Georgia Standards of Excellence Curriculum Frameworks

Mathematics

GSE Kindergarten

Unit 1: Counting With Friends

Georgia Department of Education

Richard Woods, Georgia's School Superintendent

"Educating Georgia's Future"

Georgia Department of Education
Georgia Standards of Excellence Framework
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Kindergarten Unit 1: Counting With Friends
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Classroom video available here: https://www.georgiastandards.org/Georgia-Standards/Pages/Implement-Math-Task-Classroom-Videos/What-Does-it-Look-Like-When-you-Implement-a-Task.aspx
IF YOU HAVE NOT READ THE KINDERGARTEN CURRICULUM OVERVIEW IN ITS ENTIRETY PRIOR TO USE OF THIS UNIT, PLEASE **STOP** AND CLICK HERE:
https://www.georgiastandards.org/Georgia-Standards/Frameworks/K-Math-Grade-Level-Overview.pdf
Return to the use of this unit once you've completed reading the Curriculum Overview. Thank you.

The Critical Areas are designed to bring focus to the standards at each grade by describing the big ideas that educators can use to build their curriculum and to guide instruction.

Students use numbers, including written numerals, to represent quantities and to solve quantitative problems, such as counting objects in a set; counting out a given number of objects; comparing sets or numerals; and modeling simple joining and separating situations with sets of objects, or eventually with equations such as 5 + 2 = 7 and 7 – 2 = 5. (Kindergarten students should see addition and subtraction equations, and student writing of equations in kindergarten is encouraged, but it is not required.) Students choose, combine, and apply effective strategies for answering quantitative questions, including quickly recognizing the cardinalities of less sets of objects, counting and producing sets of given sizes, counting the number of objects in combined sets, or counting the number of objects that remain in a set after some are taken away.

OVERVIEW

In this unit, students will start kindergarten thinking of counting as a string of words, but then they make a gradual transition to using counting as a tool for describing their world. They must construct the idea of counting using manipulatives and other resources to see the numbers visually (dot cards, tens frames). To count successfully, students must remember the rote counting sequence, assign one counting number to each object counted, and at the same time have a strategy for keeping track of what has already been counted and what still needs to be counted. Only the counting sequence is a rote procedure. The meaning students attach to counting is the key conceptual idea on which all other number concepts are developed. Students will develop successful and meaningful counting strategies as they practice counting and as they listen to and watch others count.

Although the units in this instructional framework emphasize key standards and big ideas at specific times of the year, routine topics such as counting, positional word and time should be addressed on an ongoing basis through the use of calendar, centers (tubs), and games. This unit should allow students to understand the concepts of numbers and counting.

The Critical Areas are designed to bring focus to the standards at each grade by describing the big ideas that educators can use to build their curriculum and to guide instruction.

In Kindergarten, instructional time should focus on two critical areas:

(1) Representing, relating, and operating on whole numbers, initially with sets of objects. Students choose, combine, and apply effective strategies for answering quantitative questions, including quickly recognizing the cardinalities of less sets of objects, counting and producing sets of given sizes, counting the number of objects in combined sets, or counting the number of objects that remain in a set after some are taken away.

(2) Students use numbers, including written numerals, to represent quantities and to solve quantitative problems, such as counting objects in a set; counting out a given number of objects; comparing sets or numerals; and modeling simple joining and separating situations with sets of objects, or eventually with equations such as 5+2 = 7 and 7 – 2 = 5. *(Kindergarten students should see addition and subtraction equations, and student writing of equations in kindergarten is encouraged, but it is not required.)*

For more detailed information about unpacking the content standards, unpacking a task, math routines and rituals, maintenance activities and more, please refer to the Grade Level Overview

STANDARDS FOR MATHEMATICAL PRACTICE

The standards for mathematical practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education. The statements provided offer a few examples of connections between the Standards for Mathematical Practice and Content Standards of this unit. The list is not exhaustive and will hopefully prompt further reflection and discussion.

Students are expected to:

1. Make sense of problems and persevere in solving them. Students make sense of problems involving rote counting, recognizing counting patterns, and identifying quantities of items.

2. Reason abstractly and quantitatively. Students demonstrate abstract reasoning by writing numerals to represent an amount of objects counted, creating a set of objects to match a given number, and selecting the correct number card to continue a counting sequence

3. Construct viable arguments and critique the reasoning of others. Students begin to develop the ability to reason and analyze situations by considering questions such as, "How do you know you counted correctly?", and by asking classmates to explain how they found their answer.

4. Model with mathematics. Students use objects, numbers, and drawings to represent quantities of objects and counting sequence.

5. Use appropriate tools strategically. Students will use counters, connecting cubes, ten frames, and technological materials (illuminations 5- and 10- frames) to explore counting and cardinality.

6. Attend to precision. Students will build their mathematical vocabulary by expressing their ideas and explaining their reasoning using words with regard to quantity and cardinality.

7. Look for and make use of structure. Students will begin to look for patterns and structure in the number system by working with dot cards, number cards, and ten frames.

8. Look for and express regularity in repeated reasoning. Students will recognize repetitive actions in counting by realizing that when joining one more object to a pile, the new amount is the next number in the count sequence (4 cubes and 1 more cube is 5 cubes).

(For descriptors of standard cluster please see the Grade Level Overview)
*****Mathematical Practices 1 and 6 should be evident in EVERY lesson*****

STANDARDS FOR MATHEMATICAL CONTENT

Counting and Cardinality

Know number names and the count sequence.

MGSEK.CC.1. Count to 100 by ones and by tens.

MGSEK.CC.2. Count forward beginning from a given number within the known sequence (instead of having to begin at 1).

MGSEK.CC.3. Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).

Count to tell the number of objects.

MGSEK.CC.4 Understand the relationship between numbers and quantities; connect counting to cardinality.

a. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object. **(one-to-one correspondence)**
b. Understand that the last number name said tells the number of objects counted **(cardinality)**. The number of objects is the same regardless of their arrangement or the order in which they were counted.
c. Understand that each successive number name refers to a quantity that is one larger.

Classify objects and count the number of objects in each category.

MGSEK.MD.3. Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.

Geometry

MGSEK.G.1. Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as *above, below, beside, in front of, behind,* and *next to*.

Number Sense Trajectory –*Putting It All Together*

Trajectory	**Subitizing** Being able to visually recognize a quantity of 5 or less.	**Comparison** Being able to compare quantities by identifying which has more and which has less.	**Counting** Rote procedure of counting. The meaning attached to counting is developed through one-to-one correspondence.	**One-to-One Correspondence** Students can connect one number with one object and then count them with understanding.	**Cardinality** Tells how many things are in a set. When counting a set of objects, the last word in the counting sequence names the quantity for that set.	**Hierarchical Inclusion** Numbers are nested inside of each other and that the number grows by one each count. 9 is inside 10 or 10 is the same as 9 + 1.	**Number Conservation** The number of objects remains the same when they are rearranged spatially. 5 is 4&1 OR 3&2.

Each concept builds on the previous idea and students should explore and construct concepts in such a sequence

Number Relationship	Spatial Relationship Patterned Set Recognition Students can learn to recognize sets of objects in patterned arrangements and tell how many without counting.	One and Two-More or Less Students need to understand the relationship of number as it relates to +/- one or two. Here students should begin to see that 5 is 1 more than 4 and that it is also 2 less than 7.	Understanding Anchors Students need to see the relationship between numbers and how they relate to 5s and 10s. 3 is 2 away from 5 and 7 away from 10.	Part-Part-Whole Relationship Students begin to conceptualize a number as being made up from two or more parts.

Addition and Subtraction Strategies

One/Two More/Less These facts are a direct application of the One/Two More/ Less than relationships	**Make a Ten** Use a quantity from one addend to give to another to make a ten then add the remainder. 9 + 7 = 10 + 6	**Near Doubles** Using the doubles anchor and combining it with 1 and 2 more/less.
Facts with Zero Need to be introduced so that students don't over generalize that answers to addition are always greater.	**Doubles** Many times students will use doubles as an anchor when adding and subtracting.	

Big Ideas

Number Properties

- Understand numbers, ways of representing numbers, relationships among numbers, and number systems.
- Count with understanding and recognize "how many" in a set of objects.
- Develop a sense of whole numbers and represent and use them in flexible ways.
- Develop understanding of the relative magnitude and position of whole numbers.
- Use multiple models to develop initial understandings of the base-ten number system.
- Connect number words and numerals to the quantities they represent, using various physical models and representation
- Counting tells how many things are in a set.
- The last number word, when counting, names the quantity in a set.
- A number can be represented by a set of objects, then by a word, and finally by a numeral.
- Numbers are related to each other through a variety of relationships. For example, 6 is one more than 5, and is 4 less than 10.
- Counting can be a way to gather information.

Other than pennies, coins are not explicitly taught in kindergarten, but the connections to patterns and skip counting should be made. Pennies can be used as a manipulative for patterns, skip counting and counting.

ESSENTIAL QUESTIONS

- How can numbers be represented?
- How can we show numbers in different ways?
- Why do we need to be able to count objects?
- How do we use numbers every day?
- How do we know if a number is more or less than another number?
- Why would we need to be able to read number words?
- What is a numeral?
- Why do we need to be able to count forwards and backwards?
- How can we use counting in our everyday lives?
- Why is it important to know how to put things in number order?
- What is the difference between "more" and "less"?
- How can numbers be represented?

CONCEPTS/SKILLS TO MAINTAIN

Although some students may have attended pre-school prior to entering kindergarten, this is the first year of school for some students. For that reason, no concepts/skills to maintain will be listed at this time. It is expected that teachers will differentiate to accommodate those students that may enter kindergarten with prior knowledge.

STRATEGIES FOR TEACHING AND LEARNING

Provide settings that connect mathematical language and symbols to the everyday lives of kindergarteners. Support students' ability to make meaning and mathematize the real world. Help them see patterns, make connections and provide repeated experiences that give students time and opportunities to develop understandings and increase fluency. Encourage students to explain their reasoning by asking probing questions, such as, "How do you know?"

Students view counting as a mechanism used to land on a number. Young students mimic counting often with initial lack of purpose or meaning. Coordinating the number words, touching or moving objects in a one-to-one correspondence may be little more than a matching activity. However, saying number words as a chant or a rote procedure plays a part in students constructing meaning for the conceptual idea of counting. They will learn how to count before they understand cardinality, i.e. that the last count word is the amount of the set.

Counting on or counting from a given number conflicts with the learned strategy of counting from the beginning. In order to be successful in counting on, students must understand cardinality. Students often merge or separate two groups of objects and then re-count from the beginning to determine the final number of objects represented. For these students, counting is still a rote skill or the benefits of counting on have not been realized. Games that require students to add on to a previous count to reach a goal number encourage developing this concept. Frequent and brief opportunities utilizing counting on and counting back are recommended. These concepts emerge over time and cannot be forced.

Like counting to 100 by either ones or tens, writing numbers from 0 to 20 is a rote process. Initially, students mimic the actual formation of the written numerals while also assigning it a name. Over time, children create the understanding that number symbols signify the meaning of counting. Numerals are used to communicate across cultures and through time a certain meaning.

Numbers have meaning when children can see mental images of the number symbols and use those images with which to think. Practice count words and written numerals paired with pictures, representations of objects, and objects that represent quantities within the context of life

experiences for kindergarteners. For example, dot cards, dominoes and number cubes all create different mental images for relating quantity to number words and numerals.

One way students can learn the left to right orientation of numbers is to use a finger to write numbers in air (sky writing). Children will see mathematics as something that is alive and that they are involved.

Students should study and write numbers 0 to 20 in this order: numbers 1 to 9, the number 0, and then numbers 10 to 20. They need to know that 0 is the number items left after all items in a set are taken away. Do not accept "none" as the answer to "How many items are left?" for this situation.

One of the first major concepts in a student's mathematical development is cardinality. Cardinality, knowing that the number word said tells the quantity you have and that the number you end on when counting represents the entire amount counted. The big idea is that number means amount and, no matter how you arrange and rearrange the items, the amount is the same. Until this concept is developed, counting is merely a routine procedure done when a number is needed. To determine if students have the cardinality rule, listen to their responses when you discuss counting tasks with them. For example, ask, "How many are here?". The student counts correctly and says that there are seven. Then ask, "Are there seven?". Students may count or hesitate if they have not developed cardinality. Students with cardinality may emphasize the last count or explain that there are seven because they counted them. These students can now use counting to find a matching set.

Students develop the understanding of counting and cardinality from experience. Almost any activity or game that engages children in counting and comparing quantities, such as board games, will encourage the development of cardinality. Frequent opportunities to use and discuss counting as a means of solving problems relevant to kindergarteners, is more beneficial than repeating the same routine day after day. For example, ask students questions that can be answered by counting up to 20 items before they change, and as they change, locations throughout the school building.

As students develop meaning for numerals, they also compare numerals to the quantities they represent. Models that can represent numbers – such as dot cards and dominoes – become tools for such comparisons. Students can concretely, pictorially or mentally look for similarities and differences in the representations of numbers. They begin to "see" the relationship of one more, one less, two more and two less, thus landing on the concept that successive numbers name quantities that are one larger. In order to encourage this idea, children need discussion and reflection of pairs of numbers from 1 to 10. Activities that utilize anchors of 5 and 10 are helpful

in securing understanding of the relationships between numbers. This flexibility with numbers will build students' ability to break numbers into parts.

Provide a variety of experiences in which students connect count words or number words to the numerals that represent the quantities. Students will arrive at an understanding of a number when they acquire cardinality and can connect a number with the numerals and the number word for the quantity they all represent.

Special Note:

Although the standard **MGSEK.CC.1.** (*Count to 100 by ones and by tens*) is included throughout this unit, students should be given ample time to count and really focus on numbers through 20. This standard is seen as a progression that is to be met by the end of the year. Although the standard states "to 100", this unit (in particular the tasks), focus on numbers and number relationships through 10. It is because of the aforementioned reasons that skip counting is not specifically addressed in this unit.

SELECTED TERMS AND SYMBOLS

The following terms and symbols are often misunderstood. These concepts are not an inclusive list and should not be taught in isolation. However, due to evidence of frequent difficulty and misunderstanding associated with these concepts, instructors should pay particular attention to them and how their students are able to explain and apply them.

Teachers should first present these concepts to students with models and real life examples. Students should understand the concepts involved and be able to recognize and/or use them with words, models, pictures, or numbers.

- **Zero**
- **Order**
- **Number Line**
- **Forward**
- **Backward**
- **Count**
- **Counting-On**
- **Compare**
- **Digits**
- **Number**
- **Numeral**
- **Less than**
- **More than/Greater than**
- **Model**
- **Number**
- **Numeral**
- **Ones**
- **Pair**
- **Quantity**
- **Same**
- **Sequence**
- **Set**

Mathematics Glossary

COMMON MISCONCEPTIONS

Some students might not see zero as a number. Ask students to write 0 and say *zero* to represent the number of items left when all items have been taken away. Avoid using the word *none* to represent this situation.

Some students might think that the count word used to tag an item is permanently connected to that item. So, when the item is used again for counting and should be tagged with a different count word, the student uses the original count word. For example, a student counts four geometric figures: triangle, square, circle and rectangle with the count words: one, two, three, and four. If these items are rearranged as rectangle, triangle, circle and square and counted, the student says these count words: four, one, three, and two.

TASK DESCRIPTIONS

Scaffolding Task	Tasks that build up to the learning task.
Constructing Task	Constructing understanding through deep/rich contextualized problem solving tasks.
Practice Task	Tasks that provide students opportunities to practice skills and concepts.
Culminating Task	Designed to require students to use several concepts learned during the unit to answer a new or unique situation. Allows students to give evidence of their own understanding toward the mastery of the standard and requires them to extend their chain of mathematical reasoning.
Formative Assessment Lesson (FAL)	Lessons that support teachers in formative assessment which both reveal and develop students' understanding of key mathematical ideas and applications. These lessons enable teachers and students to monitor in more detail their progress towards the targets of the standards.
3-Act Task	A Three-Act Task is a whole-group mathematics task consisting of 3 distinct parts: an engaging and perplexing Act One, an information and solution seeking Act Two, and a solution discussion and solution revealing Act Three. More information along with guidelines for 3-Act Tasks may be found in the ***Guide to Three-Act Tasks*** on georgiastandards.org.

TASKS

Task Name	Standards	Task Type/ Grouping Strategy	Content Addressed	Brief Description
Dotty	MGSEK.CC.2-4a, b, c	3-Act Task *Whole Group*	Subitizing, Counting, Sequencing numbers	Students use counting and sequence of numbers to figure out what comes next.
Got Dots? (0-10)	MGSEK.CC.1-4a,b,c	Scaffolding *Whole/Small/Partner/Individual*	Subitizing, Counting objects to 10, Sequencing Numbers,	Students practice counting and subitizing objects to 10 in a variety of activities.
Numerals, Pictures, Words (0-10)	MGSEK.CC.2, 4a,b,c	Constructing Task *Whole/Small/Partner/Individual*	Subitizing, Counting objects to 10, Sequencing Numbers, Matching Number Words to Numbers	Students begin to make the connection between numeral, pictures and words in a variety of activities.
Fill in the Line (0-9)	MGSEK.CC.1-4	Constructing Task *Whole/partner*	Numeral recognition, number word recognition, Numeral writing	Students practice connecting numerals to sets.
What the Heck is Rekenrek?	MGSEK.CC.1-4 MGSEK.MD.3	Constructing Task *Partner*	Subitizing, Modeling numbers, Understanding number relationships	Students make a Rekenrek. Students also practice modeling numbers through a variety of activities.
Fill the Chutes	MGSEK.CC.2, 4	Practice Task *Whole/Small/Partner/ Individual*	One to one correspondence	Students practice counting and making a set of objects to represent a number.

Race to 20	MGSEK.CC.1, 2, 4	Practice Task *Partner*	One to one correspondence	Students use one to one correspondence to count their way around a game board.
Counting Dots (dots of various arrangements)	MGSEK.CC.1-4	FAL	One to one correspondence, Counting Objects to 10, Numeral recognition, Understanding number relationships	Students are assessed on the standards taught so far in the unit. This allows teachers to address any students who may need remediation or acceleration.
The Cardinal Cup (0-10)	MGSEK.CC.1, 2, 4	Constructing Task *Whole/Partner*	One to one correspondence, Counting objects to 10, Numeral recognition	Students practice counting forwards and backwards as they participate in a variety of activities.
Order the Dice	MGSEK.CC.1, 2, 4MGSEK.MD.3	Constructing Task *Partner*	Sequencing Numerals, numeral recognition	Students practice ordering sets from least to greatest.
More or Less	MGSEK.CC.1-4b,c	Constructing Task *Whole/Partner*	Numeral recognition, Understanding number relationships	Students begin to understand more and less in a variety of activities.
How Many Are in the Bag?	MGSEK.CC.1-4 MGSEK.MD.3	Constructing Task *Small groups, individual*	Numeral recognition, Understanding number relationships	Students practice connecting sets to numerals and words.
More or Less-Make a Guess	MGSEK.CC.1, 2, 4b,c	Practice Task *Whole/Partner*	Numeral recognition, Sequencing Numerals, Understanding number relationships	Students practice their understanding of more or less to guess their partners number on a number line.

Find the 5th Tower	MGSEK.CC.1-4 MGSEK.G.1 MGSEK.MD.3	Culminating Task *Whole group/Small group*	One to one correspondence, Understanding number relationships, Numeral writing, Positional words, Ordinal words	Students use all the concepts they have learned in this unit to complete a task.

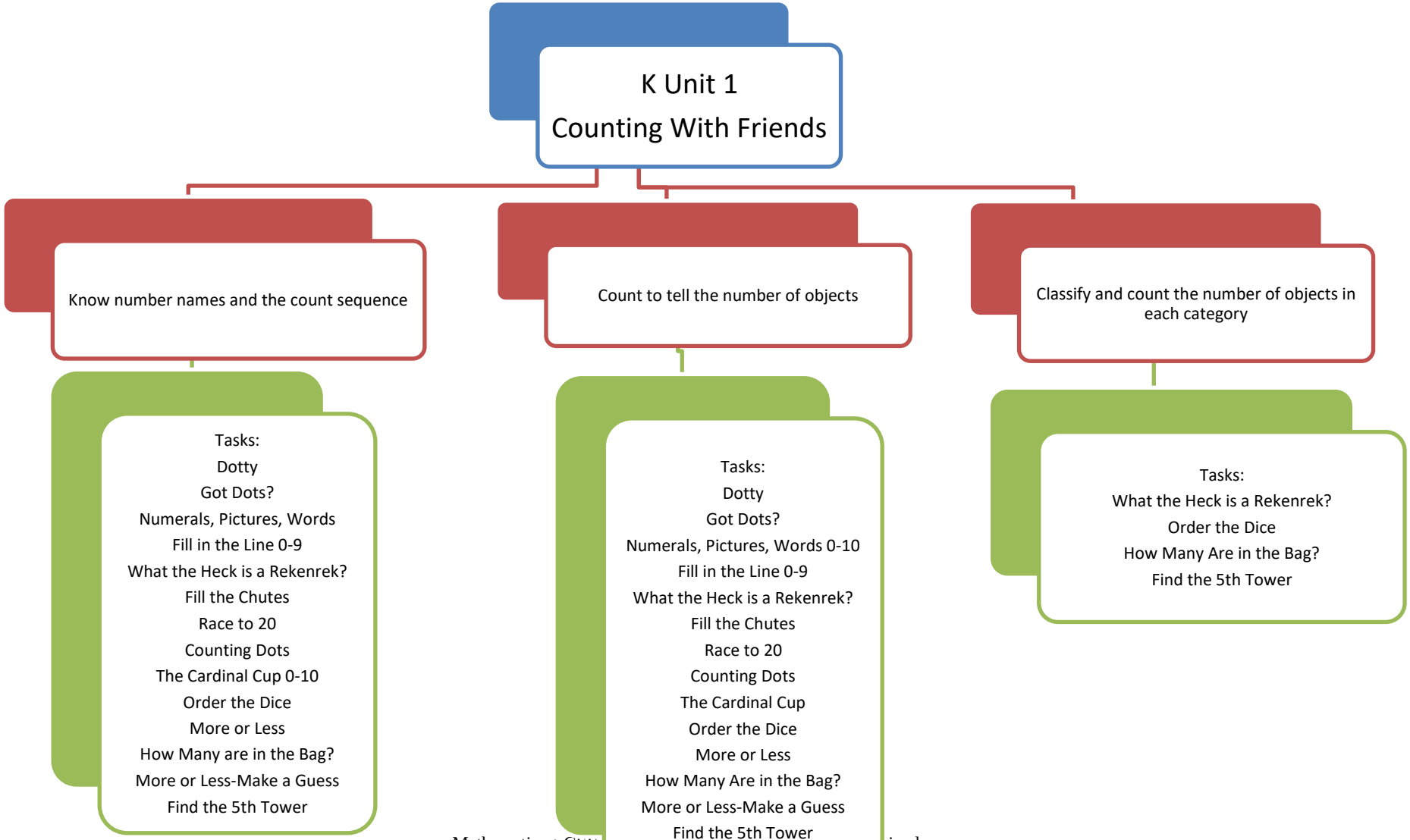
Each task is suggested but not required; teachers should choose the most appropriate tasks based on the needs of their students.

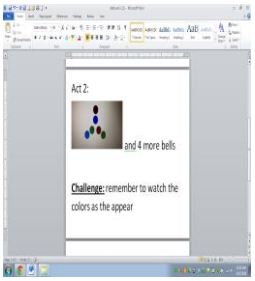
For more information on these tasks in this unit please refer to the unit webinar found at
https://www.georgiastandards.org/Archives/Pages/default.aspx

INTERVENTION TABLE

The Intervention Table below provides links to interventions specific to this unit. The interventions support students and teachers in filling foundational gaps revealed as students work through the unit. All listed interventions are from New Zealand's Numeracy Project.

Cluster of Standards	Name of Intervention	Snapshot of summary or Student I can statement. . .
Counting and cardinality Know number names and count sequence MGSEK.CC.1 MGSEK.CC.2 MGSEK.CC.3	Birthday Cake	Count, identify and form groups of items to 10.
	Caterpillar Legs	Identify numbers 0-20. Count, order and form groups of items to 10.
	Clapping	Say the forwards and backwards number word sequence in the range 0-10, 0-20, 0-100
	Counting as We Go	Form a set of objects and identify all the numbers in the range 0-10.
	Flower Petals	Count, form and identify all the numbers of a set of objects in the range 0-10.
	Number Line Flips	Order and say the forwards and backwards number word sequences in the range 0-10, 0-20.
Count to tell the number of objects MGSEK.CC.4	Feed the Elephants	Count, identify and form a set of objects in the range 1-10.
	How Many Cubes?	Count a set of objects in the range 1-10.
	Match it up	Count, form and identify all the numbers of a set of objects in the range 0-10.
	Ten Frames Matching Game	Know groupings of five, within ten, and with ten.
Geometry MGSEK.G.1	Arty Shapes	Name 2-D shapes and describe shape attributes in their own language





3-ACT TASK: Dotty

Back To Task Table

Approximately 1 day *Adapted from: www.gfletchy.com*

STANDARDS FOR MATHEMATICAL CONTENT

MGSEK.CC.2. Count forward beginning from a given number within the known sequence (instead of having to begin at 1).

MGSEK.CC.3. Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).

Count to tell the number of objects.

MGSEK.CC.4 Understand the relationship between numbers and quantities; connect counting to cardinality.

- **a.** When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object. **(one-to-one correspondence)**
- b. Understand that the last number name said tells the number of objects counted **(cardinality)**. The number of objects is the same regardless of their arrangement or the order in which they were counted.
- c. Understand that each successive number name refers to a quantity that is one larger.

STANDARDS FOR MATHEMATICAL PRACTICE

1. **Make sense of problems and persevere in solving them.** Students make sense of problems involving rote counting, recognizing counting patterns, and identifying quantities of items.

2. **Reason abstractly and quantitatively.** Students demonstrate abstract reasoning by writing numerals to represent an amount of objects counted, creating a set of objects to match a given number, and selecting the correct number card to continue a counting sequence

3. **Construct viable arguments and critique the reasoning of others.** Students begin to develop the ability to reason and analyze situations by considering questions such as, "How do you know you counted correctly?", and by asking classmates to explain how they found their answer.

4. **Model with mathematics.** Students use objects, numbers, and drawings to represent quantities of objects and counting sequence.

5. **Use appropriate tools strategically.** Students will use counters, connecting cubes, ten frames, and technological materials (illuminations 5- and 10- frames) to explore counting and cardinality.

6. **Attend to precision.** Students will build their mathematical vocabulary by expressing their ideas and explaining their reasoning using words with regard to quantity and cardinality.

7. **Look for and make use of structure.** Students will begin to look for patterns and structure in the number system by working with dot cards, number cards, and ten frames.

8. **Look for and express regularity in repeated reasoning.** Students will recognize repetitive actions in counting by realizing that when joining one more object to a pile, the new amount is the next number in the count sequence (4 cubes and 1 more cube is 5 cubes).

BACKGROUND KNOWLEDGE

This task follows the 3-Act Math Task format originally developed by Dan Meyer. More information on this type of task may be found at http://blog.mrmeyer.com/category/3acts/.
A Three-Act Task is a whole-group mathematics task consisting of 3 distinct parts: an engaging and perplexing Act One, an information and solution seeking Act Two, and a solution discussion and solution revealing Act Three.
More information along with guidelines for 3-Act Tasks may be found in the ***Guide to Three-Act Tasks*** on georgiastandards.org.

Subitizing introduces basic ideas of cardinality- "how many", ideas of "more" and "less," ideas of parts and wholes and their relationships, beginning arithmetic, and, in general, ideas of quantity. Developed well, these are related, forming webs of connected ideas that are the building blocks of mathematics through elementary, middle, and high school, and beyond. (Clementes & Sarama, *Learning and Teaching Early Math*, 2009)

COMMON MISCONCEPTIONS

Some students might think that the count word used to tag an item is permanently connected to that item. So when the item is used again for counting and should be tagged with a different count word, the student uses the original count word. For example, a student counts four geometric figures: triangle, square, circle and rectangle with the count words: one, two, three,

and four. If these items are rearranged as rectangle, triangle, circle and square and counted, the student says these count words: four, one, three, and two.

ESSENTIAL QUESTIONS

In order to maintain a student inquiry-based approach to this task, it may be beneficial to wait until Act 2 to share the EQ's with your students. By doing this, students will be allowed the opportunity to be very creative with their thinking in Act 1. By sharing the EQ's in Act 2, you will be able to narrow the focus of inquiry so that the outcome results in student learning directly related to the content standards aligned with this task.

- How can numbers be represented?
- How can we show numbers in different ways?

MATERIALS

- www.gfletchy.com
- Act 1 video http://vimeo.com/91994883
- Act 2 information (word document attached)
- Act 3 video http://vimeo.com/91994950

GROUPING

Individual/Partner Task

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION (All SMP's apply!)

In this task, students will view the video and tell what they noticed. Next, they will be asked to discuss what they wonder about or are curious about. These questions will be recorded on a class chart or on the board. Students will then use mathematics to answer their own questions. Students will be given information to solve the problem based on need. When they realize they don't have the information they need, and ask for it, it will be given to them.

Comments

This lesson will allow students the opportunity to move students from *Perceptual Subitizers* to *Conceptual Subitizers.*

- **Perceptual** see 5 dots and that is all they know
- **Conceptual** sees 5 dots and they can articulate and explain how they see the 5 dots (a group of 2 and a group of 3)

Important Note: giving students the opportunity to share how they recognized a quantity is as important as, if not more important than, speed of quantity recognition.

Task Directions

Act 1 – Whole Group - Pose the conflict and introduce students to the scenario by showing Act 1 video or picture. **(Dan Meyer** http://blog.mrmeyer.com/2011/the-three-acts-of-a-mathematical-story/**)**

"Introduce the central conflict of your story/task clearly, visually, viscerally, using as few words as possible."

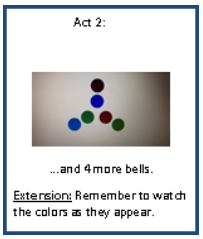
- Show Act 1 video to students. http://vimeo.com/91994883
- Ask students what they noticed in the video, what they wonder about, and what questions they have about what they saw in the video/picture. Consider doing a think-pair-share so that students have an opportunity to talk with each other before sharing questions with the whole group. Students may need to watch the video several times.
- Share and record students' questions. The teacher may need to guide students so that the questions generated are math-related.
- Ask students to estimate answers to their questions (think-pair-share). For the question "How many dots will be on the screen after the last bell?", students write down an estimate in their journals, then write down two more estimates – one that is too low and one that is too high. This is an excellent time to informally assess a student's understanding of quantity sizes, in addition to practicing writing numbers. Next, students discuss the questions and determine the information they need.

Anticipated questions students may ask and wish to answer:

- How many dots will be shown for the first, second, and third bell?
- How many dots will be on the screen after the last bell?
- What would the next set of dots look like after the last set shown?

Act 2 – **Student Exploration** - Provide additional information as students work toward solutions to their questions. **(Dan Meyer** http://blog.mrmeyer.com/2011/the-three-acts-of-a-mathematical-story/**)**

"The protagonist/student overcomes obstacles, looks for resources, and develops new tools."



- During Act 2, students determine the main question(s) from Act 1 and decide on the facts, tools, and other information needed to answer the question(s). When students decide what they need to solve the problem, they should ask for those things. It is pivotal to the problem-solving process that students decide what is needed without being given the information up front. Some groups might need scaffolds to guide them. The teacher should question groups who seem to be moving in the wrong direction or might not know where to begin. Questioning is an effective scaffolding strategy which can be used, with questions such as:
    - What is the problem you are trying to solve?
    - What do you think affects the situation?
    - Can you explain what you've done so far?
    - What strategies are you using?
    - What assumptions are you making?
    - What tools or models may help you?
    - Why is that true?
    - Does that make sense? What number comes before_____? After?
    - How many more do you need for _____?
    - How do you know you saw _____amount of dots?
    - Is there any other way you could group your dots?

Act 3 – Whole Group – Share solutions and strategies.

- Students to present their solutions and strategies and compare them.
- Reveal the solution in Act 3 video, picture or solution. http://vimeo.com/91994950
- Lead discussion to compare these solutions, asking questions such as:
    - How reasonable was your estimate?
    - Which strategy was most efficient?
    - Can you think of another method that might have worked?
    - What might you do differently next time?

FORMATIVE ASSESSMENT QUESTIONS

- What models did you create?
- What organizational strategies did you use?
- What does your model (do your models) represent?

DIFFERENTIATION

Extension

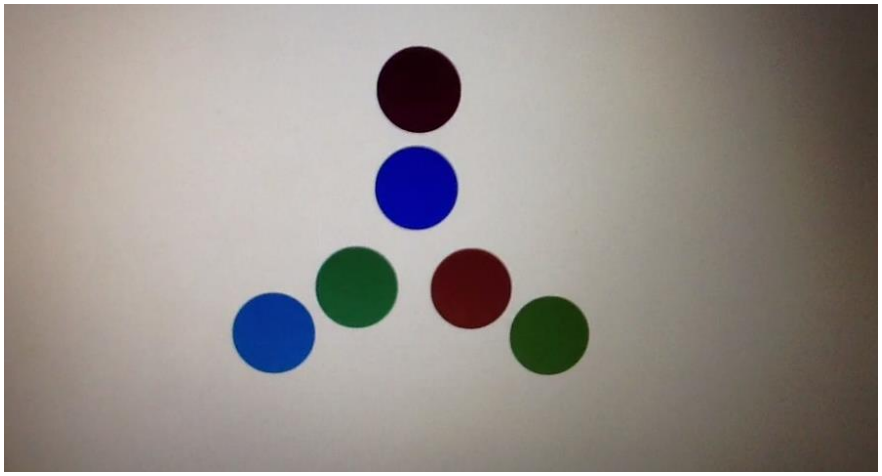
- *Do you know what colors will be after the last bell and how many of each?* Students may need to go back and watch Act 1 again to identify the color pattern.

Intervention

- Allow students to find the total number of dots for the first covered bell and come up with different arrangements the dots could be in.

Back to Intervention Table

Act 2:



…and 4 more bells.

SCAFFOLDING TASK: Got Dots? (0-10)

Back To Task Table

This task contains numerous activities where students can engage using the different representations of numbers. Adapted from VDW Backline Masters

STANDARDS FOR MATHEMATICAL CONTENT

MGSEK.CC.1 Count to 100 by ones and by tens.

MGSEK.CC.2. Count forward beginning from a given number within the known sequence (instead of having to begin at 1).

MGSEK.CC.3. Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).

MGSEK.CC.4 Understand the relationship between numbers and quantities; connect counting to cardinality.

a. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object. **(one-to-one correspondence)**
b. Understand that the last number name said tells the number of objects counted **(cardinality)**. The number of objects is the same regardless of their arrangement or the order in which they were counted.
c. Understand that each successive number name refers to a quantity that is one larger.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.

BACKGROUND KNOWLEDGE

This task contains numerous activities where students engage in subitizing activities.
Subitizing introduces basic ideas of cardinality- "how many", ideas of "more" and "less," ideas

of parts and wholes and their relationships, beginning arithmetic, and, in general, ideas of quantity. Developed well, these are related, forming webs of connected ideas that are the building blocks of mathematics through elementary, middle, and high school, and beyond. (Clementes & Sarama, *Learning and Teaching Early Math*, 2009)

The subitizing of quantities can be achieved with dot cards, ten frames, and base-ten manipulatives later on. Using recognizable patterns like the ones found on dice are patterns that are instantly recognizable to most kindergarten students to game play. Many of the tasks included throughout this unit involving subitizing and dot cards should be continued throughout the year.

For more information about common misconceptions, please refer to the unit overview.

ESSENTIAL QUESTIONS

- Why do we need to be able to count objects?
- How do we use numbers every day?

MATERIALS

- Dot cards (recommend printing multiple sets of cards on tag board and laminating)

GROUPING

Whole group and partner task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

- **Dot Flash:** Teacher/Student flashes a dot card to class/partner and quickly covers it up. Students must say the quantity of dots they saw and describe how they know what they saw. Example: I saw 4 dots because I saw a group of 3 dots and there was one left over to make 4. The difficulty in the game can be increased by the amount of time that the dots are shown to students. (SMP#1,3,6,7)

- **Count 'Em:** a card is turned over. The first player to say the quantity of dots on the cards keeps that card. Partner must count the dots on the card to verify. No assuming. (SMP#6,7)

- **One More/Less:** same as dot flash but students need to say either 1 more or less than the dots on the card. Whether it is more or less must be established before the game begins. (SMP#1,3,6,7)

- **Who Has More/Less/Same?:** 2 players turn over 1 card at the same time. The first player to identify which card has more/less/same keeps the 2 cards. (SMP#3)

- **Line 'Em Up:** give a student a set of cards and have them line the cards up in a specific order. (least to greatest – forward counting sequence, greatest to least-backward counting sequence) (SMP 1, 3,6,7)

Kindergarten students are extremely creative and continuously invent new games. Have students create a game using the cards and share with classmates. Van de Walle's *Teaching Student Centered Mathematics k*-3, lists numerous ways to incorporate subitizing activities into the classroom. A greater variety of dot cards and dot plates can be found online and Van de Walle's Blackline Masters Series at https://wps.ablongman.com/ab_vandewalle_math_6/0,12312,3547876-,00.html In addition, Van de Walle suggests numerous ways that activities and tasks can be repeated throughout the school year as centers or stations.

TEACHER REFLECTION QUESTIONS

- Are students able to rote count accurately?
- Are students able to count dots with one-to-one correspondence?
- Are students able to subitize?
- Are students able to compare quantities to determine more, less, or same?
- Are students able to line cards up in a specific order (least to greatest – forward counting sequence or greatest to least – backward counting sequence)?

FORMATIVE ASSESSMENT QUESTIONS

- How do you know that you counted correctly?
- How many dots did you see?
- How do you know?
- What way did you see the dots grouped together?
- How many dots away from 5 is your number? How many dots would you need to make 10? (anchoring 5&10)

DIFFERENTIATION

Extension and Intervention

- Increasing or decreasing the quantity of dots on a card can help with differentiating subitizing.

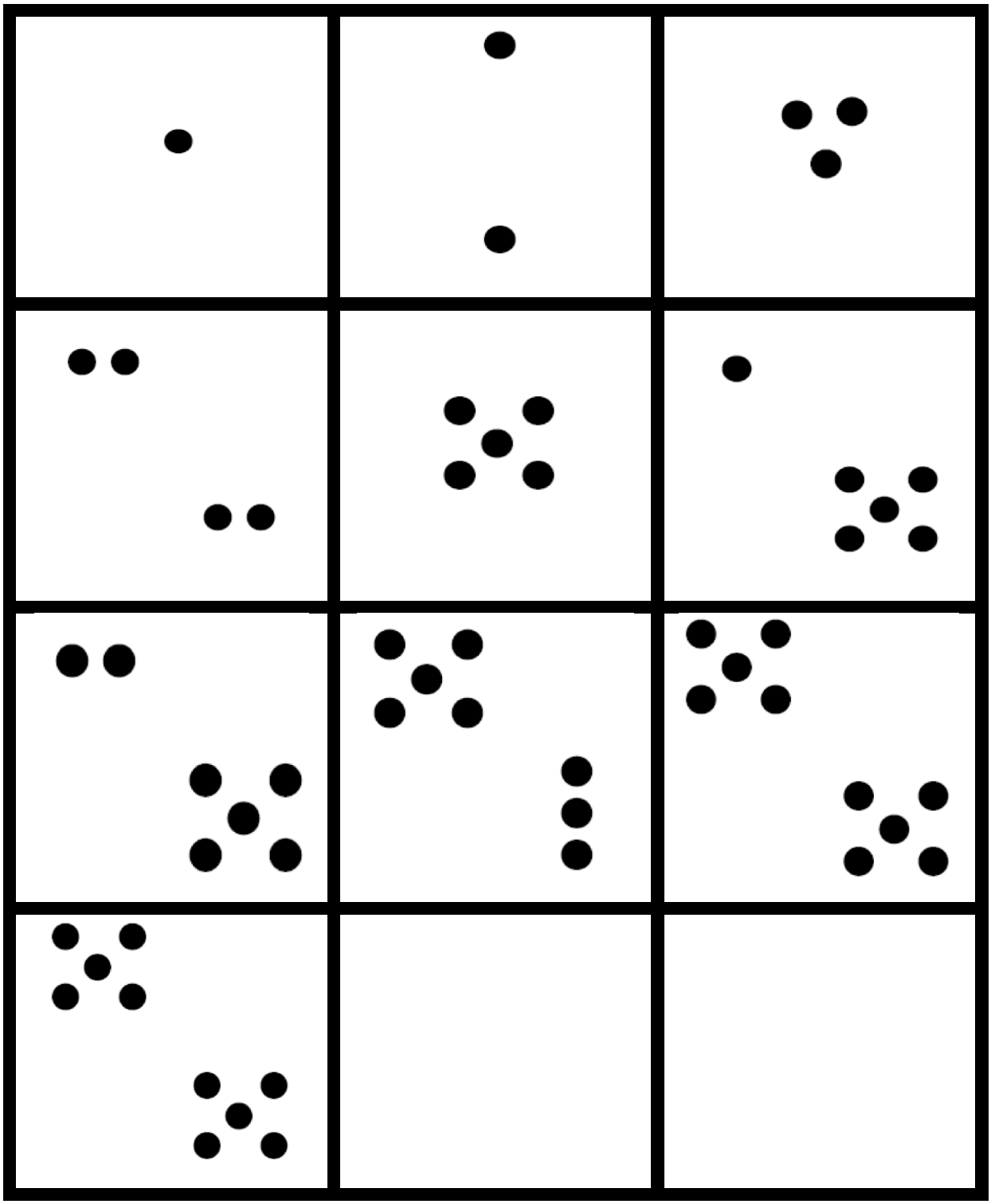
Back to Intervention Table

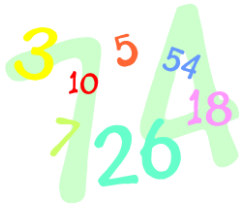
TECHNOLOGY RESOURCES

Five Frames: http://illuminations.nctm.org/ActivityDetail.aspx?ID=74
Students manipulate objects to fill and answer the question "how many" in a five frame.

Ten Frames: http://illuminations.nctm.org/ActivityDetail.aspx?ID=75
Students manipulate objects to fill and answer the question "how many" in a ten frame.

Number Frames: http://www.mathlearningcenter.org/web-apps/number-frames/
Students manipulate objects in five and ten frames to develop understanding of number relationships and quantity.





CONSTRUCTING TASK: Numerals-Pictures-Words Back To Task Table

This task contains numerous activities where students can engage in use of the different representations of numbers.

STANDARDS FOR MATHEMATICAL CONTENT

MGSEK.CC.2. Count forward beginning from a given number within the known sequence (instead of having to begin at 1).

MGSEK.CC.4 Understand the relationship between numbers and quantities; connect counting to cardinality.

a. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object. **(one-to-one correspondence)**
b. Understand that the last number name said tells the number of objects counted **(cardinality)**. The number of objects is the same regardless of their arrangement or the order in which they were counted.
c. Understand that each successive number name refers to a quantity that is one larger.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
3. Construct viable arguments and critique the reasoning of others.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure

BACKGROUND KNOWLEDGE

Students need to understand that quantity can be represented through numerals, pictures, and words. Students should be given ample time to explore this concept early on in kindergarten. These task cards are designed for students to see and recognize the different forms in which a quantity can be represented.

For more information about common misconceptions, please refer to the unit overview.

ESSENTIAL QUESTIONS

- How do we know if a number is more or less than another number?

- How can we show numbers in different ways?
- Why would we need to be able to read number words?

MATERIALS

- *Numerals, Pictures, Words* playing cards

GROUPING

Whole group, small group, partner, individual

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Concentration/Memory: Shuffle the cards and lay them face down in a pattern. Let students decide the pattern, but they need to explain their pattern. On each turn, a player turns over two cards (one at a time) and keeps them if they match numbers. If they successfully match a pair of numbers, that player also gets to take another turn. When a player turns over two cards that do not match numbers, those cards are turned face down again and it becomes the next player's turn. Players keep each pair they find. At the end of the game, each pair scores one point. When all the pairs have been found, the player with the most points wins. (SMP 1, 3, 7)

Squeeze: Cards are placed face down in a stack on the table. The first player takes two cards and places them face up on the table with a space between them and in order from least to greatest. The second player does the same. They then turn up the top card in the pile. If this card squeezes between the two cards that player gets a point. If Player 1 has "2" and "5" and Player 2 has "4" and "9" and a "3" is flipped over, only Player 1 gets a point because "3" fits between their numbers. Keep score on a ten-frame. First player to 10 wins. (SMP 1, 3, 6, 7)

Got Dots: The subitizing activities listed in the task, *Got Dots,* can also be included and played with the *Numerals, Pictures, Words* Cards. (SMP 1-7)

TEACHER REFLECTION QUESTIONS

- Are students able to rote count accurately?
- Are students able to identify numbers 0-10?
- Are students able to place numbers in counting order?
- Are students able to subitize?
- Are students able to count dots with one-to-one correspondence?

FORMATIVE ASSESSMENT QUESTIONS

- How do you know that you counted correctly?
- How many dots did you see?
- How do you know?
- What way did you see the dots grouped together?
- How many more dots are in 8 than in 5? How many more dots would you need to make 10? (anchoring 5&10)

DIFFERENTIATION

Extension and Intervention

- Increasing or decreasing the quantity of dots on a card can help with differentiating subitizing activities.

Back to Intervention Table

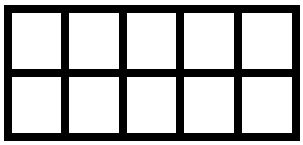
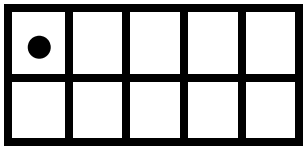
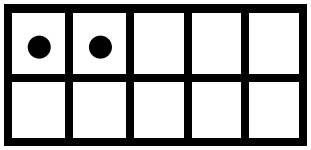
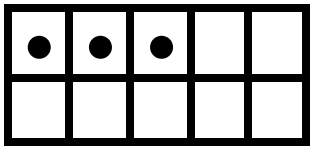
TECHNOLOGY

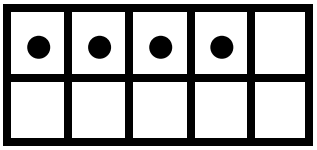
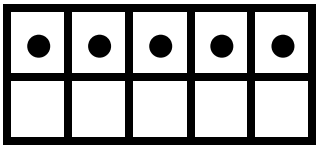
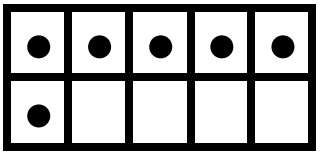
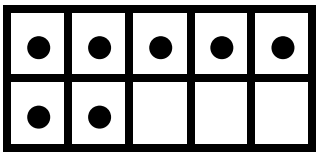
Five Frames: http://illuminations.nctm.org/ActivityDetail.aspx?ID=74
Students manipulate objects to fill and answer the question "how many" in a five frame.

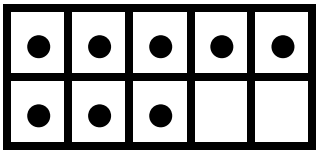
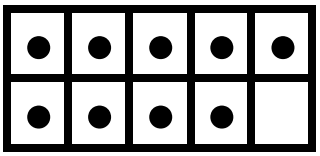
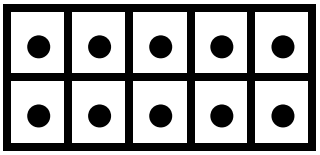
Ten Frames: http://illuminations.nctm.org/ActivityDetail.aspx?ID=75
Students manipulate objects to fill and answer the question "how many" in a ten frame.

Number Frames: http://www.mathlearningcenter.org/web-apps/number-frames/
Students manipulate objects in five and ten frames to develop an understanding of number relationships and quantity.

Concentration: http://illuminations.nctm.org/ActivityDetail.aspx?ID=73
Students play concentration finding the number word that matches the numeral, ten frame or dot representation.

0	zero	
1	one	
2	two	
3	three	

4	four	
5	five	
6	six	
7	seven	

8	eight	
9	nine	
10	ten	

CONSTRUCTING TASK: Fill in the Line 0 to 9

Back To Task Table

Approximately 1 Day repeated as a station (Adapted from Race to Trace from www.K-5mathteachingresources.com)

Classroom video here: https://www.georgiastandards.org/Georgia-Standards/Pages/Implement-Math-Task-Classroom-Videos/What-Does-it-Look-Like-When-you-Implement-a-Task.aspx

STANDARDS FOR MATHEMATICAL CONTENT

MGSEK.CC.1. Count to 100 by ones and by tens.

MGSEK.CC.2. Count forward beginning from a given number within the known sequence (instead of having to begin at 1).

MGSEK.CC.3. Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).

MGSEK.CC.4 Understand the relationship between numbers and quantities; connect counting to cardinality.

a. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object. **(one-to-one correspondence)**
b. Understand that the last number name said tells the number of objects counted **(cardinality)**. The number of objects is the same regardless of their arrangement or the order in which they were counted.
c. Understand that each successive number name refers to a quantity that is one larger.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
5. Use appropriate tools strategically.
6. Attend to precision.

BACKGROUND KNOWLEDGE

Students need practice writing numerals. Fill in the Line 0-9 allows students and opportunity for repeated practice.

For more information about common misconceptions, please refer to the unit overview.

ESSENTIAL QUESTIONS

- What is a numeral?

MATERIALS

- 0-9 spinner
- game board for each student
- pencil

GROUPING

Whole group and partner task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

The object of the game is to be the first person to trace a complete line 0-9. To play the game, players will choose number word spinner or dot spinner. Player 1 will spin the spinner and trace the corresponding number. He/she may choose any row to trace the number. Next, Player 2 will spin the spinner and trace the corresponding number. He/she may choose any row to trace the number. If a number has already been traced in all rows then the player loses that turn. The first player to trace all the numbers in one row wins! (SMP1,2,3,6)

TEACHER REFLECTION QUESTIONS

- Are students able to count dots with one-to-one correspondence?
- Are students able to read number words zero – nine?
- Are students able to identify numbers 0-9?
- Are students able to trace/write numbers 0-9?

FORMATIVE ASSESSMENT QUESTIONS

- How many numbers do you need to win?
- What numbers do you need to win?
- Who is closer to winning? How do you know?
- What number do you have the most of? Least of?

DIFFERENTIATION

Extension

- Have students play Fill in the Line without the recording sheets. Have them record the numerals in their math journal. Spatial recognition will be critical as students need to leave space for the unwritten numerals.

- Using a ten sided dice or spinner, students could record the numeral that is one less or 1 more than what was rolled. (Example: if a 3 was rolled, the student would record 2 or 4 depending on the rule)

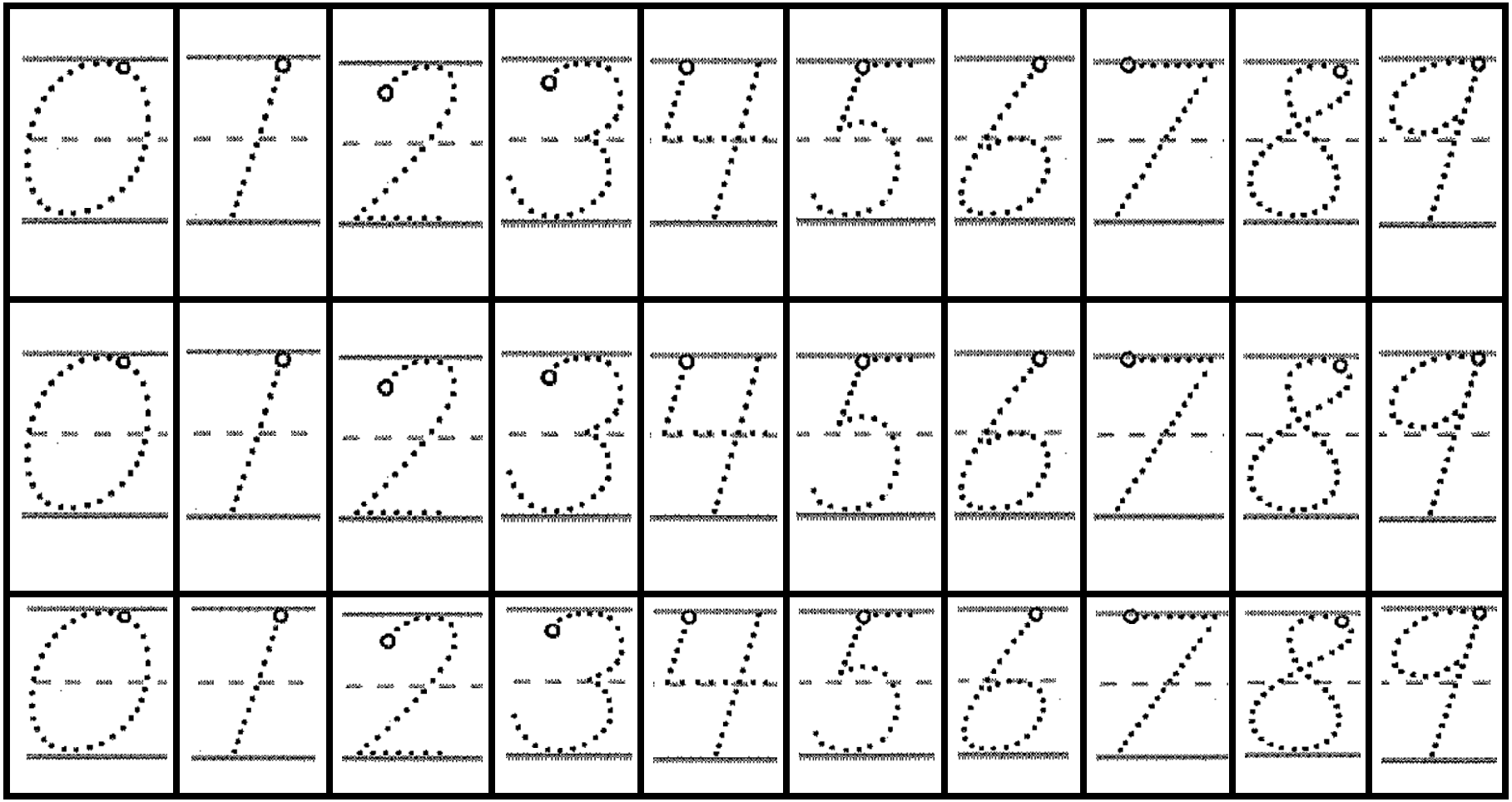
Intervention

- Correctly writing digits/numbers is an ongoing process that requires ongoing practice throughout the year.

- Students can practice writing numerals in the sand, with finger paint, or with a dry erase marker on the desk.

Back to Intervention Table

Fill the Line 0 to 9!

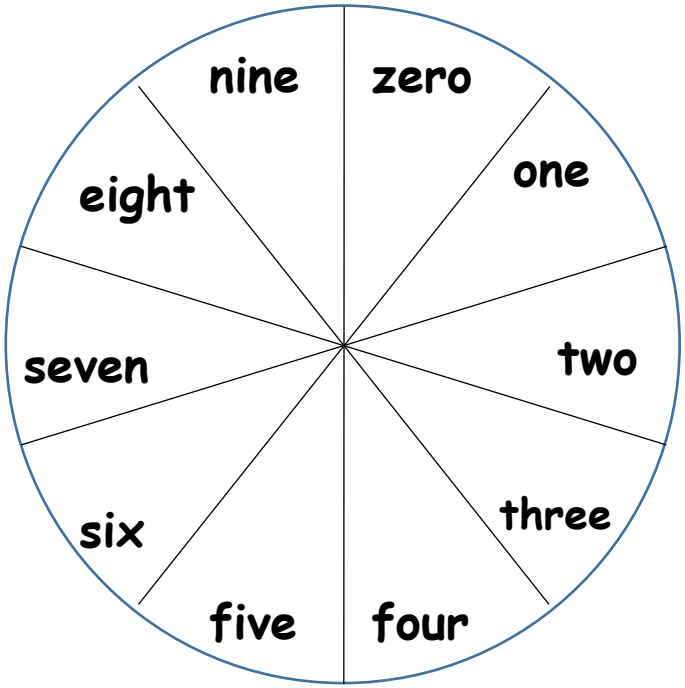


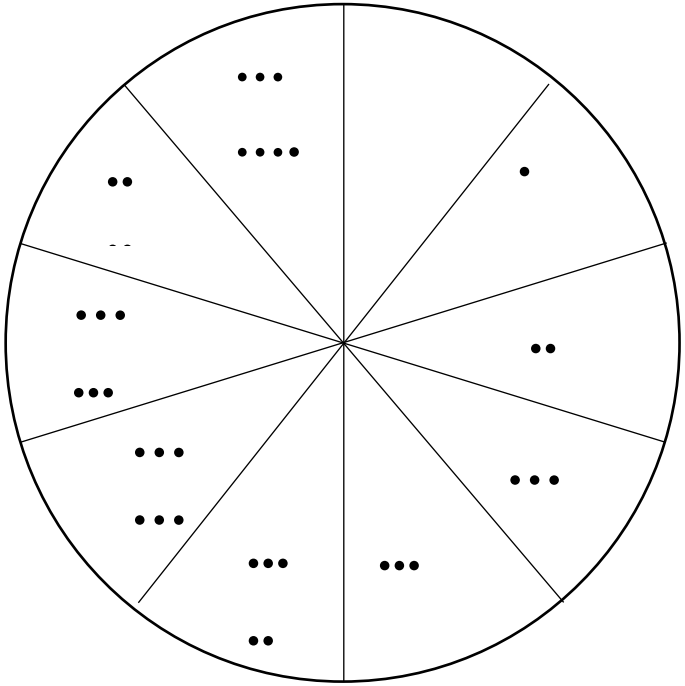
Fill the Line 0 to 9!

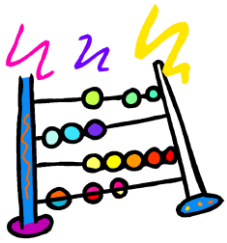
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____

Provide a paper clip or transparent spinner to use with the templates below. Place a pencil point inside one end of the paper clip and hold with one hand. Use the other hand to flick the paperclip and it will spin. Students will need to have practice with this prior to this activity. Great fine motor skill developer!

0-9 Spinner







CONSTRUCTING TASK: What the Heck is Rekenrek?

Back To Task Table

The Rekenrek can be used throughout the year and incorporated in a variety of tasks to enforce concrete representation of numbers and strategies. Adapted from www.k-5mathteachingresources.com

STANDARDS FOR MATHEMATICAL CONTENT

MGSEK.CC.1. Count to 100 by ones and by tens.

MGSEK.CC.2. Count forward beginning from a given number within the known sequence (instead of having to begin at 1).

MGSEK.CC.3. Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).

MGSEK.CC.4 Understand the relationship between numbers and quantities; connect counting to cardinality.

a. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object. **(one-to-one correspondence)**
b. Understand that the last number name said tells the number of objects counted **(cardinality)**. The number of objects is the same regardless of their arrangement or the order in which they were counted.
c. Understand that each successive number name refers to a quantity that is one larger.

MGSEK.MD.3. Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

The Rekenrek is a math tool created by Adrian Treffers at the Freudenthal Institute in Holland. Translated to English, Rekenrek means "counting rack". The Rekenrek is composed of 20 beads in two rows of ten with five red and five white on each rod. Although the Rekenrek may look similar to an abacus, it differs because its structure is based around fives as opposed to tens. The five-structure represents the five fingers on each of our hands and five toes on each of our feet. Tournaki et al (2008) concluded that the structure of five utilized by the Rekenrek was extremely helpful in the advancement of students' number sense. In addition to increasing number sense, Tournaki et al (2008) recognized that the Rekenrek acted as a facilitator of knowledge as students develop efficient thinking strategies. Gravemeijer (1991) stated that materials themselves cannot transmit knowledge to the learner; however, it can make numbers and relationships accessible to students to later obtain fact mastery and fluency. More information on the Rekenrek can be found at https://www.mathlearningcenter.org/sites/default/files/pdfs/LTM_Rekenrek.pdf

Gravemeijer, K. (1991).*An Instruction-Theoretical Reflection On The Use Of Manipulatives*.
Tournaki, N., Bae, Y., &Kerekes, J. (2008).*Rekenrek: A manipulative used to teach addition and subtraction to students with learning disabilities.*

For more information about common misconceptions, please refer to the unit overview.

ESSENTIAL QUESTIONS

- How can we show numbers in different ways?

MATERIALS

- Cardboard
- 2 Pipe Cleaners or beading elastics
- 20 Beads (10 red/10 white)
- Rekenrek Recording Sheet (optional)

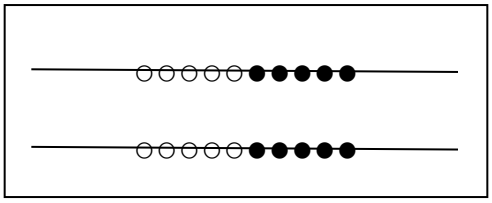
GROUPING

The Rekenrek can be used whole group, small group, partner task, and/or individually.

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Making the Rekenrek:

- Poke two small holes at each end of the cardboard, about 1in. in from the side.
- Cut two 5in. lengths of elastic or use pipe cleaners. Place one end of each piece of elastic into the holes at one end of the board and tie in a knot at the back or poke a pipe cleaner through the hole and bend it.
- Place five white beads and five red beads on each length of elastic or pipe cleaner.
- Once all the beads are on, thread the elastic through the holes on the other end and tie securely so that the elastic is pulled tight, or put the other end of the pipe cleaner through and bend.



Tasks:

- **Make It:** teacher says or shows a number as students model the number using their Rekenrek. It is important for students to share the different ways they modeled the number. (SMP 2, 3, 4, 5, 6, 7, 8)

- **Flash It:** teacher flashes a teacher made Rekenrek with a particular number and students model what they saw. To extend student thinking, reduce the amount of time the teacher Rekenrek is shown to students. The students could also have to model the number a different way from the way that is flashed on the teacher Rekenrek. (SMP 1, 2, 3, 4, 5, 6, 7, 8)

Comment:

Rekenrek Norm Setting: When looking at the Rekenrek, the beads should be pushed over to the 'Start Position' (the right hand side), with the white beads farthest right and the red beads next to them on the left. Note that the start position has the beads on the right so that when a student pushes the beads over they can 'read' the quantity on the Rekenrek from left to right.

Students can record their thinking and modeling of the Rekenrek on the recording sheet. Once students are familiar and comfortable drawing a pictorial representation with the recording sheet, have them record/represent directly in their math journals.

Many of the activities with dot cards, Rekenreks and ten frames are interchangeable. The use of multiple manipulatives to show number and quantity further reinforces a student's understanding of number which in turn increases number sense.

TEACHER REFLECTION QUESTIONS

- Are students able to model a given number on the Rekenrek?
- Are students able to model a given number in more than one way on the Rekenrek?
- Are students able to draw a pictorial representation on the recording sheet?
- Are students able to identify which benchmark/anchor of 5/10 their number is closest to?

FORMATIVE ASSESSMENT QUESTIONS

- What number have you modeled?
- What did you see? How do you know?
- How many fives/tens do you see?
- How many more do you need to make ten?
- Which benchmark/anchor of 5/10 is your number closest to?
- Can you build the number a different way?

DIFFERENTIATION

Extension/Invention

- Differentiating with the Rekenrek can be achieved through a variety of techniques which are controlled by the teacher:
    - The amount of time the Rekenrek is shown or flashed to students.
    - Increasing or decreasing the quantity made on the Rekenrek can help with differentiating.

Back to Intervention Table

TECHNOLOGY

Number Rack (Rekenrek): http://www.mathlearningcenter.org/web-apps/number-rack/
Students use the number rack to develop an understanding of number and quantity.

Five Frames: http://illuminations.nctm.org/ActivityDetail.aspx?ID=74
Students manipulate objects to fill and answer the question "how many" in a five frame.

Ten Frames: http://illuminations.nctm.org/ActivityDetail.aspx?ID=75
Students manipulate objects to fill and answer the question "how many" in a ten frame.

My Rekenrek Recording Sheet Name:_____

My number sentence:_____

My number sentence:_____

My number sentence:_____

PRACTICE TASK: Fill the Chutes

Back To Task Table

Approximately 1 Day, then as center (Van de Walle Activity 2.3)

STANDARDS FOR MATHEMATICAL CONTENT

MGSEK.CC.2. Count forward beginning from a given number within the known sequence (instead of having to begin at 1).

MGSEK.CC.4 Understand the relationship between numbers and quantities; connect counting to cardinality.

a. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object. **(one-to-one correspondence)**
b. Understand that the last number name said tells the number of objects counted **(cardinality)**. The number of objects is the same regardless of their arrangement or the order in which they were counted.
c. Understand that each successive number name refers to a quantity that is one larger.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.

BACKGROUND KNOWLEDGE

Children will learn *how* to count (matching counting words with objects) before they understand that the last count word indicates the *amount* of a set or the *cardinality* of a set. Children who have made this connection are said to have the *cardinality principle,* which is a refinement of their early ideas about quantity. (Van de Walle, 2006)

For more information about common misconceptions, please refer to the unit overview.

ESSENTIAL QUESTIONS

- How can we show numbers in different ways?
- Why do we need to be able to count forwards and backwards?

MATERIALS:

- 20 counters per player
- 1 number cube (die) (1-6)
- *Fill the Chutes* game board

GROUPING:

1-4 players

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION:

Part I
Place all the counters in a central pile where all players have access to them. Players take turns rolling the die and collecting/placing the corresponding amount of counters in their chute that matches the roll on the die.

Both players must count out loud the total number of counters in their chute as they are added.

If a player has 3 spaces remaining unfilled and they roll 4 they cannot fill up the chute and have a leftover or unused counter. The chutes must be filled exactly. (SMP 1, 2, 3, 4, 5, 6, 7)

Part II
After students have had an opportunity to engage in the activity the purpose of the roll alternates each time.

Player 1 rolls and adds counters to the chute as they count out loud. On the next roll player 1 removes counters from the chute counting backwards. The first player to fill the chute wins the game. This version of the activity helps with counting forward/backwards number sequence with a starting a number other than 0 or 1. (SMP 1, 2, 3, 4, 5, 6, 7)

TEACHER REFLECTIONS QUESTIONS

- Are students able to count dots/counters with one-to-one correspondence?
- Are students able to count forward/backward number sequence with a starting number other than 0 or 1?

FORMATIVE ASSESSMENT QUESTIONS

- What number did you roll?
- How many counters do you have in your chute right now?
- What number do you need to roll to fill your chute?
- Which chute has the most? Least?

DIFFERENTIATION

Extension

- Change the value of each space to 10 and have students skip count by 10 to 100. Note: the chute won't be filled if students play to 100. After students are familiar with skip counting forward by tens they may alternate rolls to skip count backwards and forwards. You may also make a version with no individual spaces instead the playing board would consist of columns. This allows for a variety of counters to be used, including paper clips, pennies, etc. Use only one type of counter when playing, of course!

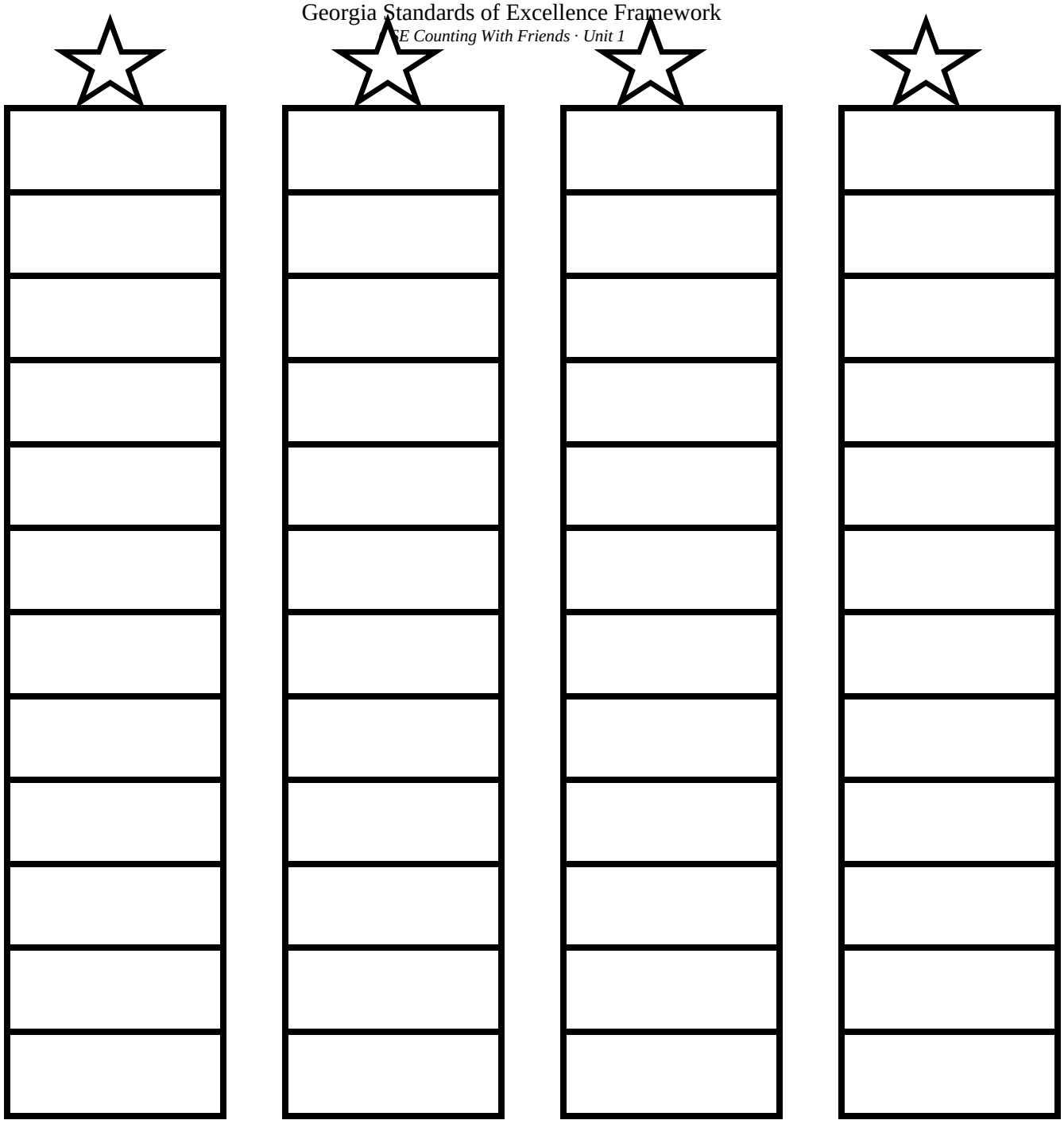
Intervention

- Because the students must say the total number of counters out loud, the numerals for each space could be written on the game board to help with number recognition and counting forward and backwards.

Back to Intervention Table

TECHNOLOGY:

Okta's Rescue: http://illuminations.nctm.org/Activity.aspx?id=3528
Students create a quantity to match a number while being timed.



Player 1 **Player 2** **Player 3** **Player 4**

PRACTICE TASK: Race to 20

Back To Task Table

Approximately 1-2 days

STANDARDS FOR MATHEMATICAL CONTENT

MGSEK.CC.1. Count to 100 by ones and by tens.

MGSEK.CC.2. Count forward beginning from a given number within the known sequence (instead of having to begin at 1).

MGSEK.CC.4 Understand the relationship between numbers and quantities; connect counting to cardinality.

a. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object. **(one-to-one correspondence)**
b. Understand that the last number name said tells the number of objects counted **(cardinality)**. The number of objects is the same regardless of their arrangement or the order in which they were counted.
c. Understand that each successive number name refers to a quantity that is one larger.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
3. Construct viable arguments and critique the reasoning of others.
6. Attend to precision.

BACKGROUND KNOWLEDGE

Children will learn *how* to count (matching counting words with objects) before they understand that the last count word indicates the *amount* of a set or the *cardinality* of a set. Children who have made this connection are said to have the *cardinality principle,* which is a refinement of their early ideas about quantity. (Van de Walle, 2006)

For more information about common misconceptions, please refer to the unit overview.

ESSENTIAL QUESTIONS

- Why do we need to be able to count forwards and backwards?

MATERIALS

- 2 different colored counters
- 1 number cube (1-6)
- Race to 20 game board

GROUPING

Partners (2 players)

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

Each player places their counter in the starting square. Players take turns using the spinner and move their counter the corresponding number of spaces. Players must state what space they are on and count out loud in sequence to the new space. Each player alternates turns until one player reaches 20. (SMP 1, 3, 6,)

TEACHER REFLECTION QUESTIONS

- How are students moving the counter to locate the new place on the game board.?
- Is the student counting by ones, or is he/she using a strategy?
- If so, which one?

FORMATIVE ASSESSMENT QUESTIONS

- How many spaces do you need to win the game?
- What space are you on now?
- What is the number of the next space?
- How can playing board games make me a better mathematician?

DIFFERENTIATION

Extension

- Each time a student rolls a die they alternate between counting spaces forwards and backwards. The number of spaces is determined by the amount shown on the die. Example: If player one rolled a six, they would move forward six spaces. If on the next

turn, player one rolled a three, they would move backwards three spaces. Students would continue on until a player reached 20.

Intervention

- Because the students must say the numerals aloud, the numerals could also be written on the game board to assist with location identification and sequential counting.

Back to Intervention Table

TECHNOLOGY

Okta'sRescue: http://illuminations.nctm.org/ActivityDetail.aspx?ID=219

Start 0					5				
									10
Finish 20					15				

Race to 20

Materials:
2 different colored counters
1 number cube (1-6)

Directions:
-Each player places their counter in the starting space numbered 0.
-Players take turns using the spinner and move their counter the corresponding number of spaces. Players must state what space they are on and count out loud in sequence (forward or backward) to the new space.
-Players alternate turns until one player reaches 20.

FAL: Counting (Dots in Various Arrangements)

Back To Task Table

Please using the following website to access the FAL:
https://education.ky.gov/curriculum/conpro/Math/Documents/K_KDE_Counting_Dots_in_Various_Arrangements_Kindergarten.pdf

https://education.ky.gov/curriculum/conpro/Math/Pages/ElemFormAssessLessons.aspx.

CONSTRUCTING TASK: The Cardinal Cup (0-10) Back To Task Table

Approximately 1-2 days, then repeated

STANDARDS FOR MATHEMATICAL CONTENT

MGSEK.CC.1 Count to 100 by ones and by tens.

MGSEK.CC.2. Count forward beginning from a given number within the known sequence (instead of having to begin at 1).

MGSEK.CC.4 Understand the relationship between numbers and quantities; connect counting to cardinality.

a. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object. **(one-to-one correspondence)**
b. Understand that the last number name said tells the number of objects counted **(cardinality)**. The number of objects is the same regardless of their arrangement or the order in which they were counted.
c. Understand that each successive number name refers to a quantity that is one larger.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

Students should learn that counting objects in a different order does not alter the result, and they may notice that the next whole number in the counting sequence is one more than the number just named. Children should learn that the last number named represents the last object as well as the total number of objects in the collection (NCTM Principles and Standards, 2012).

For more information about common misconceptions, please refer to the unit overview.

ESSENTIAL QUESTIONS

- Why do we need to be able to count objects?
- Why do we need to be able to count forwards and backwards?

MATERIALS

- Cardinal Cup playing mat
- Playing cards from *Numerals, Pictures, Words* Task
- (10) cubes or counters for the cup and 20 counters to keep score
- Cup
- Math journal to record numbers

GROUPING

Whole group and partner task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Part I (counting forward)

Students use the task cards from *Numerals, Pictures and Words* and place them in a pile face down. Player 1 turns over the top card and places that many cubes in the cup and counts out loud as each cube is placed into the cup. Once Player 1 is finished counting, Player 2 removes the contents from the cup and verifies that the correct number of cubes was placed in the cup by placing the counters on the counting mat. (1-to-1 correspondence). If the player was correct in counting out the cubes they receive 1 chip to be placed on their ten-frame. The first player to fill up their ten frame wins.
As students place cubes on the number line ask questions that pertain to ordinal numbers and positional words. What color is the 5^{th} cube? What color is next to the 7^{th} cube? (SMP 2, 3, 4, 5, 6)

Part II (counting forward and/or backwards)

Students use the task cards from *Numbers, Pictures, Words* and place them in a pile face down. Player 1 turns over the top card and places that many cubes in the cup and counts out loud as

each cube is placed into the cup. Once Player 1 has finished placing all the counters into the cup, they turn over the next card from the pile and add/ remove cubes to/ from the cup to match the second card. As player 1 adds/removes cubes from the cup they must count out loud forward or backward in sequence, with the starting number being the quantity in the cup. *The key is that player 1 must mentally retain the number of cubes that were in the cup after the first card and adjust the quantity in the cup without recounting the initial set of cubes. The new quantity must match the number displayed on the second card.*

After Player 1 has made the necessary change to the cup, Player 2 dumps the cup out to verify that the quantity in the cup matches the second card by using the counting mat. If the card and quantity match, player 1 gets a chip to place on their ten frame. The first player to fill up their ten frame wins. (SMP 1, 2, 3, 4, 5, 6, 7, 8)

Comment:

- Students can record the numeral they counted in their journal for practice.
- Ordinal numbers and understanding of positional words can be introduced /revisited through teacher questioning. (Example: What was the second number you had to count?)
- Only using two different colored cubes would allow students to count while creating a pattern. (Example: 1st cube red, 2nd cube blue, 3rd cube red, etc…)

TEACHER REFLECTION QUESTIONS

- Are students able to count dots/counters with one-to-one correspondence?
- Are students able to identify ordinal positions using the number line?
- Are students able to mentally retain the number of cubes in the cup after the first count?
- Are students able to adjust the quantity in the cup without recounting the initial set of cubes?

FORMATIVE ASSESSMENT QUESTIONS

- How many cubes are there in this *set?*
- How do you know that you counted correctly?
- What color is the 5th cube? (ordinal numbers)
- What color comes after the blue cube? (positional words)
- If you created a pattern using red, blue, red, blue (ABAB) what color would the 7th cube be?

DIFFERENTIATION

Extension

- Ordinal numbers and understanding of positional words can be introduced /revisited through teacher questioning.
- Only using two different colored cubes would allow students to count while creating a pattern. (Example: 1st cube red, 2nd cube blue, 3rd cube red, etc…)

Intervention

- Repeated practice is the best intervention. To develop counting, engage students in almost any game or activity that involves counts and comparison.
- Have students model the Cardinal Cup with their Rekenrek or ten-frame.

Back to Intervention Table

TECHNOLOGY

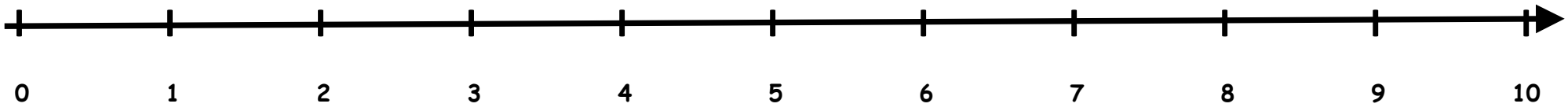
Five Frames: http://illuminations.nctm.org/ActivityDetail.aspx?ID=74
Students manipulate objects to fill and answer the question "how many" in a five frame.

Ten Frames: http://illuminations.nctm.org/ActivityDetail.aspx?ID=75
Students manipulate objects to fill and answer the question "how many" in a ten frame.

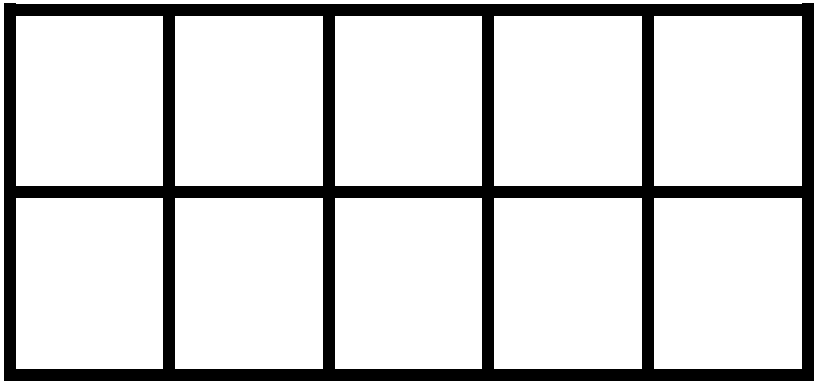
Number Rack (Rekenrek): http://www.mathlearningcenter.org/web-apps/number-rack/
Students use the number rack to develop an understanding of number and quantity.

Concentration: http://illuminations.nctm.org/ActivityDetail.aspx?ID=73
Students play concentration finding the number word that matches the numeral, ten frame or dot representation.

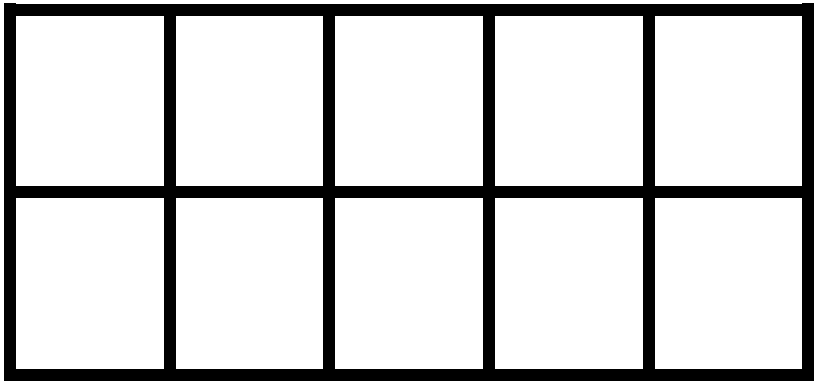
The Cardinal Cup



Player 1 Scoreboard



Player 2 Scoreboard



CONSTRUCTING TASK: Order the Dice

Back To Task Table

Approximately 1 day

STANDARDS FOR MATHEMATICAL CONTENT

MGSEK.CC.1 Count to 100 by ones and by tens.

MGSEK.CC.2. Count forward beginning from a given number within the known sequence (instead of having to begin at 1).

MGSEK.CC.4 Understand the relationship between numbers and quantities; connect counting to cardinality.

a. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object. **(one-to-one correspondence)**
b. Understand that the last number name said tells the number of objects counted **(cardinality)**. The number of objects is the same regardless of their arrangement or the order in which they were counted.
c. Understand that each successive number name refers to a quantity that is one larger.

MGSEK.MD.3. Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.

(For descriptors of standard cluster please see the Grade Level Overview)

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
6. Attend to precision.
7. Look for and make use of structure.

BACKGROUND KNOWLEDGE

This activity task is designed for number sequence and recognition. It will also help students start at a number that may not be one and continue counting forward.

For more information about common misconceptions, please refer to the unit overview.

ESSENTIAL QUESTIONS

- How can we use counting in our everyday lives?
- Why is it important to know how to put things in number order?

MATERIALS

- Order the Dice game board
- Dice

GROUPING

Partner task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Player 1 throws (5) six-sided dice at once. Dice numbers are placed in order from least to greatest. *Example: 5,2,5,1,3 are rolled and place in order. 1,2,3,5,5.* Player 1 receives 1 chip for having three numbers in counting sequence (1,2,3). 1 chip is added to Player 1's ten frame and they say the new total amount of chips. First player to fill their two ten frames win the game. (SMP 1, 2, 3, 4, 6, 7)

Dice in counting sequence	3	4	5
Points (chips collected)	1	2	3

TEACHER REFLECTION QUESTIONS

- Are students able to rote count accurately?
- Are students able to count dots with one-to-one correspondence?
- Are students able to put numbers in counting sequence?

FORMATIVE ASSESSMENT QUESTIONS

- How do you know that you counted correctly?
- What strategy did you use to help you put the numbers in order?

DIFFERENTIATION

Extension

- Use number cubes that are not numbered 1-6 (perhaps 4-9?) or increase the quantity of dice used from 5 to 10.

Intervention

- Give students 5 dice and have them arrange the dice so that they are sequenced 1-5.
- Give students a set of cards from *Numeral, Picture, Word* (use only one form of card).Shuffle the cards and have the students practice putting them in order.

Back to Intervention Table

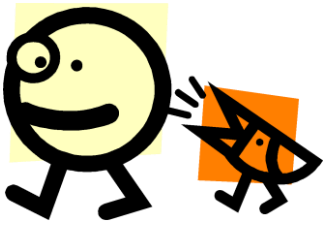
Order the Dice

Player 1 throws five (5) six-sided dice at once. Dice are placed in order from least to greatest. *Example: 5,2,5,1,3 are rolled and place in order: 1,2,3,5,5.* Player 1 receives 1 chip for having three numbers in counting sequence (1,2,3). 1 chip is added to Player 1's ten frame and they say the new total amount of chips. First player to fill their two ten frames wins the game.

Dice in counting sequence	3	4	5
Points (chips collected)	1	2	3

Player 1 Scoreboard

Player 2 Scoreboard



CONSTRUCTING TASK: More or Less

Back To Task Table

Approximately 1 day (Adapted from Van De Walle 2.1)

STANDARDS FOR MATHEMATICAL CONTENT

MGSEK.CC.1 Count to 100 by ones and by tens.

MGSEK.CC.2. Count forward beginning from a given number within the known sequence (instead of having to begin at 1).

MGSEK.CC.3. Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).

MGSEK.CC.4 Understand the relationship between numbers and quantities; connect counting to cardinality.

a. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object. **(one-to-one correspondence)**
b. Understand that the last number name said tells the number of objects counted **(cardinality)**. The number of objects is the same regardless of their arrangement or the order in which they were counted.
c. Understand that each successive number name refers to a quantity that is one larger.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

The concept of "*more"*, "less" and the "*same*" are basic relationships contributing to the overall concept of number. Children begin to develop these ideas before they begin school. Children

entering kindergarten can almost always choose the set that is *"more"* if presented with sets that are quite obviously different in number.

For more information about common misconceptions, please refer to the unit overview.

ESSENTIAL QUESTIONS

- What is the difference between "more" and "less"?
- How do we know if a number is more or less than another number?

MATERIALS

Version 1 (Numbers 0-8)

- Recording Sheet and game board
- 20 red/yellow counters
- 6 sided dice (1-6)
- More/Less Spinner or Dice

Version 2 (Numbers 2-11)

- Recording Sheet and game board
- 20 red/yellow counters
- 6 sided dice (4-9) (use wooden block)
- More/Less Spinner or Dice

GROUPING

Whole group and/or partner task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Comment

There are 2 versions of this game. Each version can be played with more/less 1 OR more/less 2. The spinners provided can be used or dice/wooden blocks can be used to take place of the spinners. The following description is generic for both games.

Player 1 rolls the die (1-6) or (4-9) and spins the spinner (more/less or more/less 1&2). The player covers the number which represents the die and the spinner combined.

Part I (More/Less):
Example: if player 1 rolls a5, then spins *less*, they can cover any number less than 5. (4,3,2,1, or 0) Watch the number the student covers as it relates to covering 3 in a row. Are they randomly picking a number to cover? Or are they choosing the number to cover based on their best chance to cover 3 in a row? (SMP 1-8)

Part II (More/Less 1&2):
Example: if you roll a 5 and spin 2 more, you count forward 2 from 5 to end at seven.

As students play, they record the number they rolled on the recording sheet. Then they record what they spun (more/less, 1 more, 1 less, etc….). Students then record what they covered on the game board. They justify this in the *"because"* section by writing an equation or another justification for covering. (Example: A player could say she rolled one more than 8. That's 9, because one more is the next number, so in the space she wrote "it's next.") First player to get 3 counters in a row wins. (SMP 1-8)

TEACHER REFLECTION QUESTIONS

- Are students able to identify numbers 0-10?
- Are students able to identify 1 more or less than a given number?
- Are students able to identify 2 more or less than a given number?
- Are students able to write numerals correctly?

FORMATIVE ASSESSMENT QUESTIONS

- How do you know that you counted correctly?
- What does "more" mean? What does "less" mean?
- What numbers do you need to win?
- Why did you choose that number?
- If you spun "2 more" what number would you need to roll to win?

DIFFERENTIATION

Extension

- Have the students model their actions using a ten-frame or Rekenrek. This will also help students to record their actions.

Intervention

- Allow the students to model with a ten frame or through the use of a number line. Back to Intervention Table

(0-8) More or Less -3 in a Row

Materials:	**Rules:** Player 1 rolls the dice and spins the spinner. Player 1 covers a number space that relates to the spinner. (Example: if player 1 rolls a 5 and spins *"less",* they can cover any number less than 5. (4, 3, 2, 1, 0). If player 1 spins "*2 less*", they would cover 3. Record what you did on the *More or Less* recording sheet. First player to get 3 counters in a row wins.
spinner dice counters	

7	8	6	0
4	5	4	2
3	3	6	5
1	0	2	4
5	7	1	8

(2-11) More or Less -3 in a Row

Materials: spinner, dice, counters	Rules: Player 1 rolls the dice and spins the spinner. Player 1 covers a number space that relates to the spinner. (Example: if player 1 rolls a 5 and spins *"less",* they can cover any number less than 5. (4, 3, 2, 1, 0). If player 1 spins "*2 less*" they would cover 3. First player to get 3 counters in a row wins.

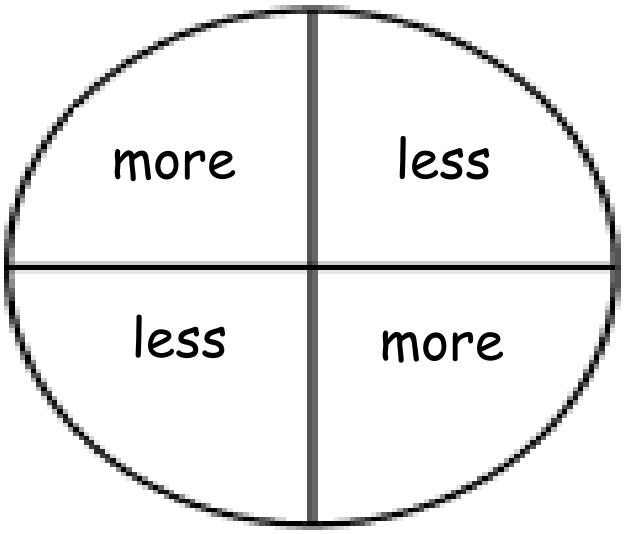
9	10	5	6
6	8	7	9
11	6	5	10
10	7	6	8
9	10	9	6

More or Less

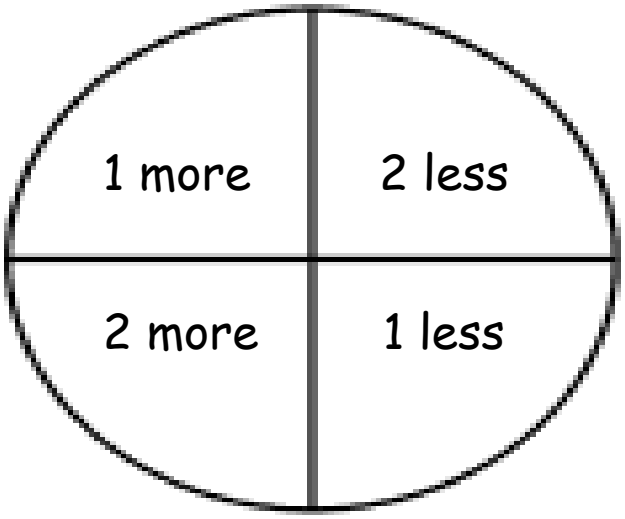
	I rolled this number. . .	more or less	I covered. . .	Because. . .
1				
2				
3				
4				
5				

More or Less

	I rolled this number. . .	more or less	I covered. . .	Because. . .
6				
7				
8				
9				
10				



Place the end of a paper clip at the center of the spinner and hold in place with a pencil. Flick the paperclip with your finger.



CONSTRUCTING TASK: How Many Are in the Bag (0-9)

Back To Task Table

Approximately 1 day

STANDARDS FOR MATHEMATICAL CONTENT

MGSEK.CC.1. Count to 100 by ones and by tens.

MGSEK.CC.2. Count forward beginning from a given number within the known sequence (instead of having to begin at 1).

MGSEK.CC.3. Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).

MGSEK.CC.4 Understand the relationship between numbers and quantities; connect counting to cardinality.

a. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object. **(one-to-one correspondence)**
b. Understand that the last number name said tells the number of objects counted **(cardinality)**. The number of objects is the same regardless of their arrangement or the order in which they were counted.
c. Understand that each successive number name refers to a quantity that is one larger.

MGSEK.MD.3. Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

We want to help students relate a given number to other numbers, specifically to 5 and 10. These relationships are especially useful in thinking about various combinations of numbers. (Example: students need to recognize that 8 is not a number in isolation. 8 is 3 more than 5 and 2 less than ten). This understanding of number and relationships has a tremendous impact on a student's ability to mentally compute in the later years as opposed to rote memorization. (Van de Walle, p45)

For more information about common misconceptions, please refer to the unit overview.

ESSENTIAL QUESTIONS

- How can numbers be represented?
- Why do we need to be able to count objects?

MATERIALS

- *How Many Are in the Bag?* Recording Sheet
- Small bags
- Small items to place in each bag

GROUPING

Students can work in small groups if you aren't using this as a performance task, individually (each child would need 3 bags with objects in each bag), or this can be placed in a work station for students to visit with recording done individually as a performance task.

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

Comments

Prepare and label three bags A, B, and C filled with 0-10 objects for each group of 3 students. You can put any small object in the bags (e.g. beans, counting cubes, small centimeter blocks, paper clips, crayons, pencils, etc.) Be sure each bag has the same item in it. There should only be one kind of manipulative per bag, i.e. Bag A could be filled with butter beans, Bag B could be filled with pennies and Bag C could be filled with paperclips.

Task Directions

Instruct students to look in each bag, count the number of objects and record it on their recording sheet. They should also be able to answer the questions below in order to show understanding.

While students are working, ask questions such as:

- Which bag had the most? Least?
- Which bag contained the least amount of objects?
- Did either of the bags have the same amount?
- Which bag had an amount closest to 10? Closest to 20? (SMP 1-8)

Comment

Students have a difficult time determining which benchmark number the quantity is closer to (anchoring 5 & 10). **DO NOT TELL STUDENTS A MNEMONIC or RYHME THAT MAKES NO SENSE CONCEPTUALLY!** Instead, have student locate the number on a number line and compare which anchor it is closer to. For this, incorporate a 0-10 number line to lead the discussion. Students need to see and recognize that zero is a number. The number "0" needs to be recognized as part of the set.

0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**

If a 0-10 number line is used students can conceptually begin to see that 3 and 7 are both closer to 5 than to 10. A 0-9 and 1-10 number line are both composed of 10 numerals meaning there is no defined middle. **Using a 0-10 line will help students see that the number 5 falls exactly in the middle of 0 and 10. Using a 0-9 or 1-10 number line will cause confusion and many students will not be able to make sense of benchmarks.**

Once in first grade, students will benchmark numbers to the nearest ten. It is strongly encouraged that students use a 0-99 chart to understand rounding.

TEACHER REFLECTION QUESTIONS

- Are students able to identify which bag contains the most and the least?
- Are students able to determine which benchmark number a quantity was closest to using a 0-10 number line?
- Are students able to identify bags containing the same quantity?
- Are students able to represent numbers in different ways?

FORMATIVE ASSESSMENT QUESTIONS

- What are some of the different ways you can represent numbers?
- How did you decide which benchmark number your quantity was closest to?
- If you had 1 more in your bag, how many would you have? If you had 1 less?

DIFFERENTIATION

Extension

- Provide students with bags that have 11-19 items and have them create quantity drawings using their own drawing of a ten frame.

Intervention

- Allow students to use ten frames to place the small items on once they take them out of the bag. Have number words displayed in the room to assist with spelling.

If you hear them skipping numbers, assist by giving them a number line or another counting device (number chart with numbers and words along with illustrations).

Back to Intervention Table

Georgia Department of Education
Georgia Standards of Excellence Framework
GSE Counting With Friends · Unit 1

Name:_____

Bag	Numeral	Ten frame	How many more to 10?	A numeral that is Greater	A numeral that is Less

PRACTICE TASK: More or Less-Make a Guess?

Back To Task Table

Approximately 1-2 days

STANDARDS FOR MATHEMATICAL CONTENT

MGSEK.CC.1. Count to 100 by ones and by tens.

MGSEK.CC.2. Count forward beginning from a given number within the known sequence (instead of having to begin at 1).

MGSEK.CC.4 Understand the relationship between numbers and quantities; connect counting to cardinality.

a. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object. **(one-to-one correspondence)**
b. Understand that the last number name said tells the number of objects counted **(cardinality)**. The number of objects is the same regardless of their arrangement or the order in which they were counted.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

"Though the concept of less is logically related to the concept of more (selecting the set with more is the same as not selecting the set with less), the word *less* proves to be more difficult for children than *more*. A possible explanation is that children have many opportunities to use the word *more* but have limited exposure with the term *less.* Having students focus on which quantity is *less* through questioning will help students better understand the meaning of *less."* (Van de Walle, 2010).

For more information about common misconceptions, please refer to the unit overview.

ESSENTIAL QUESTIONS

- What is the difference between "more" and "less"?

MATERIALS

- *More or Less-Make a Guess* game board
- 21 counters, markers, or other objects to hide the numbers on the number line
- Folder or object to hide mystery number

GROUPING

Whole group and/or partner task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Cut the game board along the dotted line and give each player a half. Player 1 hides their board using a folder or book and places a counter on their number line at the location of the mystery number. *It is important that player two does not see the location of the counter.*
Player 2 begins to ask questions about the mystery number Player 1 has identified on their number line. With each question, Player 2 eliminates the numbers on their number line that they know CANNOT be the answer. Example: if Player 2 asks, "Is your number more than 15?", and Player 2 responds, "No ", Player 2 covers the numbers 16, 17, 18 ,19, and 20. Notice that 15 was not covered because it is equal. **DO NOT TELL STUDENTS THIS STEP**. Allow for this conversation to develop through the course of the game. The playing is where learning happens. If Player 2 identifies the number in 5 or less tries, Player 2 makes the mystery number. If the Mystery number is not identified in 5 or less tries, the players roles are reversed. (SMP 1-8)

TEACHER REFLECTION QUESTIONS

- Are students able to identify numbers to 0-20?
- Are students able to identify numbers that are more/less than a given number?
- Are students able to use a number line?

FORMATIVE ASSESSMENT QUESTIONS

- What strategy are you using to find the mystery number?
- How does "more" and "less" help you identify the mystery number?

DIFFERENTIATION

Extension

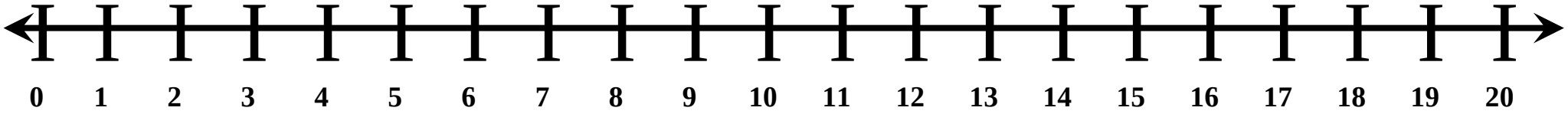
- Play *More or Less-Make a Guess* on a 0-99 chart using only the numbers 0-20.

Intervention

Write the numbers on the number line so that students can actually see which number they are trying to guess or reduce the numbers to 0-10.

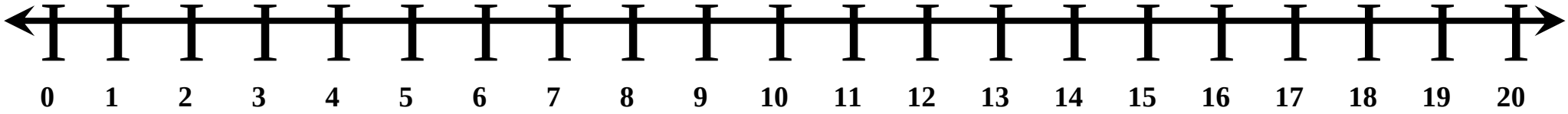
Back to Intervention Table

More or Less-Make a Guess Player 1



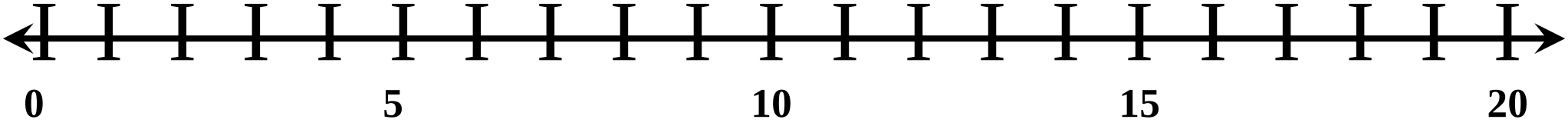
Cover a number on the number line with a counter. Don't let your partner see the number.

More or Less-Make a Guess Player 2



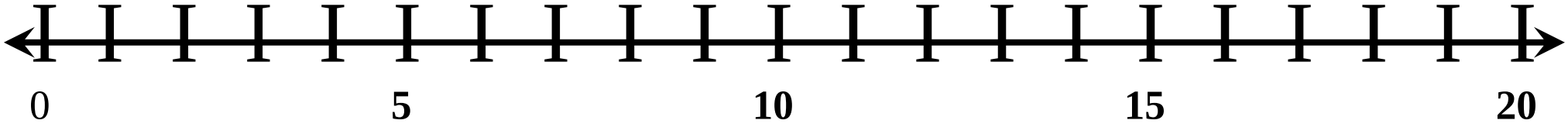
Try and guess the number your partner has covered by asking questions. (example: Is your number greater than 12?)
Cover numbers on your board which you have eliminated.

More or Less-Make a Guess Player 1



Cover a number on the number line with a counter. Don't let your partner see the number.

More or Less-Make a Guess Player 2



Try and guess the number your partner has covered by asking questions. (example: Is your number greater than 12?)
Cover numbers on your board which you have eliminated.

CULMINATING TASK: Find the 5th Tower

Back To Task Table

Approximately 1-2 days

STANDARDS FOR MATHEMATICAL CONTENT

MGSEK.CC.1. Count to 100 by ones and by tens.

MGSEK.CC.2. Count forward beginning from a given number within the known sequence (instead of having to begin at 1).

MGSEK.CC.3. Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).

MGSEK.CC.4 Understand the relationship between numbers and quantities; connect counting to cardinality.

a. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object. **(one-to-one correspondence)**
b. Understand that the last number name said tells the number of objects counted **(cardinality)**. The number of objects is the same regardless of their arrangement or the order in which they were counted.
c. Understand that each successive number name refers to a quantity that is one larger.

MGSEK.G.1. Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as *above*, *below*, *beside*, *in front of*, *behind*, and *next to*.

MGSEK.MD.3. Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.

6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

Numbers are related to each other through a variety of number relationships. The number 7, for example, is 3 more than 4, two less than 9, composed of 3 and 4, as well as 2 and 5, is three away from 10, and can be quickly recognized in several patterned arrangements of dots. These ideas further extend to an understanding of 17, 77, and beyond. Number concepts are intimately tied to the world around us. Application of number relationships to the real world marks the beginning of making sense of the world in a mathematical manner (Van de Walle, 2010).

For more information about common misconceptions, please refer to the unit overview.

ESSENTIAL QUESTIONS

- Why is it important to know how to put things in number order?
- What is the difference between "more" and "less"?

MATERIALS

- Recording Sheet
- 10 cubes (let students count out the 10 cubes)

GROUPING

Whole group and/or small group

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Students count 10 cubes. Students choose the colors.
Allow time for students to build towers of no more than 5 and practice placing them on the recording sheet. Allow students time to describe and share what their towers look like and the order in which their towers appear.
Teacher reads the directions as students build towers and place them in the correct location/order according to what the teacher says. The teacher will give the directions for (4) towers and students must determine what the 5^{th} tower would look like based on what they see (patterns).

As the teacher describes what each tower should look like, the students recreate the tower to match what the teacher is saying. Students should identify the pattern and be able to count the total number of cubes used to make all the 5 towers. Students must record the quantity for each tower in the box provided.

After students have counted the total amount of cubes, have students make one long tower. *(Some students may have done this to count all of their cubes, which is fine).* After all five towers for the first set have been connected to make one tower, have students **decompose** the tower one cube at a time counting backwards out loud. Discuss the vocabulary term **decompose** if not already addressed previously. As they count backwards, engage students in questions by asking what number is next, more/less than, etc… Once the tower has been broken down into individual cubes move on to the next set of towers and repeat.

First set of towers:

- The 1st tower has one cube.
- The 2nd tower has 2 cubes.
- The tower after the 2nd has the same amount of cubes as the 1st tower.
- The 4th tower has 2 cubes.
- What would the 5th tower look like?
- How many cubes make up all 5 towers?

Second set of towers:

- The 2nd tower has 2 cubes.
- The tower that comes after the 4th tower has 2 cubes.
- The tower in between the 2nd and 4th tower has 3 cubes.
- The first tower has 1 less cube than the 2nd tower.
- What would the 5th tower look like?
- How many cubes make up all 5 towers?

Third set of towers

- The fourth tower has 3 cubes.
- The second tower has 1 cube.
- The first tower has less than one cube. *(Zero-Allow for constructive struggle and conversation)*
- The third tower has 1 more cube than the 2nd tower.
- What would the 5th tower look like?
- How many cubes make up all 5 towers?

After students have made all the towers and counted all the blocks in the five towers, have them reconstruct their favorite set of towers. Have students decide and describe how they could sort their favorite set of towers. (Color, height, quantity, etc…) This will vary with student and chosen set. Student then sort towers in the way they described and draw a picture of how they sorted.

TEACHER REFLECTION QUESTIONS

- Are students able to follow multi-step directions?
- Are students able to use ordinal numbers to put their towers in the correct place?
- Are students able to describe their towers using mathematical language?
- Are students able to describe how they sorted their towers?

FORMATIVE ASSESSMENT QUESTIONS

- How do you know that you counted correctly?
- What did you do to find the 5^{th} tower?
- How did you decide what the 5^{th} tower would look like?
- Did you have a strategy for counting all your cubes? Describe your strategy.
- What does decompose mean?
- What are some ways that we can sort objects?

DIFFERENTIATION

Extension

- Increase the complexity by adding the terms “more” and “less” into the descriptors. Example:
    - The 2^{nd} tower has 1 less cube than 3 cubes.
    - The 1^{st} tower has one less cube than the 2^{nd} tower.
    - The tower after the 3^{rd} tower has 1 more cube than the 1^{st} tower.
    - The tower between the 2^{nd} and 4^{th} has one less than the towers it is between.
    - What would the 5^{th} tower look like?
- Allow student to make a pattern with towers and describe the pattern to their partner. The partner must predict what the 5^{th} tower looks like.

Intervention

- Be explicit in the description of each tower and describe each tower in order. For example:
  - The 1st tower has 2 cubes.
  - The next tower has 1 cube.
  - The 3rd tower has 2 cubes.
  - The 4th tower has 1 cube.
  - What would the 5th tower look like?

Back to Intervention Table

Find the Fifth

Build Tower Here	Build Tower Here	Build Tower Here	Build Tower Here	Build Tower Here

_____ _____ _____ _____ _____

How many blocks were used to make the 5 towers?
Write the total amount in the square

Build Tower Here	Build Tower Here	Build Tower Here	Build Tower Here	Build Tower Here

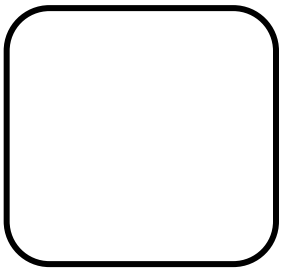
_____ _____ _____ _____ _____

How many blocks were used to make the 5 towers?
Write the total amount in the square

Build Tower Here	Build Tower Here	Build Tower Here	Build Tower Here	Build Tower Here

_____ _____ _____ _____ _____

How many blocks were used to make the 5 towers?
Write the total amount in the square

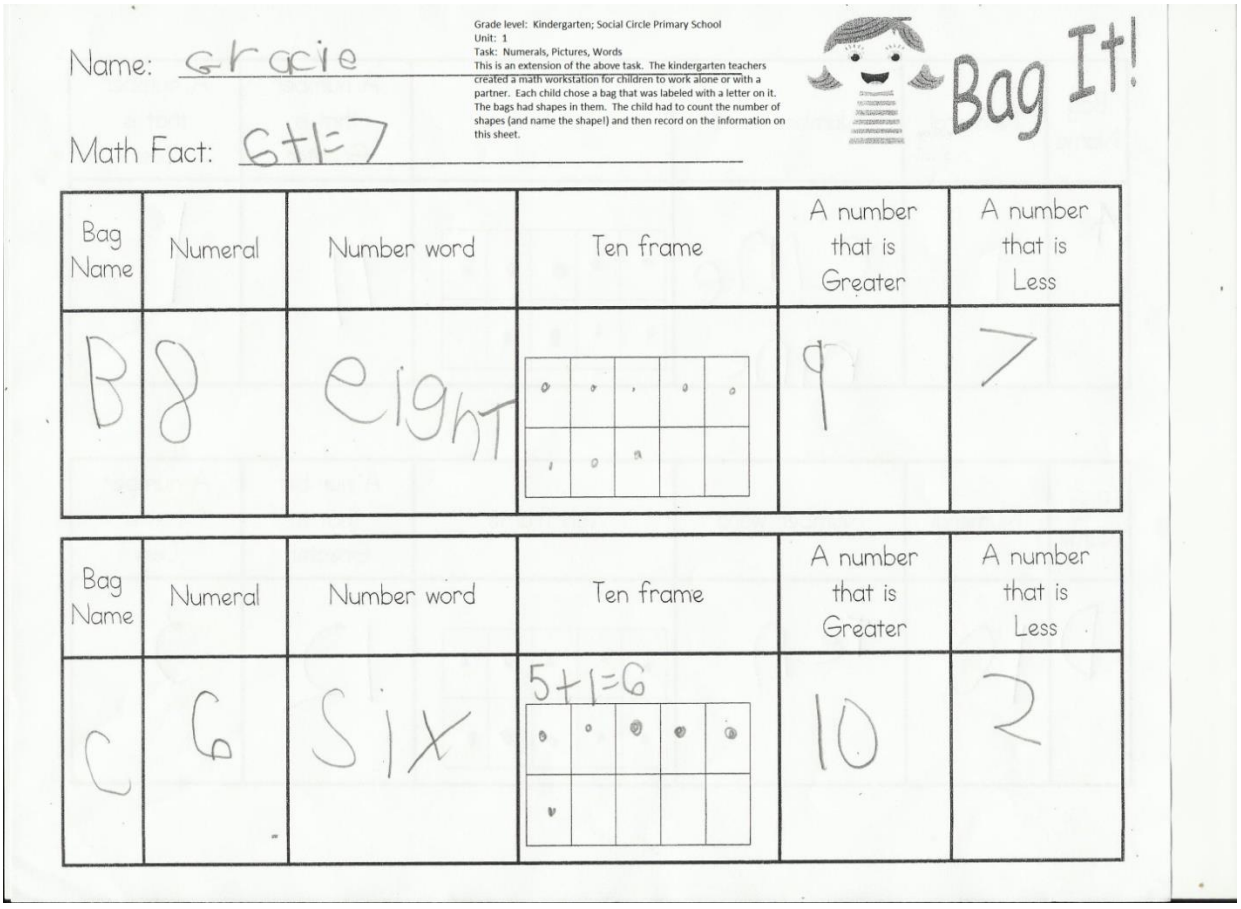


What is a way you can sort your towers?

I can sort my towers by _____

Show what you mean and draw a picture below:

STUDENT WORK SAMPLES:



Name: gracie

Math Fact: 6+1=7

Grade level: Kindergarten; Social Circle Primary School
Unit: 1
Task: Numerals, Pictures, Words
This is an extension of the above task. The kindergarten teachers created a math workstation for children to work alone or with a partner. Each child chose a bag that was labeled with a letter on it. The bags had shapes in them. The child had to count the number of shapes (and name the shape!) and then record on the information on this sheet.

Bag It!

Bag Name	Numeral	Number word	Ten frame	A number that is Greater	A number that is Less
B	8	eight		9	7

Bag Name	Numeral	Number word	Ten frame	A number that is Greater	A number that is Less
C	6	Six	5+1=6	10	2