects from one set to the other set until one set finished. The number of unmatched objects indicates how many more are in the larger set. • Relating subtraction problems to a related addition problem supports the understanding of part/whole relationships. Enrichment: • The nature of these problem types is enriching and students can try more than one strategy on each problem. Child Watching: • Identify students struggling with the comparison problem types and scaffold with manipulatives, perhaps using cubes as well as the number rack. • Connect the comparison situation with a story that is more familiar in context than penguins and fish. Sharing cookies with a sibling or friend might be a more relatable context.
Module 2- Session 1: Double-Flap Dot Cards Ten to Twenty		
1.OA.1 1.OA.3 1.OA.4 1.OA.6 1.OA.8 MP.2 MP.7 MP.8	Access Prior Learning: • Kindergarten students solved addition and subtraction word problems, and added and subtracted within 10 by using objects or drawings to represent the problem. • Kindergarten students decomposed numbers less than or equal to 10 into pairs in more than one way. • Connect to the dot cards in Unit 2 Module 2 Session 1. Developing the Big Idea and key Strategic Behaviors: • understanding part/whole relationships • using relationship between addition and subtraction • using combinations within 20 • writing addition and subtraction equations	Guiding Questions: • What patterns do you notice? • What kind of equations can you make with the combinations of dots? Instructional Note: • Consider relating a number "fact family" to their own families being made up of different parts but the total the parts remain the same no matter what configuration they are put in. No other parts can be included.  Enrichment: • Challenge students to create story problems that are more complex, like a change unknown, start unknown, or comparison problem. Child Watching: • Identify students who confuse the subtrahend and the minuend in their subtraction equation, although students do not need to use these terms yet. • Check for understanding of the written equations for both addition and subtraction. Determine if students can explain the parts of the equation - which number represents the total, which represents the parts, and what each symbol means.
Module 2- Session 2: Double-Flap Penguin Picture Cards		
1.OA.1 1.OA.3 1.OA.4 1.OA.6 1.OA.8 MP.2 MP.7 MP.8	Access Prior Learning: • Kindergarten students solved addition and subtraction problems within 10 by using objects or drawings to represent the problem and decomposed numbers less than or equal to 10 into pairs in more than one way. • Connect to the dot cards in Unit 2 Module 2 Session 1. Developing the Big Idea and key Strategic Behaviors: • understanding part/whole relationships • using relationship between addition and subtraction • using combinations within 20 • generating story problems and matching equations	Guiding Question: • How do you know the missing part? Instructional Notes: • Read the About This Session in the margin (p. 12). • Read the Math Practices in Action (p. 15). • Encourage students consider various strategies when thinking about the combinations for the Double-Flap Penguin Picture Cards, such as: doubles plus or minus one facts, add ten facts, or add nine facts. Enrichment: • Challenge students to create story problems that are more complex, like a change unknown, start unknown, or comparison. Child Watching: • Identify students still counting all or counting up from the quantity that is less on the Double-Flap cards. Refer to the addition strategy posters and ask students to identify what type of fact they worked on and model how to use the more efficient strategy to add the quantities.

Module 2- Session 3: Penguins Marching Two by Two		
1.OA.1 1.OA.2 1.OA.6 MP.2 MP.7 MP.8	Access Prior Learning: • Connect to doubles in Module 1 Session 3. Developing the Big Idea and key Strategic Behaviors: • understanding number structure • using doubles	Guiding Questions: • What do you know about doubles? • How can you change a double so it is not a double any longer? Instructional Notes: • Read the *About This Session* in the margin (p. 18). • Keep the focus of this session on the idea of doubles + 1 or - 1. The understanding of "even and odd" is a 2nd grade standard. "Near doubles are also called the "Doubles Plus One" or "Doubles Minus One" facts and include all combinations in which one addend is one more or one less that the other. This strategy uses a known fact to derive an unknown fact. Double the smaller number and add 1 or double the largest number and subtract 1. Be sure children solidly know the doubles before you focus on this strategy" (Van de Walle et al., 2014, p. 163). • If students do not know doubles, encourage them to use whatever strategies they know to solve the problems. "The reality is there is no one "best" strategy for any fact. For example, 7+8 could be solved using Up Over 10 or near-doubles. The more you emphasize choice, the more children will be able to find strategies that work for them, which will lead to fluency" (Van de Walle et al., 2014, p. 165). Up and Over 10 strategy refers to children using a known facts that equal 10 and then adding the rest of the number onto 10 (for example, 6+8, student recognizes 8+2 is 10, then add on the remaining 4). (Van de Walle et al., 2014, p. 161). Enrichment: • Challenge students to solve the problems using multiple strategies. Child Watching: • Identify students who have difficulty solving double facts and support with using other strategies while noting they need extra time to work on doubles in a meaningful way. Children often discover the pattern of doubles and the mathematical idea that when a number is doubled it is joining two equal groups. These doubles become anchors for other facts. The goal is that students will later use doubles to derive other facts.
Module 2- Session 4: Addition Facts Flash		
1.OA.6 1.NBT.2b 1.MP.2 1.MP.4 1.MP.7	Access Prior Learning: • Kindergarten students solved addition and subtraction problems within 10 by using objects or drawings to represent the problem. • Kindergarten students decomposed numbers less than or equal to 10 into pairs in more than one way. • Connect to all previous class strategies. Developing the Big Idea and key Strategic Behaviors: • understanding part/whole relationships • using strategies for problem solving – doubles, doubles +1 or -1, make 10, add 10, add 9 • operating with fluency	Guiding Questions: • How does knowing your doubles help you to solve problems quickly? • How many strategies do you know to help you solve problems? Instructional Notes: • Read the *About This Session* in the margin (p. 24). • Create time for students to discuss the selection and use of accurate, efficient, flexible and appropriate strategies for any given context or set of numbers. Enrichment: • See the *Work Place Game Variations* (p. T9). Child Watching: • Identify students struggling to choose appropriate and efficient strategies for specific problems. • Identify students still functioning with counting strategies instead of using derived facts.
Module 2- Session 5: Pick Two to Make Twenty		
1.OA.1 1.OA.6 MP.1 MP.2 MP.3	Access Prior Learning: • Kindergarten students decomposed numbers less than or equal to 10 into pairs in more than one way. • Connect to previous sessions that have developed strategies for computation.	Guiding Question: • How many ways do you know to make 20? Instructional Notes: • Read the *About This Session* in the margin (p. 30). • Read the *Math Practices in Action* in the margin (p. 31). • The assessment binder under the *Bridges Unit Assessment* tab provides the scoring guide for this checkpoint (p. 65). *-continues on next page-*

	Developing the Big Idea and key Strategic Behaviors: • understanding part/whole relationships • using combinations to 20 • finding the difference to 20	Child Watching: • Identify students struggling to select two numbers that will be closest to 20. Adjust for a target to 10 if needed. • Observe student strategy selection for combining numbers. • Use the *Scoring Guide* (p. 65) to assess students and inform your instruction.
Module 3- Session 1: Penguin Problems: Joining		
1.OA.1 1.OA.2 1.OA.6 1.OA.8 MP.1 MP.3 MP.7	Access Prior Learning: • Kindergarten students worked predominantly with "add to, result unknown," "take from, result unknown," "put together/take apart, total unknown," and "put together/take apart, addend unknown" problem types. • Connect to Unit 3 work on commutativity and associativity. Developing the Big Idea and key Strategic Behaviors: • understanding part/whole relationships • solving addition story problems within 20 • solving for unknowns in all positions • writing equations • using addition strategies – doubles, doubles +1 or -1, add 10s, add 9s • understanding the commutative and associative properties for addition	Guiding Question: • What is adding all about? Instructional Notes: • A *Common addition and subtraction situations* table can be located in the NVACS, 2010, p.88. • Students may be using various strategies for problem solving: direct modeling by drawing or counting out 9 & 5; counting strategy by not representing the 9 or 5 at all, but just counting up; or using a derived fact by thinking 9 is close to 10+5=15, so it is one less than 15. Consider allowing student to solve the problem however they would like, observe the strategy used, then draw from the strategies seen around the room to have students model their strategies, including the derived fact strategy using the number rack which is suggested in the materials. • If needed, consider changing the numbers for any of the problems and continue working with the problem types until students show understanding. • The third problem offered is an "add to, start unknown" problem type which is not a standard expectation for 1st grade. Use this problem for exposure or challenge only. Enrichment: • See Step 11 or change the numbers in the problem and provide another opportunity (p. 7). Child Watching: • Identify student strategies being used. • Identify students applying the commutative and associative properties.
Module 3- Session 2: Penguin Problems: Separating		
1.OA.1 1.OA.4 1.OA.6 1.OA.8 MP.1 MP.3 MP.7	Access Prior Learning: • Kindergarten students worked predominantly with "add to, result unknown," "take from, result unknown," "put together/take apart, total unknown," and "put together/take apart, addend unknown" problem types. Developing the Big Idea and key Strategic Behaviors: • understanding part/whole relationships • solving subtraction story problems within 20 • solving for unknowns in all positions • writing equations	Guiding Questions: • What do you know about taking things away from a group? • Where do you do it your everyday life? Instructional Notes: • A *Common addition and subtraction situations* table can be located in the NVACS, 2010, p.88. • Students may be using various strategies for problem solving: direct modeling by drawing or counting out 12, removing 3, and then counting the 9 remaining; a counting strategy by not representing the 12 at all, but just counting back 11, 10, 9, or similarly counting up from 9; or a derived fact by thinking 12- 2 is 10, and one less is 9. Again, consider allowing student to solve the problem whichever way they would like, observe the strategy used, then draw from the strategies seen around the room to have students model their strategies, including the derived fact strategy using the number rack which is suggested in the materials. If many students struggle with the first problem, consider changing the numbers and engage students in another "take from, result unknown" problem. • The third problem offered is a "take from, start unknown" problem type, which is not a standard expectation for 1st grade. Use this problem for exposure or challenge only. • Be cautious about trying to turn strategies into a procedure by coaching "when you see this box empty you just need to add, even though there is a subtraction sign." Allowing students to solve problems in their own way and listening to each other's strategies will result in more success for this hard work of making sense of the problem and understanding the operations. Enrichment: • If students can solve problems easily by recalling facts, challenge them by changing the numbers in the problem. Also, see Step 11 (p. 13). The rigor of the start unknown problem types is built into the standards. *-continues on next page-*

		Child Watching: • Observe for student strategies. Are students direct modeling? Are students using a counting strategy? Are students using a derived fact? Select students to share in that order.
Module 3- Session 3: Counting Penguin Feathers		
1.OA.1 1.OA.6 1.OA.7 1.OA.8 MP.1 MP.2 MP.3	Access Prior Learning: • Kindergarten students worked predominantly with "add to, result unknown," "take from, result unknown," "put together/take apart, total unknown," and "put together/take apart, addend unknown" problem types. Developing the Big Idea and key Strategic Behaviors: • understanding part/whole relationships • solving put together/take apart story problems within 20 - • solving for unknown total and addend • writing equations	Guiding Questions: • What do we know about putting things together and taking thing apart? • How many different ways can you find to take apart a group of things or put a group of thing together? • Where do you use both in your everyday life? Instructional Notes: • Read *About this Session* in the margin, (p. 16). • A *Common addition and subtraction situations* table can be located in the NVACS, 2010, p.88. • Consider just posing the chart, setting the stage for the work, and sending students off to come up with as many combinations as they can, rather than keeping them in a whole group. Reconvene and share out your selected group's strategy. • In making the combinations, students who are direct modeling might need to use black and white cubes and manipulate them to create their combinations. Some students will not care what color the cubes are. Other students might be able to see the patterns in the chart. If we start with 1+9, then switch one over to the other color it will be 2+8, then 3+7. Do not force students to see this, yet be looking for students who might be discovering this repeated reasoning. Choose these students to share as the last share of the day. Enrichment: • See Step 12 (p. 18). Child Watching: • Observe for student strategies. Are students direct modeling? Are students using a counting strategy? Are students using a derived fact? Select students to share in that order.
Module 3- Session 4: Comparing Penguins		
1.OA.1 1.OA.6 1.OA.8 MP.1 MP.2 MP.3	Access Prior Learning: • Kindergarten students worked predominantly with "add to, result unknown," "take from, result unknown," "put together/take apart, total unknown," and "put together/take apart, addend unknown" problem types. Developing the Big Idea and key Strategic Behaviors: • understanding part/whole relationships • solving compare story problems within 20 - • solving for unknown differences • writing equations	Guiding Questions: • What are some things that you compare? • How do you compare something with something else? Instructional Notes: • A *Common addition and subtraction situations* table can be located in the NVACS, 2010, p.88. • Compare problems are difficult to directly model, so they are difficult problems for younger learners Students cannot rely on the words alone in the problem to guide them. They have to use internal knowledge to know they must compare, and they must understand what compare means. Enrichment: • Consider posing the problem and having students work through it in small groups, rather than using your number rack to illustrate each. Child Watching: • Observe for student strategies. Who is trying to Direct Model? What strategies are students using to compare? Are students making one to one matches and seeing what is left? Are students using a counting up strategy?
Module 3- Session 5: Unit 6 Assessment		
1.OA.1 1.OA.6 1.OA.7 1.OA.8 MP.1	Access Prior Learning: • Kindergarten students worked predominantly with "add to, result unknown," "take from, result unknown," "put together/take apart, total unknown," and "put together/take apart, addend unknown" problem types. Developing the Big Idea and key Strategic Behaviors: • understanding part/whole relationships	Instructional Notes: • The *Assessment Guide* under the *Bridges Unit Assessments* tab provides the scoring guide for the *Unit 6 Assessment* (p. 70). • Standards 1.OA.1, 1.OA.4, 1.OA.6, 1.OA.7, 1.OA.8 are targeted for mastery according to the *Grade 1 Assessment Map* in the assessment binder under the *Assessment Overview* tab (pp. 13-15). • Problems in number 5 of the assessment are "take from, change unknown", "put together/take apart, addend unknown", and "compare, difference unknown" problems. If students are not successful with solving these during the assessment, consider giving them a few add to, result unknown and add to, change unknown problems just to formatively assess where they are able to be successful. • A portion of the assessment assessing addition and subtraction facts is a "gentle timed" test. Read the note on page 28 of the lesson for more descriptions. Research shows that timed tests create anxiety (Boaler, 2015). The intention of the 3-minute marker on this assessment is to support the goal of students coming to an answer using a reasoning strategy within 3 seconds. *-continues on next page-*

	• solving all types of story problems within 20 • solving for unknown in all positions • writing equations	• The goal of the assessment is for teachers to identify how students are developing in fluency and to notice what strategies they are using. Consider replacing that part of the assessment with the assessment tool created for APTT fluency assessment. It can be found on the Family Game resources section of the WCSD Curriculum and Instruction website. Child Watching: • See *Assessment Binder*, *Bridges Unit Assessment* tab, p. 61 for information on which students you should be concerned about at this time of year.
Module 4- Session 1: Emperor Penguins		
1.NBT.1 1.NBT.3 1.NBT.4 1.MD.2 MP.1 MP.3 MP.4	Access Prior Learning: • Kindergarten students worked with describing and comparing measurable attributes of objects such as length and weight. • Kindergarten students also directly compared two objects with a measurable attribute in common to see which object had "more of" or "less of" the attribute and described the difference. • Connect to measurement in U4M4. Developing the Big Idea and key Strategic Behaviors: • comparing measurements • determining difference • understanding part/whole relationships • writing inequality statement	Guiding Question: • What do you find out when you compare? Instructional Notes: • Inches and feet are standard measures and not addressed in the standards until 2nd grade. The expectation for this work is the application of using what students have learned about number lines and reinforcing that turned vertically, they can also be used as a measuring tool. • Using string to observe length is a great way to maintain the linear measurement attribute. It also supports students in constructing understanding of transitivity, which is important when direct comparison cannot be used. "In situations when direct comparison is not possible or convenient, they should be able to use indirect comparison and explanations that draw on transitivity" (K-6 Progression on Measurement and Data, 2011, p. 8). • Consider permanently posting the penguins' strings next to the labeled measuring strip. This will support students who need a concrete model, allowing them to connect the concrete string to the abstract label on the measuring strip, and support further direct comparisons. Child Watching: • Identify strategies students use in determining the difference. Are students counting up from the smallest number? Are students counting back from the largest number? Are students counting by 10s off the decade (16, 26, 36)?
Module 4- Session 2: Little Blue Penguins		
1.NBT.1 1.NBT.3 1.MD.1 1.MD.2 MP.2 MP.4	Access Prior Learning: • Kindergarten students worked with describing and comparing measurable attributes of objects such as length and weight. • Kindergarten students also directly compared two objects with a measurable attribute in common to see which object had "more of" or "less of" the attribute and described the difference. • Connect to measurement in U4M4. Developing the Big Idea and key Strategic Behaviors: • comparing measurements • determining difference • understanding part/whole relationships • writing inequality statements • ordering 3 numbers	Guiding Questions: • What does it mean to put objects in order? • How can you use height measurements to order objects? Instructional Notes: • Read the *About This Session* in the margin (p. 10). • Consider posting a student's height measuring strip (created in Unit 4, Module 4, Session 1) next to the class measuring strip displaying all penguin string lengths. Use the student's height measuring strip to compare with penguins' strings to place in height order. Consider labeling the comparisons on sticky notes, using written words and mathematical notation. This provides students another opportunity to engage with 1.MD.1, ordering three objects by length. Enrichment: • Students can explore measuring other objects. Child Watching: • Identify students struggling with the use of the vocabulary - shorter than, taller than, more than, greater than, less than. Use them interchangeably.

Module 4- Session 3: Me & the Penguins Again		
1.NBT.1 1.NBT.3 1.NBT.4 1.MD.1 1.MD.2 MP.1 MP.2	Access Prior Learning: • Kindergarten students worked with describing and comparing measurable attributes of objects such as length and weight. • Kindergarten students also directly compared two objects with a measurable attribute in common to see which object had "more of" or "less of" the attribute and described the difference. • Connect to measurement in U4M4 and previous day's work. Developing the Big Idea and key Strategic Behaviors: • comparing measurements • solving for the difference • writing inequality statement • understanding part/whole relationships • using data	Guiding Question: • How can you see comparisons on a data sheet? Instructional Notes: • Students will likely use a counting up or counting down strategy to find the difference between their height and the emperor penguin, as the difference will be minimal and the numbers close together. The little blue penguin portion of the lesson provides opportunity to look for counting strategies. Watch for students who operate on 10s and 1s separately by counting up to a decade number then counting by 10s or by counting by 10s or off the decade. • Consider allowing students the opportunity to solve these questions using whatever tools and strategies they choose. Students might use cubes to make lengths for themselves and the penguins, and then compare their cube trains. The cubes are not exactly an inch long, so 45 cubes will not equal 45 inches. If students discover this, take the opportunity to discuss the importance of equal length units when comparing. • Student Book page 48 & 49 (problems 1, 2, and 3 only) can be used as an assessment of 1.MD.1. Enrichment: • See second bullet above. Child Watching: • Common misconceptions for measurement might be students who do not keep the length of string to be measured straight, or students who do not line the beginning of their string up with the beginning of their measuring tool. Both lead to inaccurate measurements.
Module 4- Session 4: Penguin Pairs		
Supports 1.OA 1.NBT MP.7 MP.8	Access Prior Learning: • Connect to counting by 2s previously and the patterns of 5s and 10s. Developing the Big Idea and key Strategic Behaviors: • counting by 2s • understanding and using number structure • understanding and using relationships between numbers	Guiding Questions: • What patterns can you see in numbers? • How can patterns help you make predictions? Instructional Notes: • The next two lessons provide opportunity for the teacher to work with any student who might need more support based on the *Unit 6 Assessment*. • Read *Math Practices in Action* in the margin (p. 21). • This lesson sets the stage for tomorrow's lesson. • This lesson is for exposure only. Determining whether a group of objects has an odd or even number of members is a 2nd grade standard. Enrichment: • See Step 8 (p. 22).
Session 5: Counting by Twos with Penguin Pairs		
1.NBT.1 MP.7 MP.8	Access Prior Learning: • Connect to counting by 2s previously and the patterns of 5s and 10s. Developing the Big Idea and key Strategic Behaviors: • counting by 2s • understanding and using number structure • understanding and using relationships between numbers	Guiding Questions: • What patterns can you see in numbers? • How can patterns help you make predictions? Instructional Notes: • This lesson provides opportunity for the teacher to work with any students who might need more support based on the *Unit 6 Assessment*. • This lesson is for exposure only. Determining whether a group of objects has an odd or even number of members is a 2nd grade standard. Enrichment: • See Step 4 (p. 25).

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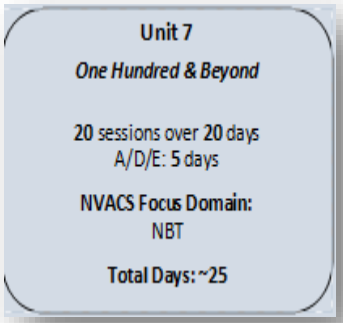
First Grade Unit 7: One Hundred & Beyond



1st Grade Curriculum Pacing Framework: Balanced Calendar

Big Conceptual Idea: K-5 Progression on Counting and Cardinality and Operations and Algebraic Thinking (pp. 1-7, 12-17), K-5 Progression on Number and Operations in Base Ten (pp. 1-4, 6-7), K-6 Progression on Measurement and Data (Measurement Part) (pp. 1-4, 8-11)

Read the Bridges Unit Overview/Introduction for Unit 7 pp. i-viii. Also, read each Module Overview for the current week's sessions, and the current Session Summary along with details for the teaching of each session as you work through Unit 7. These Introduction/Overview/Summary sections provide focus, clarity, vocabulary, definitions, and examples for the "big mathematical ideas and understandings" critical to 1st Grade. This information will support your professional decision-making within the Sessions and Modules as needed.

Mathematical Background: Read Bridges Unit 7 Overview pages (pp. i-vi)	Essential Questions for teacher consideration: How will I support students' developing understanding of place value so they are able to strategically, efficiently, accurately, and flexibly reason with two-digit numbers in problem solving? Using numbers to 120, how will I support understanding of estimating, counting, comparing, adding and subtracting within a base ten system using sticks and bundles; dimes, nickels, and pennies; and the number line?

Instructional note:

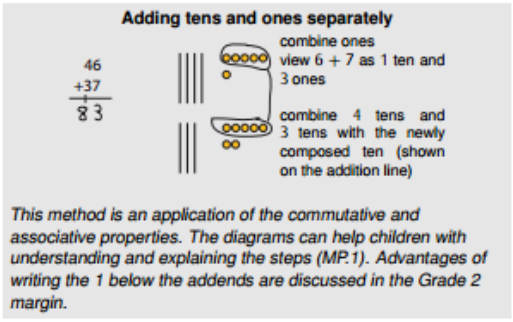
> "If you learn something deeply, the synaptic activity will create lasting connections in your brain, forming structural pathways, but if you visit an idea only once or in a superficial way, the synaptic connections can "wash away" like pathways made in the sand." (Boaler, 2016, p. 1)

Unit 7 addresses the new standard expectation for 1st Grade of addition and subtraction of two-digit numbers using strategies to match multi-digit problems, and understandings within the range of 0-120. Students will be learning to compute sums within 100 of two-digit numbers using base-ten understanding and to compute differences of two-digit numbers by multiples of 10.
Students build cognitive skills as they use the number line as both a tool for visualizing the relationships of two-digit numbers, as well as a device for recordkeeping as they work up and down the number line solving problems within 120. They will also be estimating, counting, comparing, adding and subtracting within these two-digit quantities. *Bridges Unit 7* (Introduction p. ii) states, "Research has indicated that students with a solid understanding of 1, 2, 5, and 10 can develop both formal and informal strategies for two-digit operations, particularly when those intervals are illustrated and manipulated on the open number line. If a child is comfortable counting by 1s, 2s, or 5s there is no number she cannot conceptualize easily." Also, "Central to these mental manipulation is a strong sense of place value – how our number system works, how predictable patterns can help us navigate number contexts, and how strategies that work with small numbers are scalable to larger numbers." Students will begin to see and understand how some strategies are not efficient or appropriate when working with larger numbers, and will be meaningfully encouraged to search for and use more efficient strategies based on our base-ten system of numbers.

Unitizing (combining 10 discreet objects to make a new unit called a ten and holding the understanding of both the discrete parts and the new unit) is a key understanding of place value and for working with two-digit numbers and beyond. The use of physical and pictorial models is critical for this development of computational fluency and for foundations for algebra. *Bridges* materials for 1st Grade intentionally come with Unifix Cubes rather than Base 10 Blocks so students have many opportunities to develop this critical understanding by manipulating and seeing both the discreet objects and the units of ten. With the use of physical and pictorial models, students come to understand that the two digits of a two-digit number represent the amounts of tens and ones and that the place of a digit represents its value. Students are then able to use this understanding to compose and decompose a unit of 10 to solve problems. "The ability to compose and decompose this unit (a ten) flexibly and to view the numbers 11-19 as composed of one ten and some ones allows development of efficient, general base-ten methods for addition and subtraction." (Progressions for the Common Core State Standards in Mathematics – K-5, Number and Operations in Base Ten p. 6).

As students develop deeper understanding of place value concepts, they also couple this work with the operations and algebraic understandings they have been working toward. "There is no need to separate place-value instruction from computation instruction. Children's efforts with the invention of their own computation strategies will both enhance their understanding of place value and provide a firm foundation for flexible methods of computation." (Van de Walle, et al., 2014, p. 176). The idea of supporting computation and place value understanding together is at the forefront of 1.NBT.4 (NVACS, 2010). The "written method" addressed in 1.NBT.4 does not at this time refer to the U.S Traditional Algorithm. The *Progressions for the Common Core State Standards in Mathematics – K-5, Number and Operations in Base Ten* states, "Concrete objects, cards, or drawings afford connections with written numerical work and

discussions and explanations in terms of tens and ones. In particular, showing a composition of a ten with objects or drawings affords connection of the visual ten with the written numeral 1 that indicates 1 ten" (pp. 6-7).



Fluency using the standard algorithms for addition and subtraction is not required until the end of 4th grade. "Use of the standard algorithms can be viewed as the culmination of a long progression of reasoning about quantities, the base-ten system, and the properties of operations." *(*Progressions for the Common Core State Standards in Mathematics – K-5, Number and Operations in Base Ten, p. 3). Students have TIME to build deep understandings of place value. Do not push the use of the written standard algorithm too early at the risk of creating a student who memorizes the steps but has no conceptual understanding of place value. This will create severe disadvantage to students as they progresses through the years in the mathematics trajectory supported by the standards. Battista addresses this as well, "…if algorithms are taught too early in student's development of reasoning about addition and subtraction, students cannot understand the algorithms conceptually, so they learn them by rote." (Battista, 2012, p. 5).

Children construct understandings in connected and integrated ways, not as isolated, individual pieces. Therefore, continually ask students to explain and show what they are thinking ("How did you know?", "What made you think that?", "What did you notice?", "How did you figure that out?" etc.). By child-watching teachers can make explicit the connections students are already making from previous learning; strengthen the synaptic connections being constructed through questions, discussion or student's sharing; and encourage the continuance of sense-making behavior (NVACS, 2010, p. 6).

The opportunities to connect the content in *Unit 7* to the knowledge and skills students have gained through *Number Corner* are endless. Consider how students have been building the concept of "ten" through the *Days in School* and *Number Line* activities: each day adding a one until a group of ten has been made; identifying equivalent names and equations for the total; considering multiple equivalent representations of a given number; and other continuous opportunities for creating place value understanding.

On-going enrichment*:*
Take note of the *Skills Across the Grade Level* chart in the Introduction, Unit 7, (pp. vi-vii). Note that most OA and NBT Standards are expected to be secure by the end of this Unit. This information supports your professional decision-making within the *Unit* for instruction, intensification, and intervention. Expect all students to engage in the problem solving, and in explaining and justifying their thinking. Use Table 1 in the *Nevada Academic Content Standards* (NVACS) titled "Common addition and subtraction situations" (p. 88) to inform decisions about intensification and acceleration.

Continue to consider "Support" and "Challenge" options within each *Session*, and "Game Variations", "Differentiate", and "English-Language Learners" ideas in *Work Places*.

Essential Academic Vocabulary Use these words consistently during instruction.			
New Academic Vocabulary: (first time explicitly taught) *indicates Word Resource Cards are available in the Bridges materials	Review Academic Vocabulary: (Vocabulary from Number Corner or previous units)		
Hundreds* Quarter (one-fourth)	*Add** *Addition* *After** *Before** *Coin/coins* *Coordinate grid* *Coordinates* *Compare** *Count** *Count back** *Count on**	*Difference** *Digit** *Dime** *Distance* *Estimate* *Equation** *Fives* *Fourth** *Greater than** *Hundred Length**	*Less than** *Ones** *Penny** *Square** *Subtract** *Subtraction* *Sum or Total** *Tens** *Twos* *Two-digit number* *Zero*

Additional terminology that students might need support with: backward, beginning, end, first, forward, paces, reasonable, section, steps strategies

*Collaborative Team Conversations (CTC)

Consider using *one* of the following as part of the formative assessment process at the lesson level to **collect student work** to analyze for evidence of mathematical understanding:

Guiding questions:
"What strategies and tools are students using to solve for missing numbers along a number line, using understandings of multiples of 1s, 5s, and 10?"
"What evidence shows understanding and use of grouping by 5s, and 10s?"
"What evidence demonstrates fluent understanding of 5 and/or 10?"
"How do students show they are making sense of the problems and deepening their understanding of the number system to 120?"
"If needed, what intensification interactions will support the use of a variety of strategies and tools for problem solving with place value concepts?"

Lesson	Evidence	Look for
U7M2S4 *Observations Along the Path* TG pp. 17-19	*Student Book* *Missing Bread Crumbs* (TG U7M2S4 Student Book p. 58) *Student Book* Answer Keys Bridges Educator Site, Curriculum Tab (p. 62)	Focus CTC around conceptual understandings of the big idea and strategies used: • making sense of the number system (seeing and using 1s, 5s, and/or 10s to identify and confirm missing numbers on a number line) • counting by 1s, 5s, and/or 10s • monitoring own confusions and self-correcting • persevering and explaining thinking • using 1s, 5s, and/or 10s to solve for missing numbers on a number line using place value understandings with flexibility, accuracy, efficiency, and appropriateness
U7M2S5 *Numbers to 120 Checkpoint #1 & 2* TG pp. 21-23	*Numbers to 120 Checkpoint* observations and student record sheet (TG U7M2S5 p. T7) *Numbers to 120 Checkpoint Scoring Guide* (AG Bridges Unit Assessments pp. 75-76)	Focus CTC around conceptual understandings of the big idea and strategies used: • making sense of the number system (seeing and using 1s, 5s, and/or 10s to identify and confirm missing numbers) • counting by 1s, 5s, and/or 10s • monitoring own confusions and self-correcting • persevering and explaining thinking • using 1s, 5s, and/or 10s to solve for missing numbers on a number line using place value understandings with flexibility, accuracy, efficiency, and appropriateness • adding and subtracting with multiples of 5s and/or 10s with flexibility, accuracy, efficiency and appropriateness

Learning Cycle Assessments (summative)	*Unit 7 Assessment* - U7M3S5 TG pp. 24, T10-T12; AG Bridges Unit Assessments pp. 77-79	Use *Unit 7 Assessment Scoring Guide* AG Bridges Unit Assessment p. 80

Standards listed in **bold** indicate a focus of the lesson.

NVACS (Content and Practices)	Mathematical Development of the Big Idea	Instructional Clarifications & Considerations
Module 1- Session 1: Estimating & Counting Popsicle Sticks		
1.NBT.1a 1.NBT.2a 1.NBT.2c MP.4 MP.7	Access Prior Learning: • Kindergarten students composed and decomposed numbers from 11-19 into ten ones and some further ones building foundations for place value understanding. Developing the Big Idea and key Strategic Behaviors: • understanding number relationships - place value of ones, tens, and hundreds • unitizing 10	Guiding Questions: • What do you already know about estimating? • How can you figure out how to make a close estimation? Instructional Notes: • Send home the *Family Letter* found here. • Read the *Math Practices in Action* in the margin (p. 6). • Ensure students engage in the process of constructing the bundles of ten. This model of popsicle sticks supports the need for proportionality. "That is, a model for ten is physically ten times larger than the model for a one." (Van de Walle, et al., 2014, p. 179). • When counting, emphasize the base-ten language (1 hundred, 3 tens, 5 ones). • Capitalize on the opportunities for students to make a connection between patterns with single digits such as 2+2= 4 being similar to 20+20= 40. • Consider observing students count with their own jar of sticks. Watch for how they count. Are they grouping? Are they counting by 1? Have students share their strategies, selecting students from the least to the highest sophistication to share in that order. *-continues on next page-*

		• Graham Fletcher Resources such as his 3-Act Tasks could support this work. See the Whopper Jar video. Consider having students watch as the teacher grabs a handful at a time of popsicle sticks and places them in the jar, similar to the bags of whoppers. Before collecting estimates from students, help them gather evidence to make an estimate. Create a T-chart with one side for "Noticing" and the other labeled "Wondering". Students may say, "I noticed it was 5 handfuls of sticks." A wondering might be, "How many sticks fit in a handful?" This encourages use of estimation as a strategy based on evidence (Math Practice 6). Enrichment: • Have students write the total in expanded notation. 100+ 30+5=135. This can be included in Number Corner with the days in school grid. • Have students explore how different groups of students counted the sticks, and consider what pros and cons there are for each strategy. What strategy is efficient? What strategy helps if you lose track? Child Watching: • Identify students referring to the hundreds or the groups of tens as "5" or "3". Respond with, "5 what?" and encourage them to always state "5 hundreds." • Identify students counting by 1s. • Identify students making groups of ten. • Observe for organization techniques that students can share.
Module 1- Session 2: Two Turns to Build, Day 1		
1.NBT.1 1.NBT.2 1.NBT.3 1.NBT.4 MP.4 MP.7	Access Prior Learning: • Kindergarten students composed and decomposed numbers from 11-19 into ten ones and some further ones building foundations for place value understanding. • Connect to all groups of 10 work from previous sessions. Developing the Big Idea and key Strategic Behaviors: • understanding number relationships - place value with ones, tens, and hundreds • unitizing 10 • adding groups of 10s and 1s	Guiding Questions: • How can sticks help you as a mathematical tool? • What do you know about "a bundle" of sticks? Instructional Notes: • The digital display tools for this lesson is provided on the Educator Site. • Use the language from the Work Place Sentence Frames while playing. See the *Work Place Sentence Frames* for Unit 7 here. Enrichment: • Encourage the use of base-ten language. Child Watching: • Identify students who struggle with understanding the 10 sticks as a bundle (conservation of number). Allow students to count the single sticks as often as needed to confirm there are always 10.
Module 1- Session 3: Two Turns to Build, Day 2		
1.NBT.1 1.NBT.2 1.NBT.3 1.NBT.4 MP.2 MP.7	Access Prior Learning: • Kindergarten students composed and decomposed numbers from 11-19 into ten ones and some further ones building foundations for place value understanding. • Connect to previous understandings of addition. Developing the Big Idea and key Strategic Behaviors: • understanding and using number relationships - place value with ones, tens, and hundreds • unitizing 10 • adding groups of 10s and 1s • representing 10s and 1s with drawings and equations • comparing 2-digit numbers	Guiding Questions: • How can sticks help you as a mathematical tool? • What do you know about "a bundle" of sticks? Instructional Note: • Allowing students to come to the idea of adding the 10s first then counting the 1s will support their independent use of this strategy. This lays the foundation for thinking in terms of partial sums, by adding the 10s first, then adding the 1s. Enrichment: • See Step 9 (p.17). Child Watching: • Identify students who are struggling to understanding that a bundle makes up ten 1s. Allow these students to deconstruct and construct bundles repeatedly. • Identify students struggling to count by 10s, then switching to counting by 1s. Consider adding in a symbolic sound, or motion, such as a clap for support.
Module 1- Session 4: Introducing Work Place 7A Two Turns to Build		
1.NBT.1 1.NBT.2 1.NBT.3 1.NBT.4	Access Prior Learning: • Kindergarten students composed and decomposed numbers from 11-19 into ten ones and some further ones.	Guiding Questions: • How can cubes help you as a mathematical tool? • What do you know about a train of 10 cube? *-continues on next page-*

MP.2 MP.8	• Connect to all groups of 10 work, especially the popsicle sticks from previous days. • Connect to previous understandings of addition. Developing the Big Idea and key Strategic Behaviors: • understanding and using number relationships - place value • unitizing 10 • adding groups of 10s	Instructional Notes: • See the *Work Place Sentence Frames* for Unit 7 here. • The online digital tools for the *Work Place* are provided on the Educator Site. Enrichment: • See the *Game Variations on Work Place Instructions* (p. T6). Child Watching: • Identify students who are struggling with understanding that a bundle makes up ten 1s. Allow these students to deconstruct and construct bundles again. • Identify students struggling to count by 10s, then switching to count by 1s. Consider adding in a symbolic sound, or motion, such as a clap for support.
Module 1- Session 5: Introducing Work Place 7B Race to Zero		
1.NBT.6 MP.2 MP.8	Access Prior Learning: • Kindergarten students composed and decomposed numbers from 11-19 into ten ones and some further ones building foundations for place value understanding. • Connect to all groups of 10 work from previous sessions. • Connect to previous understandings of addition. Developing the Big Idea and key Strategic Behaviors: • understanding and using number relationships - place value • unitizing 10 • subtracting multiples of 10s	Guiding Questions: • How are addition and subtraction related? • What do you know about addition and subtraction? Instructional Note: • The online digital tools for the *Work Place* is provided on the Educator Site. Enrichment: • See the *Game Variations on Work Place Instructions* (p. T10). Child Watching: • Identify students who are struggling with understanding that a bundle makes up ten 1s. Allow these students to deconstruct and construct bundles repeatedly. • Identify students struggling to count by 10s, and then switch to count by 1s. Consider adding in a symbolic sound, or motion, such as a clap for support. • Identify students struggling with counting backward by 10s.
Module 2- Session 1: Introducing Hansel & Gretel's Path		
1.NBT.1 1.NBT.2 1.NBT.4 MP.3 MP.7	Access Prior Learning: • Kindergarten students composed and decomposed numbers from 11-19 into ten ones and some further ones building foundations for place value understanding. • Connect to all groups of 10 work from previous sessions. • Connect to knowledge of the story of Hansel and Gretel. Developing the Big Idea and key Strategic Behaviors: • understanding and using number relationships - place value • understanding and using number structure to 120 • counting by 10s and 1s • adding multiples of 10 • counting forwards and backwards by 1s	Guiding Questions: • What do you notice about the trails? • How are they different? Instructional Notes: • The blog titled *Hansel & Gretel's Path* on the Educator Site shares ideas for supporting students. It can be found under the Implementation tab, and then search for the title in the search bar. • This unit is an opportunity to engage in Math Practice 3, constructing viable arguments and critiquing the reasoning of others. Enrichment: • See Step 11 (p. 6). Child Watching: • Identify students working together counting 10 paces and laying a different colored cube down with their partner.
Module 2- Session 2: Counting Pebbles Along the Path		
1.NBT.1 1.NBT.4 MP.1 MP.7	Access Prior Learning: • Connect to the last session's work. Developing the Big Idea and key Strategic Behaviors: • understanding and using number relationships - place value • understanding and using number structure to 120	Guiding Questions: • How are these paths like a number line? • What do you know about counting forward and backward? Instructional Note: • Continuously reinforce strategies that involve place value understanding and use of the landmark numbers of 5 and 10 when appropriate, rather than counting on or counting backward by 1s. *-continues on next page-*

	• reading and writing numbers • counting forward and backward by 10s and 1s	Enrichment: • See Steps 2, 3, 4 & 6 (p. 10-11) Child Watching: • Identify students who are using place value addition and subtraction strategies and not counting on or back by 1s. Have these students share so others who are using counting on or counting back are exposed to a more sophisticated strategy.
Module 2- Session 3: A Fork in the Path		
1.NBT.1 1.NBT.4 1.NBT.5 MP.3 MP.7	Access Prior Learning: • Connect to the last session's work. Developing the Big Idea and key Strategic Behaviors: • understanding and using number relationships - place value • understanding and using number structure to 120 • reading and writing numbers • counting forwards and backwards by 10s 5s and 1s	Guiding Question: • What strategies can you use to fill in the path? Instructional Note: • The "Math Practices in Action" blog from the Educator Site provides support for how this discussion might look in the classroom and what student response might be anticipated. Search for the blog title under the Implementation Tab. Enrichment: • See Step 6 (p. 15). Child Watching: • Identify students who struggle with counting by multiples of 5. See the support suggestion, Step 7 (p. 15).
Module 2- Session 4: Observations Along the Path		
1.NBT.1 1.NBT.4 MP.2 MP.7	Access Prior Learning: • Connect to the last session's work. Developing the Big Idea and key Strategic Behaviors: • understanding and using number relationships - place value • reasoning with number structure to 120 • reading and writing numbers • using multiples of 5 and 10	Guiding Questions: • What do you notice about the path? • What is a "key" and how does it help you to solve the problem? Instructional Notes: • Encourage students to work with the boxes out of sequence to reinforce reasoning with multiples of 5 and 10. See note in Step 4. • This game suggested on the Educator Site may be used to reinforce understanding for counting on the number line. • The Student Book page for this session is suggested as a possible CTC. Enrichment: • See Step 5 (p. 19). Child Watching: • Identify students struggling with skip counting by 5s or 10s.
Module 2- Session 5: Problems Along the Path		
1.NBT.1 1.NBT.4 1.NBT.6 MP.1 MP.3	Access Prior Learning: • Connect to the last session's work. Developing the Big Idea and key Strategic Behaviors: • understanding and using number relationships - place value • reasoning with number structure to 120 • reading and writing numbers • using multiples of 5 and 10	Guiding Question: • What do you observe about the path? Instructional Notes: • Read the *Math Practices in Action* in the margin (p. 23). • Review getting information from a "key". • Students may be confused with the abbreviations used for the breadcrumb, pinecone, and pebble (P, PC and B). Consider having them draw a picture and/or write the numbers associated with the symbol if needed. • The *Assessment Binder* under the *Bridges Unit Assessment* tab provides the scoring guide for this checkpoint (p. 76). Enrichment: • Consider using sidewalk chalk outside to recreate the pathways beginning from various numbers. • See the Challenge in Step 6 (p. 23). Child Watching: • Use the scoring guide to inform your instruction and consider pulling a small group of students who need support. This Assessment is suggested as a CTC.
Module 3- Session 1: Ten Steps on the Path		
1.OA.1 1.OA.3 1.MD.2	Access Prior Learning: • Connect to all previous work with groups of 10 and 5.	Guiding Questions: • What do you already know about a "key"? • What strategies will you use to make decisions about what fences, benches and flowerpots you will use? • How can pictures help you write equations? *-continues on next page-*

MP.2 MP.4 MP.7	• Kindergarten students represented addition and subtraction with objects, fingers, mental images, drawings, sounds, actions, verbal explanations, and expressions or equations. Developing the Big Idea and key Strategic Behaviors: • understanding and using number relationships - place value • reasoning with number structure to 120 • reading and writing numbers • using multiples of 5 and 10 both forward and backward • understanding and using the commutative property	Instructional Notes: • Read the *About This Session* in the margin (p. 4). • Read the *Math Practices in Action* in the margin (p. 5). Enrichment: • See Step 6 (p. 5). Consider having students write an equation to match their thinking. Child Watching: • See the *Support* note in step 7 (p. 5).
Module 3- Session 2: Twenty Steps on the Path		
1.OA.1 1.OA.2 1.OA.3 1.OA.6 1.MD.2 MP.2 MP.4 MP.7	Access Prior Learning: • Kindergarten students represented problems in various ways. • Connect to all previous work with groups of 10 and 5. Developing the Big Idea and key Strategic Behaviors: • understanding and using number relationships - place value • reasoning with number structure to 120 • reading and writing numbers • using multiples of 5 and 10 forward and backward • understanding and using the commutative property	Guiding Questions: • What do you already know about a "key"? • What strategies will you use to make decisions about what fences, benches and flowerpots you will use? • How can pictures help you write equations? Instructional Note: • Read the *About This Session* in the margin (p. 8). Enrichment: • Consider limiting the number of each object students can use. See the *About This Session* note (p. 8). Child Watching: • Observe for student strategies. Are students using any systematic way to determine combinations? • When writing an equation, are they identifying and using friendly numbers?
Module 3- Session 3: The Path Game, Part 1		
1.NBT.1 1.NBT.4 1.NBT.5 1.NBT.6 1.G.3 MP.2 MP.3	Access Prior Learning: • Kindergarten students represented addition and subtraction with objects, fingers, mental images, drawings, sounds, actions, verbal explanations, and expressions or equations. • Connect to all previous work with combinations of 10 and 5. Developing the Big Idea and key Strategic Behaviors: • understanding and using number relationships – place value • reasoning with number structure to 120 • using 1s, 2s, 5s and 10s to move forward along a number line 0-60 • writing equations	Guiding Question: • What do you already know about moving on a number line? Instructional Notes: • Give time for students to create their own number lines. This allows them to construct understandings of the tool's properties. • Capitalize on opportunities for students to share their written methods for adding and subtracting these numbers as they work on 1.NBT.4. Refrain from any focus on the traditional algorithm. Encourage students to use sense-making strategies and document those strategies in a representational form. Have students' share their thinking on the board, using their words to express in written form their thinking. Enrichment: • See Step 8 (p. 16). Child Watching: • Identify students struggling with the construction of the number line. • Identify student strategies (counting on, making friendly numbers, using 5 and 10 as landmark numbers, counting on and off the decade, adding the 10s and the 1s, etc.). Invite students to share when there are interesting strategies for more challenging combinations such as 17+5.

Module 3- Session 4: The Path Game, Part 2		
1.NBT.1 1.NBT.4 1.NBT.5 1.NBT.6 MP.2 MP.3	Access Prior Learning: • Kindergarten students represented addition and subtraction with objects, fingers, mental images, drawings, sounds, actions, verbal explanations, and expressions or equations. • Connect to all previous work with combinations of 10 and 5. Developing the Big Idea and key Strategic Behaviors: • understanding and using number relationships – place value • reasoning with number structure to 120 • using 1s, 2s, 5s and 10s to move forward along a number line 61-120 • writing equations	Guiding Question: • How is this path like other paths you have seen? Instructional Notes: • This session is an opportunity to revisit the understandings of the open number line (introduced in Unit 4) to allow students to expand their reasoning. This will support their transition to 2nd grade. • Capitalize on opportunities for students to share their written methods for adding and subtracting these numbers as they work on 1.NBT.4. Refrain from any focus on the traditional algorithm. Encourage students to use sense-making strategies and document those strategies in a representational form. Have students' share their thinking on the board, using their words to express in written form their thinking. Enrichment: • See Step 8 (p. 20). Child Watching: • Identify student strategies (counting on, making friendly numbers, using 5 and 10 as landmark numbers, counting on and off the decade, adding the 10s and the 1s, etc.). Invite students to share when there are interesting strategies for more challenging combinations such as 72+10. • Observe how students express their thinking in written form. Collect ways to show thinking on a big poster in the room.
Module 3- Session 5: Unit 7 Assessment		
1.NBT.1 1.NBT.4 1.NBT.5 1.NBT.6 MP.2 MP.3	Access Prior Learning: • Kindergarten students represented addition and subtraction with objects, fingers, mental images, drawings, sounds, actions, verbal explanations, and expressions or equations. • Connect to all previous work using 1s, 2s, 5s, 10s, 20s, and 30s to move along a number line both forward and backward. Developing the Big Idea and key Strategic Behaviors: • understanding and using number relationships – place value • reasoning with number structure to 120 • reading and writing numbers • using 1s, 5s, 10s, 20s, and 30s to move forward along a number line 0-120 • writing equations	Guiding Question: • How is this path like other paths you have seen? Instructional Notes: • The *Assessment Guide* under the *Bridges Unit Assessments* tab provides the scoring guide for *Unit 7 Assessment* (p. 80). • Standards 1.OA.2, 1.OA.3, 1.NBT.1, 1.NBT.4, 1.NBT.6 are targeted for security according to the *Grade 1 Assessment Map* (pp. 13-15) in the *Assessment Binder* under the *Assessment Overview* tab. • The assessment provides another opportunity to assess 1.OA.1, which was targeted for security last unit. • In the assessment, if students are confused with the abbreviations used for the breadcrumb, pinecone, and pebble (P, PC and B), have them draw a picture and/or write the numbers associated with the symbol. Enrichment: • See Step 11 (p. 24). Child Watching: • At this point teachers, should be concerned about students struggling with one or more of the following: solving addition and subtraction story problems within 20; counting on and counting back to solve addition and subtraction combinations within 20; adding and subtracting with sums and minuends to 10; working from familiar facts such as doubles, make 10s, and add tens; counting to 120; reading and writing numbers to 100; understanding that whole numbers between 10 and 100 are composed of 10s and 1s. (See *Assessment Binder*, *Bridges Unit Assessment* tab, p. 61 for more information). • Any students struggling with these standards at this point could benefit from use of the Bridges Intervention materials.
Module 4- Session 1: How Many Pennies in the Jar?		
1.NBT.1 1.NBT.2 1.NBT.4 Supports 1.MD MP.7 MP.8	Access Prior Learning: • Kindergarten students classified objects and counted the number of objects in each category. • Connect to previous use of coins to support place value understandings. Securing the Big Idea and key Strategic Behaviors: • understanding and using number relationships - placer value	Guiding Questions: • What do you already know about estimation? • How can you count all these pennies most efficiently? Instructional Notes: • See Module 1 Session 1 notes for more ideas on this session. • The intent of the use of coins as a model in 1st grade is to support place value understanding. Money and adding the values of money is a 2nd grade standard. • Money is an example of a nonproportional model for place value in which the ten is not physically ten times larger than the one. Nonproportional representations are used "once children have a conceptual understanding of the numeration system and need additional reinforcement" (Van de Walle, et al., 2014, p. 181). *-continues on next page-*

	• counting and comparing quantities to 100 • estimating • unitizing 10	Enrichment: • See *Extension* in the margin (p. 6). Child Watching: • Identify students who struggle with the nonproportional representation of place value. Consider reinforcing their understandings by using 1 cube per penny and 100 cubes per dollar to help them see the connection.
Module 4- Session 2: Two Turns to Win		
1.NBT.1 1.NBT.2 1.NBT.3 1.NBT.4 Supports 1.MD MP.2 MP.7	Access Prior Learning: • Kindergarten students classified objects and counted the number of objects in each category. • Connect to previous use of coins to support place value understandings. • Coins have been utilized during Number Corner throughout the year. Securing the Big Idea and key Strategic Behaviors: • understanding and using number relationships - placer value • counting and comparing quantities to 100 • adding 10s and 1s	Guiding Question: • What do you already know about comparing? Instructional Notes: • Read the Math Practices in Action in the margin (p. 10). • The intent of the use of coins as a model in 1st grade is to support place value understanding. Money and adding the values of money is a 2nd grade standard. • Money is an example of a nonproportional model for place value in which the 10 is not physically ten times larger than the 1. Nonproportional representations are used "once children have a conceptual understanding of the numeration system and need additional reinforcement" (Van de Walle, et al., 2014, p. 181). Child Watching: • Identify students who struggle with the nonproportional representation for place value. Consider reinforcing their understandings by using 1 cube per penny and 100 cubes per dollar to help them see the connection.
Module 4- Session 3: Pull, Count & Compare		
1.NBT.3 1.NBT.4 1.NBT.5 Supports 1.MD MP.4 MP.8	Access Prior Learning: • Kindergarten students classified objects and counted the number of objects in each category. • Connect to previous use of coins to support place value understandings. • Coins have been utilized during Number Corner throughout the year. Securing the Big Idea and key Strategic Behaviors: • understanding and using number relationships - placer value • counting and comparing quantities to 100 • adding 10s and 1s	Guiding Question: • Why is it important to know how to compare? Instructional Notes: • The intent of the use of coins as a model in 1st grade is to support place value understanding. Money and adding the values of money is a 2nd grade standard. • Money is an example of a nonproportional model for place value in which the 10 is not physically ten times larger than the 1. Nonproportional representations are used "once children have a conceptual understanding of the numeration system and need additional reinforcement" (Van de Walle, et al., 2014, p. 181). Child Watching: • Use the suggestions in Step 13 (p. 16) to guide child watching.
Module 4- Session 4: Coins on Board, Day 1		
1.NBT.2 1.NBT.3 1.NBT.4 Supports 1.MD MP.1 MP.3	Access Prior Learning: • Connect to previous use of coins to support place value understandings. • Connect to the use of coordinate grids in other content areas. Securing the Big Idea and key Strategic Behaviors: • understanding and using number relationships - placer value • counting and comparing quantities to 100 • adding by 10s, 5s, and 1s	Guiding Question: • What strategies can you use to add by 1s, 5s, and 10s? Instructional Notes: • These next few lessons provide opportunities to pull aside students who might need more support based on the *Unit 7 Assessment*. • The intent of this experience is to provide a different opportunity for students to work with adding strings of numbers by 10s, 5s and 1s. The focus of this lesson is not to understand coordinate grids. Therefore, if students struggle with locating on the grid provide as much support as needed. Enrichment: • See Step 15 (p. 20). Child Watching: • Identify students struggling to use the coordinate grid and partner them with a peer for support. *-continues on next page-*

		• Identify students using the property of commutativity and adding numbers in orders that make sense, for example adding all the 10s first, then 5s, followed by 1s. Select students to share. • Observe student's documentation of their addition in a written method. Share student strategies, and add to class posters for idea of representing thinking.
Module 4- Session 5: Coins on Board, Day 2		
1.NBT.2 1.NBT.3 1.NBT.4 Supports 1.MD MP.7 MP.8	Access Prior Learning: • Connect to previous use of coins to support place value understandings. • Connect to the use of coordinate grids in other content areas. Securing the Big Idea and key Strategic Behaviors: • understanding and using number relationships - placer value • counting and comparing quantities to 100 • adding by 10s, 5s, and 1s	Guiding Question: • What strategies can you use to add by 1s, 5s, and 10s? Instructional Notes: • These next few lessons provide opportunities to pull aside students who might need more support based on the *Unit 7 Assessment*. • The intent of this experience is to provide a different opportunity for students to work with adding strings of numbers by 10s, 5s and 1s. The focus of this lesson is not to understand coordinate grids. Therefore, if students struggle with locating on the grid provide as much support as needed. Child Watching: • Identify students using the property of commutativity and adding numbers in orders that make sense, for example adding all the 10s first, then 5s, followed by 1s. Select students to share. • Observe student's documentation of their addition in a written method. Share student strategies, and add to class posters for idea of representing thinking.

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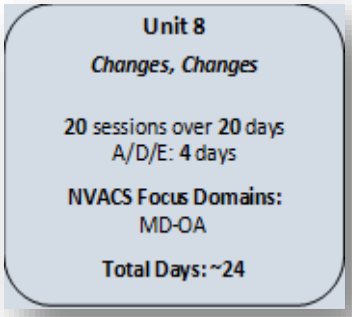
First Grade Unit 8: Changes, Changes



1st Grade Curriculum Pacing Framework: Balanced Calendar

Big Conceptual Idea: K-5 Progression on Counting and Cardinality and Operations and Algebraic Thinking (pp. 1-7, 12-17), K-5 Progression on Number and Operations in Base Ten (pp. 1-4, 6-7), K-6 Progression on Measurement and Data (Measurement Part) (pp.1-4, 8-11)

Read the Bridges Unit Overview/Introduction for Unit 8 pp. i-vi. Also, read each Module Overview for the current week's sessions, and the current Session Summary along with details for the teaching of each session as you work through Unit 8. These Introduction/Overview/Summary sections provide focus, clarity, vocabulary, definitions, and examples for the "big mathematical ideas and understandings" critical to 1st Grade. This information will support your professional decision-making within the Sessions and Modules as needed.

Mathematical Background: Read Bridges Unit 8 Overview pages (pp. i-xii)	Essential Questions for teacher consideration: How will I support students' understanding of change in the context of time, numbers, location, and their own life? How can students apply mathematical understanding to real life situations?

Instructional note:

> "If you learn something deeply, the synaptic activity will create lasting connections in your brain, forming structural pathways, but if you visit an idea only once or in a superficial way, the synaptic connections can "wash away" like pathways made in the sand." (Boaler, 2016, p. 1)

Unit 8 provides an opportunity to blend math with the *National Science Education Standards* (NSES). This *Unit* focuses on the idea that our daily lives and things in it, such as time, location, growth, and distance change. These changes can be measured as a series of iterated units and the different measurement units or quantities compared. This also continues the idea of the understanding of numbers and their relationships to one another. The *Unit* brings to life problem based learning, and teaching through the problem solving encouraged by Van de Walle, Karp, and Bay-Williams (2013), "Doing mathematics in classrooms should closely model the act of doing mathematics in the real world."

Linear measurement is one of four critical content areas identified by *NVACS* (NVACS, 2010, p. 13). The K-6 Progression on Measurement and Data (Measurement Part) states, "The general reasoning processes of seriation, conservation (of length and number) and classification predict success in early childhood as well as later schooling" (p. 8). Longitudinal research has also identified early childhood student success with number and measurement as an indicators for academic success in both mathematics and reading later in life (Duncan et al., 2007; Claessens and Duncan, 2009). Therefore, providing ample opportunities for students to experience and deepen these mathematical ideas is incredibly beneficial and needed. "Data from international studies consistently indicate that children in the United States are weaker in the area of measurement than any other topic" (Van de Walle, Karp, Lovin, Bay-Williams, 2014, p. 269), even though measurement opportunities are prevalent in our daily lives and embedded in many other mathematics, science, social studies, art and music experiences.

The *K-6 Progression on Measurement and Data (Measurement Part)* also addresses a number of early developmental issues.to consider in instruction. It states, "…the use of a variety of different length units, before students understand the concepts, procedures, and usefulness of measurement, may actually deter students' development…Early use of many nonstandard units may actually interfere with students' development of basic measurement concepts required to understand the need for standard units." The use of unifix cubes as a nonstandard yet standardized tool in *Unit 8* acknowledges this warning and provides great opportunity for students to solidify their early understanding of linear measurement (also addressed in the Instructional note for *Unit 6*). The use of a ruler as a standard measure is not expected until second grade. However, comparing lengths, as the intended mathematical understanding for 1st Grade, requires precision of linear measurement. Students are also expected to understand the idea of transitivity (for example: if the table is longer than the rug, and the rug is longer than the book, then the table is longer than the book also). The use of a standardized tool such as unifix cubes supports the construction of these early understandings. The practice of comparing lengths also connects measurement to number with the computing of differences between quantities, incorporating the understanding of subtraction with 2 digit and 1 digit numbers.

Another early developmental challenge when using nonstandard measures is students' understanding that the size of the iterated unit makes a difference in the quantity of units when measuring the length of an object (e.g., the use of unifix cubes to measure the length of a table will result in a larger quantity of units than if unsharpened pencils are used as the unit). The understanding that all iterated units have to be the same length and placed next to each other with no additional space is also challenging. Experience and

exploration, supported with precise teacher understandings, allow for the construction of solid student understandings from the beginning.

Seriation, ordering a set of objects by length, is another idea explored in *Unit 8*. Students might struggle with ordering a large set (more than 6 objects) if the lengths vary by slight differences. Teachers might begin by using smaller sets or using objects with larger differences (K-6 Progression on Measurement and Data (Measurement Part), p. 8).

On-going enrichment:
Take note of the *Skills Across the Grade Level* chart in the Introduction section to each *Unit*. All standards are expected to be secure by the end of this *Unit*. Work throughout this Unit solidifies specifically 1.NBT.3 (comparison of numbers), 1.NBT.5 (mentally find 10, more or less), 1.MD.1 (order three objects by length), 1.MD.2 (length of object), and 1.MD.4 (data) (NVACS, 2010). Continue to expect all students to engage in the problem solving, and in explaining and justifying their thinking. Use Table 1 in the *Nevada Academic Content Standards* (NVACS) titled "Common addition and subtraction situations" (p. 88) to think about intensification and acceleration.

Continue to consider "Support" and "Challenge" options within each *Session*, and "Game Variations", "Differentiate", and "English-Language Learners" ideas in *Work Places*.

Essential Academic Vocabulary Use these words consistently during instruction.			
New Academic Vocabulary: (first time explicitly taught) *indicates Word Resource Cards are available in the Bridges materials	Review Academic Vocabulary: (Vocabulary from Number Corner or previous units)		
Hour (hr.)* Minute (min.)* Second (sec.)*	*Add** *Clock* *Compare** *Count** *Cube** *Distance* *Difference** *Double* *Edge** *Equal** *Fives*	*Graph* *Greater than** *Group/groups* *Half** *Hundreds** *Length** *Less than** *Long/longer/longest** *Lowest* *Measure* *More than* *Number line**	*Ones** *Parallel* *Pattern** *Rectangle** *Short/shorter/shortest** *Subtract** *Subtraction* *Sum or Total** *T- Chart* *Tally marks* *Tens** *Weight**

Additional terminology that students might need support with: change, circumference, clock face, day, fast, fold, left side, location, minus, minute hand, order, plus, range, right side, rule, second hand, slow, sudden, time, strategies, year

*Collaborative Team Conversations (CTC)

Consider using ***one*** of the following as part of the formative assessment process at the lesson level to **collect student work** to analyze for evidence of mathematical understanding:

Guiding questions:
"What strategies are students using to represent and solve for the amount of time passing on an analog clock?"
"What different strategies are students using to add two-digit numbers?"
"What different strategies are students using to compare up to 3 numbers and find differences?"
"What tools do students choose to support their problem-solving?"
"What evidence demonstrates fluent understanding of 5, 10, and/or 10 and some more?"
"How do students show they are searching for patterns, looking for relationships, looking for predictable change, testing their theories, and discovering patterns for predicting future events?"
"How do students show they are making sense of the problems and deepening their understanding of the number system to 120?"
"If needed, what intensification interactions will support the use of a variety of strategies and tools for problem solving?"

Lesson	Evidence	Look for
U8M2S4 *Time and Change Checkpoint* TG p. 24	*Time and Change Checkpoint* observations and student record sheet (TG U8M2S4 pp. T6-T7) *Time and Change Checkpoint Scoring Guide* (AG Bridges Unit Assessments pp. 85-87)	Focus CTC around conceptual understandings of the big idea and strategies used: • adding two-digit numbers • using multiples of 5 and 10 • using counting strategies with 1s, 5s, and/or 10s • counting by 5s or 10s on or off the decade • jumping to the nearest 10; counting 10s and 1s • comparing two-digit numbers; using 10s and 1s • making sense of the number system (seeing and using 1s, 5s, and/or 10s) • monitoring own confusions and self-correcting • persevering and explaining thinking
U8M3S6 *Unit 8 Assessment #5 & 6* TG p. 31	*Unit 8 Assessment #5 & 6* observation and student record sheet (TG U8M3S6 p. T4) *Unit 8 Assessment Scoring Guide #5 & 6* (AG Bridges Unit Assessments pp. 89-91)	Focus CTC around conceptual understandings of the big idea and strategies used: • adding two-digit numbers • using multiples of 5 or 10 • using counting strategies with 1s, 5s, and/or 10s • counting by 5s or 10s on or off the decade • jumping to the nearest 10; counting 10s and 1s • comparing two-digit numbers; using 10s and 1s • making sense of the number system (seeing and using 1s, 5s, and/or 10s) • monitoring own confusions and self-correcting • persevering and explaining thinking

Learning Cycle Assessments (summative)	*Number Corner Checkup 4* NC TG Vol. 3 May, pp. 43-46 *Number Corner Checkup 4 Interview Response Sheet & Written Assessment* NC TG Vol. 3 May, pp. T6-T10; AG Number Corner Assessments pp. 27-31	Use *Number Corner Checkup 4 Scoring Guide* AG Number Corner Assessments p. 32

Standards listed in **bold** indicate a focus of the lesson.

NVACS (Content and Practices)	Mathematical Development of the Big Idea	Instructional Clarifications & Considerations
Module 1- Session 1: Time Tests		
1.NBT.1 MP.4 MP.7	Access Prior Learning: • Time was not an expectation in the kindergarten standards. In 1st grade Number Corner, students worked with time on both analog/digital clocks, to the hour and half hour. Securing the Big Idea and key Strategic Behaviors: • measuring and comparing the passing of time – second, minute, hour • understanding number relationships • understanding part/whole relationships	Guiding Question: • What do you know about time? Instructional Notes: • Send home the *Family Letter* found here. • "Time is different from most other attributes that are commonly measured in school because it cannot be seen or felt and because it is more difficult for children to comprehend units of time or how those units are matched against a given time period or duration. As with other attributes, for children to adequately understand the attribute of time, they should make comparisons of events that have different durations" (Van de Walle, et al., 2014, pp. 286-287). • The intent of the activities is to allow students opportunities to experience the passing of time. Enrichment: • See the *Extensions* activities in the margin (p. 7). Child Watching: • Identify students using appropriate vocabulary. • Identify students making connections to their daily lives.

Module 1- Session 2: A Second, A Minute, or An Hour		
1.NBT.1 1.MD.3 MP.4 MP.5 MP.7	Access Prior Learning: • Time was not an expectation in the kindergarten standards. • In 1st grade Number Corner, students worked with time on both analog/digital clocks, to the hour and half hour. Securing the Big Idea and key Strategic Behaviors: • measuring and comparing the passing of time – second, minute, hour • understanding and using number relationships • understanding and using part/whole relationships	Guiding Questions: • How do you know how long something will take? • What do you know that takes a long time? • What do you know that takes a short time? Enrichment: • There is a blog titled *Finish Strong & Carry On* suggested on the Educator Site with ideas for Unit 8. Child Watching: • Identify students using appropriate vocabulary. • Identify students making connections to their daily lives.
Module 1- Session 3: How Long Does it Take?		
1.MD.4 MP.4 MP.7	Access Prior Learning: • Time was not an expectation in the kindergarten standards. In 1st grade Number Corner, students worked with time on both analog/digital clocks, to the hour and half hour. Securing the Big Idea and key Strategic Behaviors: • measuring and comparing the passing of time – second, minute, hour • understanding and using number relationships • understanding and using part/whole relationships • collecting data and graphing	Guiding Question: • How can we sort and categorize activities? Instructional Note: • "Time is different from most other attributes that are commonly measured in school because it cannot be seen or felt and because it is more difficult for children to comprehend units of time or how those units are matched against a given time period or duration. As with other attributes, for children to adequately understand the attribute of time. They should make comparisons of events that have different durations" (Van de Walle, et al., 2014, pp. 286-287). Enrichment: • Consider having students ask and answer questions about their graph. How many more activities are in the second column compared to the minute column? Child Watching: • Identify students using appropriate vocabulary. • Identify students making connections to their daily lives.
Module 1- Session 4: An Hour or Bust!		
1.NBT.1 1.NBT.3 1.NBT.4 1.G.3 MP.2 MP.3	Access Prior Learning: • Connect to previous work with counting by 5s and adding multiples of 5. Securing the Big Idea and key Strategic Behaviors: • understanding and using part/whole relationships • counting by 5s • reasoning with "how many more" to get to 60 – finding the difference • adding two-digit numbers – place value understanding	Guiding Questions: • What do you know about counting on a clock? • How do you know how much more time you have before the next hour? Instructional Notes: • See the *Work Place* sentence frames for Unit 8 here. • Online digital tools for the *Work Place* are provided on the Educator Site. • Utilize the opportunity to work with adding two-digit numbers by asking the questions suggested, such as "I got 20+10+15+15. Can you figure out my total?" Enrichment: • See the Game Variations on Work Place Instructions (p. T3). Child Watching: • Identify students who are using strategies to add mentally the numbers. • Identify students using the commutative property, and changing the order of the numbers to create easier-to-add combinations.

Module 1- Session 5: Introducing Work Place 8A An Hour or Bust!		
1.OA.8 1.NBT.1 1.NBT.3 1.NBT.4 1.G.3 MP.2 MP.3	Access Prior Learning: • Connect to previous work with counting by 5s and adding multiples of 5. Securing the Big Idea and key Strategic Behaviors: • understanding and using part/whole relationships • counting by 5s • reasoning with "how many more" to get to 60 – finding the difference • adding two-digit numbers – place value understanding	Guiding Questions: • What do you know about counting on a clock? • How do you know how much more time you have before the next hour? Enrichment: • See the Game Variations on Work Place Instructions (p. T3). Child Watching: • Identify students who are using strategies to add mentally the numbers. • Identify students using the commutative property, and changing the order of the numbers to create easier-to-add combinations.
Module 2- Session 1: Grandma's Picnic Basket		
1.OA.1 1.OA.6 1.NBT.4 1.G.3 MP.2 MP.4 MP.7	Access Prior Learning: • Connect to known strategies for adding and subtracting within 20. • Students worked on doubles previously. Securing the Big Idea and key Strategic Behaviors: • understanding and using number relationships • using doubles • using combinations within 20 • understanding and using number patterns • comparing quantities • reasoning with data	Guiding Question: • What do you notice? • What predictions can you make with the in and out chart? • How can you make a reasonable prediction for what the next number will be? Instructional Notes: • Read the *Math Practices in Action* in the margin (p. 8). • In the *Bridges Overview* for this *Unit,* you will find the *Algebra Connections in This Unit* (p. vi). Consider revisiting this as you launch into work with the big idea of algebraic functions. Enrichment: • Encourage students to challenge themselves with a larger number to double, or to make multiple pages for the book. Child Watching: • Identify students seeing and using the structures and patterns they see on the T-chart.
Module 2- Session 2: The Change Box, Day 1		
1.OA.5 1.OA.6 MP.2 MP.7 MP.8	Access Prior Learning: • Connect to known strategies for adding and subtracting within 20. • Students worked with seeing and adding/subtracting 1, 2, and 3 to/from a number. Securing the Big Idea and key Strategic Behaviors: • understanding and using number relationships • understanding and using number patterns • using combinations within 20 • gathering and using data • predicting	Guiding Questions: • What do you notice? • How can you make a reasonable prediction for what the next number will be? Instructional Notes: • Continuously reinforce strategies that involve adding and subtracting. • Math Practices 7 & 8 both begin with "look for" which implies that "children who are mathematically proficient pay attention to patterns as they do mathematics." These lessons provide opportunities for students to work on these two math practices. "Children should be engaged in looking for, describing, and extending patterns to help them develop the skills to look for structure and express regularity in all mathematical situations." (Van de Walle, et al., 2014, p. 243). • These skills support understanding of relationships between numbers, developing the big idea of algebraic functions. • See the blog titled *The Ins & Outs of the Change Box* on the Educator Site for step-by-step directions and picture support to create your change box. Enrichment: • See Step 10 (p.16). Child Watching: • Identify students seeing and using the structures and patterns they see on the T-chart.

Module 2- Session 3: The Change Box, Day 2		
1.OA.6 MP.2 MP.7	Access Prior Learning: • Connect to known strategies for adding and subtracting within 20. • Students previously worked with adding/subtracting 1, 2, and 3 to/from a number. Securing the Big Idea and key Strategic Behaviors: • understanding and using number relationships • understanding and using number patterns • using combinations within 20 • gathering and using data • predicting	Guiding Questions: • What do you notice? • How can you make a reasonable prediction for what the next number will be? Instructional Notes: • Continuously reinforce strategies that involve adding and subtracting. • Math Practices 7 & 8 both begin with "look for" which implies that "children who are mathematically proficient pay attention to patterns as they do mathematics." These lessons are powerful opportunities for students to work on these two math practices. "Children should be engaged in looking for, describing, and extending patterns to help them develop the skills to look for structure and express regularity in all mathematical situations." (Van de Walle, et al., 2014, p. 243). • These skills support understanding of relationships between numbers, developing the big idea of algebraic functions. Enrichment: • See Steps 9 & 11 (p. 20); see Extensions in the margin (p. 20). Child Watching: • Identify students seeing and using the structures and patterns they see on the T-chart.
Module 2- Session 4: Introducing Work Place 8B Change Cards		
1.NBT.4 1.NBT.5 1.NBT.6 MP.2 MP.7	Access Prior Learning: • Connect to known strategies for adding and subtracting within 20. • Students worked with doubles previously. • Students also previously worked with adding and subtracting 1 or 2 to/from a number. Securing the Big Idea and key Strategic Behaviors: • understanding and using number relationships • understanding and reasoning with number patterns • adding/subtracting 10 on and off the decade • gathering and reasoning with data • predicting	Guiding Question: • How can you figure out the "rule"? Instructional Note: • The assessment binder under the Bridges Unit Assessment Tab provides the scoring guide for the Time & Change Checkpoint (p. 84). Enrichment: • See step 10 (p. 23). Child Watching: • Use the Checkpoint Scoring Guide to inform your instruction. Pull small groups as needed to support students in areas they are not secure.
Module 3- Session 1: Folding & Flying Paper Gliders		
1.G.3 MP.1 MP.6	Access Prior Learning: • Students previously worked with composing simple shapes to form larger shapes. • Unit 5 provided opportunities for students to secure geometry standards. Securing the Big Idea and key Strategic Behaviors: • constructing paper gliders	Guiding Questions: • What do you already know about making paper airplanes? • What other things do you know how to make from paper? • How important is precision and why? Instructional Notes: • Read the *Math Practices in Action* in the margin (p. 6). • Keep gliders for the entire Module. • Consider making cross content connections with the Next Generation Science Standards for this module. Child Watching: • Identify students struggling to create their glider and support as needed.

Module 3- Session 2: Constructing Runways		
1.NBT.2 1.NBT.5 1.MD.2 MP.1 MP.7	Access Prior Learning: • Students previously directly compared two objects with a measurable attribute in common. • Students had experience with measuring in the Penguin modules, Units 4 and 6. Securing the Big Idea and key Strategic Behaviors: • measuring distance in a series of iterated units • comparing measurements • gathering and reasoning with data	Guiding Questions: • What do you already know about measuring? • How can you measure distance? Instructional Notes: • Consider providing students the first opportunity to devise a plan to measure the distance of flight for their gliders (thus moving toward DOK 4 thinking). Students will likely come up with the idea of using cubes to mark a runway or you can guide them in that direction after they have brainstormed other ideas and reasoned through the pros and cons. Leaving this more open-ended creates opportunity for common measurement misconceptions to present themselves for discussion and for deeper understandings to develop. • Having students cut a length of string to represent the distance and spend time measuring the string might create additional opportunities to compare distances. Child Watching: • Observe for student misconceptions about measurement including: leaving gaps between units; having overlaps (if using tools like popsicle sticks); not starting and ending at the object's beginning or ending; not attending to the linear aspect (following a curved shape of flight pattern); assuming an item is longer than another same-sized item if the measuring unit choice resulted in a larger quantity; comparing measurements that were measured using different-sized units (popsicle sticks versus unifix cubes).
Module 3- Session 3: Gliders in Flight		
1.NBT.1 1.NBT.3 1.NBT.4 1.MD.1 1.MD.2 MP.1 MP.2	Access Prior Learning: • Students previously directly compared two objects with a measurable attribute in common. • Students had experience with measuring in the Penguin modules, Units 4 and 6. Securing the Big Idea and key Strategic Behaviors: • measuring distance in a series of iterated units • comparing measurements • gathering and reasoning with data • writing comparison expressions • determining difference	Guiding Questions: • Can different distances be compared? • How can you compare distances? Instructional Note: • Provide students the opportunity to discover that, in order to compare distances with each other, a common unit of measure must be used. Cubes then become an efficient tool to use to compare measurements of distance. Enrichment: • Students could begin engineering different paper airplanes and determining which design of airplanes flies further. Child Watching: • Observe for student misconceptions about measurement including: leaving gaps between units; having overlaps (if using tools like popsicle sticks); not starting and ending at the object's beginning or ending; not attending to the linear aspect (following a curved shape of flight pattern); assuming an item is longer than another same-sized item if the measuring unit choice resulted in a larger quantity; comparing measurements that were measured using different-sized units (popsicle sticks versus unifix cubes).
Module 3- Session 4: Analyzing the Flight Data		
1.NBT.1 1.NBT.3 1.NBT.4 1.MD.4 MP.1 MP.2	Access Prior Learning: • Students previously directly compared two objects with a measurable attribute in common. • Students also previously worked with sorting, classifying, and counting objects. • Students had experience with measuring in the Penguin modules, Units 4 and 6. Securing the Big Idea and key Strategic Behaviors: • constructing paper gliders • comparing measurements • gathering and reasoning with data	Guiding Questions: • How do you organize and read data? • What does data tell you? Instructional Note: • Read the Math Practices in Action in the margin (p. 22). Enrichment: • See Step 10 or ask students to ask and answer their own questions about the data (p. 23). Child Watching: • Observe for use of addition and subtraction strategies as they compare data points.

Module 3- Session 5: More Glider Flights		
1.NBT.1 1.NBT.3 1.NBT.4 1.MD.1 1.MD.2 MP.1 MP.2	Access Prior Learning: • Students previously directly compared two objects with a measurable attribute in common. • Students had experience with measuring in the Penguin modules, Units 4 and 6. Securing the Big Idea and key Strategic Behaviors: • measuring distance in a series of iterated units • comparing measurements • gathering and reasoning with data • writing comparison expressions • determining difference	Guiding Questions: • What do you notice about your new glider? • What do you observe about your data? Enrichment: • Students could begin engineering different paper airplanes and determining which design of airplanes flies further. Child Watching: • Observe for student misconceptions about measurement.
Module 3- Session 6: Analyzing the Second Round of flight Data		
1.NBT.1 1.NBT.3 1.NBT.4 1.MD.4 MP.1	Access Prior Learning: • Students previously directly compared two objects with a measurable attribute in common. • Students also previously worked with sorting, classifying, and counting objects. • Students had experience with measuring in the Penguin modules, Units 4 and 6. Securing the Big Idea and key Strategic Behaviors: • comparing measurements • gathering and reasoning with data	Guiding Questions: • How do you organize and read data? • What does data tell you? Instructional Notes: • The *Assessment Guide* under the *Bridges Unit Assessments* tab provides the scoring guide for the for *Unit 8 Assessment* (p. 91) • Standards 1.NBT.3, 1.NBT.5, 1.MD.1, 1.MD.2, & 1.MD.4 are targeted for mastery according to the *Grade 1 Assessment Map* in the *Assessment Binder* under the *Assessment Overview* tab (pp. 13-15). • The assessment provides another opportunity to assess 1.NBT.4, 1.NBT.6, & 1.NBT.1, which were targeted for security in previous units. Enrichment: • See Step 11 (p. 24). Child Watching: • See Assessment Binder, Bridges Unit Assessment tab, p. 61 for information regarding students who may be struggling. Watch for students struggling with solving addition and subtraction story problems within 20, counting on and counting back to solve addition and subtraction combinations within 20, adding and subtracting with sums and minuends to 10 using strategies that are efficient, accurate and flexible, working from familiar facts such as doubles, make 10s, and add tens, counting to 120, reading and writing numbers to 100, and understanding that whole numbers between 10 and 100 are composed of 10s and 1s. • Any students struggling with these standards at this point could benefit from use of the Bridges Intervention materials.
Module 4- Session 1: Baby Lengths		
1.NBT.1 1.NBT.3 1.MD.1 1.MD.2 MP.6	Access Prior Learning: • Students previously directly compared two objects with a measurable attribute in common. • Students also previously worked with sorting, classifying, and counting objects. • Students had experience with measuring in the Penguin modules, Units 4 and 6. Securing the Big Idea and key Strategic Behaviors: • measuring length in a series of iterated units • comparing measurements	Guiding Questions: • What do you already know about measuring length? • What strategies can you use to compare lengths? Instructional Notes: • Attend to culturally responsive practices when planning for this module. In analyzing the make-up of your class, be aware of any students who might not have knowledge of their birth details, or family history. Teachers might brainstorm with student's ways to participate by using a baby's length from another child. • Read the *Math Practices in Action* in the margin (p. 4). • The Big Idea of transitivity can be discussed during this session when ordering the lengths (if length A is bigger than B, and B is bigger than C, logically we can assume A is bigger than C). Allow students to directly compared lengths, if needed, to grasp the understanding of this idea. Students will later be able to engage in this process by visualizing the length attribute of each object and mentally comparing. *-continues on next page-*

	• gathering and reasoning with data • determining difference	Enrichment: • See Extension in the margin (p. 6). Child Watching: • Observe for student misconceptions about measurement.
Module 4- Session 2: How We Have Grown		
1.OA.3 1.NBT.1 1.NBT.3 1.NBT.4 1.NBT.5 MP.1 MP.5	Access Prior Learning: • Students previously directly compared two objects with a measurable attribute in common. • Students also previously worked with sorting, classifying, and counting objects. • Students had experience with measuring in the Penguin modules, Units 4 and 6. Securing the Big Idea and key Strategic Behaviors: • comparing measurements • determining difference • determining strategies and tools	Guiding Questions: • What do you already know about measuring length? • What strategies can you use to compare lengths? Instructional Note: • Read the Math Practices in Action in the margin (p. 11). Child Watching: • Observe for students' strategies when adding and subtracting. • Observe for students' written methods as they describe their strategies. • Continue to observe for measurement misconceptions.
Module 4- Session 3: How Big is This Baby?		
1.NBT.2 1.NBT.3 1.NBT.4 1.MD.1 1.MD.2 1.MD.4 MP.4 MP.6	Access Prior Learning: • Students previously directly compared two objects with a measurable attribute in common. • Students also previously worked with sorting, classifying, and counting objects. • Students had experience with measuring in the Penguin modules, Units 4 and 6. Securing the Big Idea and key Strategic Behaviors: • measuring length in a series of iterated units • comparing measurements • gathering and reasoning with data • determining difference	Guiding Questions: • What can you measure? • How much bigger are you than your little brother or sister? Instructional Note: • Students are moving into understanding of indirect measurement. As the baby leaves, students no longer have opportunity for making a direct comparison. Child Watching: • Observe for student understandings of ordering lengths (seriation) and transitivity. • Observe for student misconceptions about measurement.
Module 4- Session 4: The Baby & Me		
1.OA.3 1.NBT.1 1.NBT.4 1.NBT.5 1.MD.2 MP.1 MP.5	Access Prior Learning: • Students previously directly compared two objects with a measurable attribute in common. • Students also previously worked with sorting, classifying, and counting objects. • Students had experience with measuring in the Penguin modules, Units 4 and 6. Securing the Big Idea and key Strategic Behaviors: • comparing measurements • gathering and reasoning with data • determining difference •	Guiding Question: • How can you compare yourself to others? Instructional Note: • Comparing measurements that are not a typical straight length is the big idea of these experiences, as students engage in finding the circumference of their heads. Students must transfer that measurement to the string and then compare the measurements. Enrichment: • See Step 11 (p. 20). Child Watching: • Observe for use of addition and subtraction strategies as students compare data points. • Observe for student misconceptions about measurement as noted in previous session.

Module 4- Session 5: Time & Change		
MP.4	Access Prior Learning: • Students previously directly compared two objects with a measurable attribute in common and worked with sorting, classifying, and counting objects. Securing the Big Idea and key Strategic Behaviors: • discovering patterns • predicting future events using data	Guiding Question: • How do you change over time? By the second? By the day? By the year? Instructional Note: • This lesson can provide opportunities for student reflection about their learning over time. This would be an opportunity to visit student math portfolios, if they have them, and add items to the gallery walk from their portfolios. Child Watching: • Celebrate with students celebrating their own learning and success!

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