

South Carolina College- and Career-Ready Standards for Mathematics



**Support Document
Kindergarten**

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Kindergarten Mathematics Support Document

As support for implementing the *South Carolina College- and Career-Ready Standards for Mathematics*, the standards for each grade K-5 have been grouped into possible units. In the *Table of Contents* below, the titles for those possible units are listed in a column under each grade. To see which standards are addressed in each unit for this grade and to read a brief description of the focus for each unit in this grade, click on the *Overview of Units* in the [Table of Contents](#). The completed units for this grade are hyperlinked from/to the *Table of Contents* and the *Overview of Units*. The purpose of this document is to provide guidance as to how all the standards at this grade may be grouped into units and how those units might look. Since this document is merely guidance, districts should implement the standards in a manner that addresses the district curriculum and the needs of students.

Acknowledgments

“Jean Baptiste Massieu, famous deaf educator, made a statement that is now considered a French proverb. *Gratitude is the memory of the heart*. Indeed, appreciation comes when you feel grateful from the depths of your heart. The head keeps an account of all the benefits you received and gave. But the heart records the feelings of appreciation, humility, and generosity that one feels when someone showers you with kindness.” It is with sincere appreciation that we humbly acknowledge the dedication, hard work and generosity of time provided by the following individuals who are making the K-5 Mathematics Support Document possible. (<http://quotations.about.com/od/ThankYou/a/Gratitude-Quotes.htm>)

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Table of Contents for Grades K-5

	K	1st	2nd	3rd	4th	5th
	Overview of Units	Overview of Units	Overview of Units	Overview of Units	Overview of Units	Overview of Units
Unit 1	Counting and Cardinality	Composing and Decomposing Numbers Through 10	Place Value Concepts	Conceptual Understanding of Multiplication & Division	Place Value, Addition, & Subtraction with Whole Numbers	Expressions, Equations, & the Coordinate Plane
Unit 2	Understanding Relationship of Counting and Quantity	Addition and Subtraction Strategies	Developing Concepts Addition/ Subtraction	Place Value	Algebraic Thinking	Place Value
Unit 3	Count and Compare	Understanding Place Value	Fluency and Word Problems Addition/ Subtraction	Addition & Subtraction	Multiplication & Division of Whole Numbers	Operations with Whole and Decimal Numbers
Unit 4	Composing and Decomposing Numbers	Applying Place Value Concepts	Developing an Understanding of Multiplication	Application of Multiplication & Division	Fraction Equivalence	Adding and Subtracting Fractions
Unit 5	Addition and Subtraction	Comparisons and Data	Attributes Polygons and Fractional Parts	Conceptual Understanding of Fractions	Adding, Subtracting, & Multiplying with Fractions	Multiplying with Fractions
Unit 6	Patterns and Positions	Geometry and Equal Shares	Measurement Length	Data Analysis	Decimal Concepts	Dividing with Fractions
Unit 7	Two Dimensional and Three Dimensional Geometry	Measurement, Time, and Money	Measurement Time and Money	Identification and Classification of Geometric Shapes	Conversions & Problem Solving with Measurement	Classifying 2D Shapes
Unit 8	Foundations of Measurement		Creating and Understanding Data	Problem Solving with Measurement	Geometric Classifications & Line Symmetry	Perimeter, Area, and Volume
Unit 9	Understanding Graphs and Data			Fluency with Multiplication & Division	Angle Measurement	Converting Measurements within a Single System

Kindergarten Overview of Units

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Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7	Unit 8	Unit 9
Counting and Cardinality	Understanding Relationship of Counting and Quantity	Count and Compare	Composing and Decomposing Numbers	Addition and Subtraction	Patterns and Positions	Two Dimensional and Three Dimensional Geometry	Foundations of Measurement	Understanding Graphs and Data
Standards	Standards	Standards	Standards	Standards	Standards	Standards	Standards	Standards
K.NS.1 K.NS.2 K.NS.3 K.NS.4 K.NS.5 K.NS.6	K.NS.4 K.NS.5	K.NS.4 (c) K.NS.7 K.NS.8	K.NSBT.1 K.ATO.3	K.ATO.1 K.ATO.2 K.ATO.4 K.ATO.5	K.ATO.6 K.G.1	K.G.2 K.G.3 K.G.4 K.G.5	K.MDA.1 K.MDA.2	K.MDA.3 K.MDA.4
Unit Focus	Unit Focus	Unit Focus	Unit Focus	Unit Focus	Unit Focus	Unit Focus	Unit Focus	Unit Focus
The focus of this unit is for students to understand the relationship between number and quantity. Students will understand that quantities can be counted, represented with a number name and a written numeral is a symbol representing that quantity.	The focus of this unit is for students to develop a sense of quantity and how numbers they count relate to one another. Students will begin to understand the reasonableness of answers, understanding the need to be consistent and accurate when counting.	The main focus of this unit is for students to apply their understanding of counting and quantity to compare sets of objects and written numerals.	This unit focuses on developing the concepts of how numbers can be composed and decomposed in a variety of ways, forming a foundation for number sense in base ten.	The main focus is for students to build on composing and decomposing strategies which make sense to them to develop the conceptual understanding for the operations of addition and subtraction.	The main focus is for students to describe simple repeating patterns and positions of objects. Focus should include simple number patterns.	The main focus is on basic geometrical shapes. Students will develop an understanding of the attributes of 2-dimensional and 3-dimensional shapes. Students will apply number sense to reason about shapes in the environment.	The main focus is for students to develop a foundational understanding of length and weight measurement. This includes students developing the language needed to describe attributes, similarities and differences in the length and weight of a variety of objects.	The focus is for students to be given categories in which to sort and count objects. Students will then represent their findings in object and picture graphs to answer questions about the categories.

Kindergarten Math Unit 1

Counting and Cardinality

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Content Standards with Clarifying Notes

Open Bullets Indicate Clarifying Notes

- **K.NS.1** Count forward by ones and tens to 100.
 - Oral Rote counting, say the count sequence
 - Counting by tens is with decade numbers only (e.g. 10, 20, 30, etc.)
 - Students are not expected to write the numerals for this standard.
- **K.NS.2** Count forward by ones beginning from any number less than 100.
 - Oral Rote counting, say the count sequence from any number less than 100.
 - Students are not expected to write the numerals for this standard.
- **K.NS.3** Read numbers from 0 – 20 and represent a number of objects 0 – 20 with a written numeral.
 - Number reversal (writing a 3 backward) is developmentally appropriate at this stage, however students should be corrected so as not to form misconceptions or incorrect habits.
 - When students write the numeral, the order of the digits is important so as not to confuse the value of the number. For example, 31 is not 13 and students should be corrected so as not to form misconceptions or incorrect habits that would impact their beginning understanding of number meaning.
- **K.NS.4** Understand the relationship between number and quantity. Connect counting to cardinality by demonstrating an understanding that:
 - a. the last number said tells the number of objects in the set (cardinality);
 - b. the number of objects is the same regardless of their arrangement or the order in which they are counted (conservation of number);
 - c. each successive number name refers to a quantity that is one more and each previous number name refers to a quantity that is one less.
- **K.NS.5** Count a given number of objects from 1 – 20 and connect this sequence in a one-to-one manner.
 - Say a number name for each object counted.
- **K.NS.6** Recognize a quantity of up to ten objects in an organized arrangement (subitizing).
 - Teacher note: Subitizing is defined as seeing a small amount of objects and knowing how many there are *without counting*. (Carlyle

& Mercado 2012), Subitizing should include perceptual and conceptual subitizing. Perceptual subitizing is recognizing the quantity such as 3 without using any formal mathematical processes. Conceptual subitizing is viewing number and number patterns as units of units. (e.g. On a dominoe or a die student sees 4 dots as 2 dots and 2 dots as 1 unit of 4)(Adapted from http://www.nwaea.k12.ia.us/documents/filelibrary/pdf/connections/Subitizing_B2518BBFE8FCF.pdf)

New Academic Vocabulary for This Unit

- numeral
- number
- number names
(e.g. one, two, three, etc.)
- quantity
- count
- sequence
- 1 more
- 1 less
- count on
- how many
- amount
- set

Prior Knowledge Required for this Unit

While students may have had some informal exposure to counting in everyday situations, this may be their first formal introduction to counting and cardinality. Frequent and brief opportunities to count will allow for rote counting concepts to develop over time. Development of meaningful counting, understanding the relationship between numbers, etc., requires intentional activities designed to target understandings such as those set forth in K.NS.4. Children should come to the understanding that number symbols signify the meaning of counting. Many students come to kindergarten knowing the rote count sequence, making adults believe they know how to count, but they are just saying the rote count sequence, they do not have any formal meaning for what they are saying (numbers). For example, when shown a number such as 4, the student doesn't know it's a 4, or doesn't know a quantity of 4 objects, but they can verbalize the rote count sequence, "1,2,3,4,5,6,..."

Subsequent Knowledge Related to this Unit

This unit is the foundation for the more complex stages of number sense:

Hierarchical inclusion: Understanding that smaller numbers are part of bigger numbers. Idea of one more and one less

Part/Whole Relationships: Understanding different ways to make up a given number, composing and decomposing numbers, understanding that 6 is made up of 1 & 5, 3 & 3, 2 & 4.

Compensation: Ability to see the parts of a whole and are able to compensate, so if I know that $5+1=6$, then I also know that $4+2=6$

because 4 is one less than 5 and 2 is one more than 1.

Unitizing: Once students begin to gain a solid understanding of the preceding number sense, then they can construct unitizing as they work with larger numbers. Place value

Unit 1 provides the foundation for student understanding that in the count sequence, the next number is one more, and when counting by tens, the next number is “ten more” (or one more group of 10). As students gain this understanding, they will be prepared to compare numbers in Unit 3. However, those understandings are not innate and students should be given intentional learning opportunities. Students should then be able to apply this knowledge to part/whole relationships, compensate to compose and decompose numbers in Units 3 & 4, as well as develop a foundation for place value and operations with numbers in subsequent units as well as subsequent grade levels.

Students will use their fluency with the count sequence and cardinality to compose and decompose numbers in Unit 4, and then again to model addition and subtraction with story problems in Unit 5.

As students are able to subitize, they will use this skill in addition to cardinality to build single-digit fluency to 5 in Unit 5.

Relationship Among Standards in this Unit

The content standards and the process standards work together in this unit to form the foundation which will enable all students to develop the world class knowledge, skills, and life and career characteristics identified in the *Profile of the South Carolina Graduate*.

The standards in Unit 1 are intertwined and work together to help students build their foundation in the key concepts Number Sense and Number Sense in Base Ten . Counting and Cardinality are about understanding and using numbers. These are both essential foundations for Number Sense in Base Ten. This is the first formal introduction for students to the language of mathematics/ numbers. Frequent and brief opportunities to count will allow for rote counting concepts to develop over time. However, children must be given intentional learning opportunities to understand that number symbols signify the meaning of counting.

When taught simultaneously these standards will develop students’ understanding of number names, the count sequence, quantity, written numerals, and how they are all related; together these will provide a foundation for comparing numbers in Unit 3. The main focus of this unit is for students to use and understand numbers in a variety of ways orally and written so as to master kindergarten standards by the end of the year. Students will count objects in a set, and count out a given number of objects so as to make the connection between counting and cardinality while learning the count sequence and developing one-to one correspondence, as well as represent quantities. Students will also answer quantitative questions by subitizing, counting and producing sets of a given size.

K.NS.1 and K.NS.2 require students to say the count sequence to 100, by ones, tens, and beginning at any number less than 100. As students learn the count sequence, K.NS.5 requires that they say a number name for each object counted in a set of up to 20 objects. This leads to students understanding of cardinality, K.NS.4. Accuracy in counting relies upon knowing the patterns in the number name, correctly saying one number name to one object, and keeping track of counted and uncounted objects so as not to count an object more than once. Young students benefit from regularity and rhythm aspects of counting so as to develop one-to-one correspondence. As students begin to make sense of counting, they will be ready to read and write numbers 0-20 to correctly represent a quantity.

Unit 1 provides the foundation for the critical learning phase of counting objects. In this unit, common behaviors of students might be: 1-1 correspondence, keeping track of an unorganized pile, noticing when a recount results in a different number, bothered when counting a group results in the same number after more objects have been added or taken away, spontaneously checking or recounting to see if the result is the same, answering “How many” questions, counting out a specific quantity, showing a reaction to estimate while counting, and adjusting estimate while counting to have a closer estimate. Depending where students are in their development, these behaviors might be observed at different times with different students.

The standards in Units 1-4 are essential to the key concepts Number Sense and Base Ten and Algebraic Thinking and Operations in grades K-5. Meaningful, daily experiences with the standards in Unit 1 should be provided to young students throughout the kindergarten year to set a strong foundation for mathematics success. Students will deepen their understanding of counting and cardinality in Unit 2 as they look more closely at quantities.

Teacher Notes:

Students typically develop number sense through the following progression:

Subitizing ability to see small amounts without counting.

Magnitude ability to tell which of two sets has more without counting.

Counting ability to say the counting sequence, which happens before one-to-one correspondence is fully developed.

One-to-One correspondence is saying one number name for each object counted.

Cardinality is when you count a group of objects, and the last number you say tells how many in all. Students who don't have this, recount

objects when asked “how many?”

Hierarchical inclusion understanding that smaller numbers are part of bigger numbers. Idea of one more and one less.

Potential Instructional Strategies/Lessons

Kindergarten is the pivotal grade for creating a mathematical classroom which encourages collaboration and builds community. Students who are college-and-career-ready take a productive and confident approach to mathematics by communicating about mathematics to gain understanding.

Students in kindergarten can begin developing their communication skills by:

- Acting out mathematical scenarios/problems
- Frequently exchanging mathematical ideas and problem solving strategies
- Listening to understand one another. This involves thinking about what a person is saying so that you can explain it yourself or to help them explain it more clearly. It is not just being quiet when someone else is talking. Also, children need to listen so that they can ask a question or help the explainer.
- Utilizing *Math Talk* in the classroom before being asked to follow procedures

Kindergarten students will naturally want to do many things on their own, however it is encouraged to have students begin working in pairs or small groups to build reasoning and communication skills.

Differentiation should be considered in the mathematics classroom, even at the kindergarten level where students’ background knowledge and experiences vary. Instruction on the count sequence should be scaffolded as students are developmentally ready. (e.g. focus on 1-5, 1-10, then 1-20, etc.)

Possible Strategies:

Students should be provided many, meaningful opportunities to count throughout the day and throughout the kindergarten year. Provide settings which connect mathematical language and symbols to kindergartners’ everyday lives. Support the natural ability of young children to mathematize their world.

Number Sense Routines Daily routines that allow children ongoing support with counting, thinking and talking about numbers which help them

make sense of numbers and how they work.

A list of possible routines is here <https://gradecommoncoremath.wikispaces.hcpss.org/Routines>

Introductory Lesson/Strategy

Numbers and Me <http://illuminations.nctm.org/Lesson.aspx?id=910>

- An activity which focuses on the use of numbers in everyday situations and school to introduce teacher and students to each other.

Choral counting

- Count the number of chairs in the room
- Count the number of students today
- Count the number of shoes, papers, pencils, crayons, anything in the classroom
- Count the number of empty chairs in the room
- Count the number of snacks provided
- Count the number of napkins/cups/plates needed for snack
- Count around the circle: Students sit in a circle and pass an object as they count.
- Count the days in school using the number line and/or hundreds chart

Choral Counting <https://www.illustrativemathematics.org/content-standards/K/CC/A/1/tasks/360>

The Counting Jar

- Place objects (same objects at beginning of year such as marbles, color tiles, beans, shells, etc.) in a jar and each day, remove the objects from the jar, asking students to count the objects. At first, the teacher might record the written number, and ask students to find that number on a number line or hundred chart. As students become more fluent with counting and one-to-one correspondence, increase the magnitude of the quantity of objects in the jar.

The Counting Jar <https://www.youtube.com/watch?v=QWoRC3KwB2M>

Read Alouds

- Children's Literature is an effective and engaging way to provide students with the opportunity to understand numbers.

Possible Lesson Using :

Ten Black Dots by Donald Crews <http://www.k-5mathteachingresources.com/support-files/ten-black-dots.pdf>
<https://www.youtube.com/watch?v=h3ePDTSThg0> A recorded read aloud

After listening to the story, this lesson engages students in counting out a specific number of dots to create something. They then complete a sentence frame for a page that can be combined to create a class book.

Ten Black Dots <http://www.scholastic.com/teachers/lesson-plan/ten-black-dots-extension-activities>

- Activities to use with the children’s book by Donald Crews.

Organization of Numbers

- Five Frames
- Ten Frames
- Dot Cards
- Rekenreks <http://www.k-5mathteachingresources.com/Rekenrek.html>

The rekenrek is a tool to teach students one -to-one correspondence and then more complex counting such as in groups of 5 and ten. Lessons with the rekenrek support students natural concept development of counting.

Five Frame Fill & Ten Frame Fill <http://illuminations.nctm.org/Activity.aspx?id=3565>

- An interactive game using five and ten frames. Several options in the game allow students to count, match a quantity, and identify numbers with quantities. Can be used individually on a computer or projected on Smart Boards for whole group.

Ten Frames and Dot Cards <http://www.k-5mathteachingresources.com/ten-frames.html>

- A variety of lesson ideas for using ten frames and dot cards. Also provides blackline masters of ten frames and dot cards.

- Counting Songs
- Counting rhymes

All About the Number ____ :

- Following the count sequence, create an anchor chart for each number. Asking students, “ What do we know about the number ____?” “How can we show the number ____?” “What does it look like as a picture? a word? a symbol?” Post the anchor charts in the classroom

to begin building an organic number line with meaning based on what students know about the numbers. As students learn more, they can add to the anchor charts.

Possible Culminating Strategy:

My Counting Book <http://www.k-5mathteachingresources.com/support-files/my-counting-book.pdf>

- Students create their own counting book. A good activity for students to work on over time, especially after reading several counting books as read alouds. Provides opportunity for students to count, draw/represent, and write numbers.

Resources

Teacher Resources:

Number Early Learning Progression <http://nzmaths.co.nz/sites/default/files/Number-Early-Learning-Progression.pdf>

- This chart provides the learning progression for learning numbers and the count sequence.

The Principles of Counting <http://math.about.com/od/counting/a/The-Principles-Of-Counting.htm>

- Explanation of the different aspects of counting such as cardinality, conservation of number, and unitizing.

Mingle and Count game <https://www.teachingchannel.org/videos/mingle-count-a-game-of-number-sense>

- Explains and demonstrates how to play the game

Lesson Planning Resources:

Building Sets of Ten <http://illuminations.nctm.org/Lesson.aspx?id=1649>

- A lesson plan for exploring sets of up to 10 items, and practice writing numbers 0-10.

Tallies, Tens Frames and Baseball Games <http://illuminations.nctm.org/Lesson.aspx?id=3300>

- A lesson plan for reinforcing counting concepts using tally marks, tens frames, and patterning wins and losses for a baseball team. This lesson could be used as a daily support for these concepts. It extends to using operations with the numbers which could be used again in Unit 3 for composing and decomposing numbers and building fluency in Unit 5.

Children's Literature such as; Mouse Count by Ellen Stoll Walsh, Ten Black Dots by Donald Crews, How Many Snails? by Paul Giganti, Jr., Olly and Me, 1*2*3 by Shirley Hughes, Ten Flashing Fireflies by Philemon Sturges

Howard County Kindergarten Math Wiki <https://gradekcommoncoremath.wikispaces.hcpss.org/kindergarten+home>

- This website has a wide variety of daily number routines, vocabulary cards, lesson plans/activities, and assessment tasks including rubrics for proficiency.

Counting by Tens <https://www.illustrativemathematics.org/content-standards/K/CC/A/1/tasks/754>

- Kinesthetic and auditory lesson to demonstrate the count sequence to 100 when counting by tens.

Number Line Up <https://www.illustrativemathematics.org/content-standards/K/CC/A/2/tasks/401>

- Kinesthetic lesson for students to physically identify numbers and put them in order to form a “human number line”.

Children’s Books for Math <http://www.the-best-childrens-books.org/math-for-kids.html>

- This website has lists of children’s books for different concepts in math that make learning the concepts engaging and relatable to small children.

Interactive Resources

Counting Superhero Song by Harry Kindergarten music <https://www.youtube.com/watch?v=4RhBhzFJ4Ww>

- A counting song and video to practice and reinforce counting by ones to 100.

Find the Numbers 0-5 or 5-10 <https://www.illustrativemathematics.org/content-standards/K/CC/A/tasks/403>

- Game which students can play in groups of 2 or 3 to practice identifying numbers and matching quantities.

Glencoe Virtual Manipulatives http://www.glencoe.com/sites/common_assets/mathematics/ebook_assets/vmf/VMF-Interface.html

- An interactive library of virtual manipulatives which allow teachers to choose grade level, manipulative (tools) and backgrounds such as storyboards, workmats, and game boards for students to practice. Could be used at individual computers or on an interactive whiteboard. At the kindergarten level, students should first use concrete manipulatives before using digital manipulatives.

National Library of Virtual Manipulatives http://nlvm.usu.edu/en/nav/grade_g_1.html

- A library of virtual manipulatives which allow teachers to engage students in visualizing problems. At the kindergarten level, students should first use concrete manipulatives before using digital manipulatives.

Teddy Numbers <http://www.topmarks.co.uk/learning-to-count/teddy-numbers>

- An interactive counting game that provides practice for young students to count objects by dragging and dropping items onto a teddy bear.

Underwater Counting <http://www.topmarks.co.uk/learning-to-count/underwater-counting>

- An interactive counting game that provides practice for young students to count objects in an underwater scene and click on the corresponding numeral.

Bones <http://colaborativelearning.pbworks.com/w/page/31904645/Kindergarten%20Math>

- An interactive game for students to count to find the location on the hundreds board where the dog bones are hidden. Reinforces using a blank hundreds board and knowing count sequence from 1-100 by ones and tens.

Sample Formative Assessment Tasks/Questions

Assessing Counting Sequences Part 1; <https://www.illustrativemathematics.org/content-standards/K/CC/A/1/tasks/448>

Assessing Counting Sequences Part II <https://www.illustrativemathematics.org/content-standards/K/CC/A/2/tasks/449>

Assessing Reading Numbers to 20 <https://www.illustrativemathematics.org/content-standards/K/CC/A/tasks/450>

Assessing Sequencing Numbers <https://www.illustrativemathematics.org/content-standards/K/CC/A/tasks/451>

Assessing Writing Numbers <https://www.illustrativemathematics.org/content-standards/K/CC/A/3/tasks/452>

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Understanding Relationship of Counting and Quantity

Content Standards with Clarifying Notes*Open Bullets Indicate Clarifying Notes*

- **K.NS.4** Understand the relationship between number and quantity. Connect counting to cardinality by demonstrating an understanding that:
 - a. the last number said tells the number of objects in the set (cardinality);
 - b. the number of objects is the same regardless of their arrangement or the order in which they are counted (conservation of number);
 - c. each successive number name refers to a quantity that is one more and each previous number name refers to a quantity that is one less.
- **K.NS.5** Count a given number of objects from 1-20 and connect this sequence in a one-to-one manner.

New Academic Vocabulary for This Unit

- | | | | |
|--|------------|------------|------------|
| ● numeral | ● quantity | ● 1 more | ● amount |
| ● number | ● count | ● 1 less | ● sequence |
| ● digit | ● how much | ● count on | ● accuracy |
| ● number names
(e.g. one, two, three, etc.) | ● how many | ● set | ● estimate |

Prior Knowledge Required for this Unit

In Unit 1 students learn the count sequence from 1-100 by ones and tens. In this unit, students continue to build on the count sequence and number names to deepen their understanding that number names and number symbols relate to a quantity and all of these together are the meaning of counting. In Unit 1 students begin to develop one-to-one correspondence, however students will develop this skill up to different

magnitudes at their own developmental pace. While one student might have one-to-one correspondence for a small set of objects, another student might be developing one-to-one with a larger set of objects. The same applies to the count sequence, it cannot be forced in a given amount of time.

Subsequent Knowledge Related to this Unit

As students deepen their understanding of numbers and make meaning of counting and cardinality, they will develop beyond rote counting and one-to-one correspondence to more complex phases of meaningful counting. Unit 2 and Unit 3 should be a continuation of Unit 1, building on the development of individual students. Unit 1 provided the foundation for the critical learning phase of counting objects.

Unit 2 provides more time for student understanding that in the count sequence, the next number is one more, and when counting by tens, the next number is “ten more” (or one more group of 10). As students gain this understanding, they will be prepared to compare numbers in Unit 3. However, those understandings are not innate and students should be given intentional learning opportunities. Students should then be able to apply this knowledge to part/whole relationships, compensate to compose and decompose numbers in Units 3 & 4, as well as develop a foundation for place value and operations with numbers in subsequent units as well as subsequent grade levels.

Students will use their fluency with the count sequence and cardinality to compose and decompose numbers in Unit 4, and then again to model addition and subtraction with story problems in Unit 5.

As students are able to subitize, they will use this skill in addition to cardinality to build single-digit fluency to 5 in Unit 5.

Relationship Among Standards in this Unit

The content standards and the process standards work together in this unit to form the foundation which will enable all students to develop the world class knowledge, skills, and life and career characteristics identified in the *Profile of the South Carolina Graduate*.

The standards in this unit work together to deepen students understanding of counting and cardinality, as well as provide more time for students to understand quantities. Building on the foundational standards in Unit 1, the standards in this unit focus on students making meaning of their counting skills. As students develop one-to-one correspondence, they should notice the necessity to keep track when counting, thus students should be able to keep track of an unorganized pile when counting (conservation of number). As students deepen their understanding that the last number said tells the number of objects in the set (cardinality) they should take notice when a recount of objects results in a different number or be bothered when counting a group results in the same number after more objects have been added or taken away.

This is the beginning stage of students reasoning about their counting. As students begin to make meaningful connections between the objects they count, cardinality, and the rote count sequence, they might spontaneously check or recount to see if the result is the same. With K.NS.4 and K.NS.5 students will begin to answer “How many?” questions, as well as be able to count out a specific quantity. Depending where students are in their development, these behaviors might be observed at different times with different students. Providing students with real world, meaningful counting experiences will lend itself to students reasoning about their counting.

The standards in Units 1-4 are essential to the key concepts Number Sense and Base Ten and Algebraic Thinking and Operations in grades K-5. Meaningful, daily experiences with the standards in Unit 2 should be provided to young students to set a strong foundation for mathematics success. Students will build upon their understanding of counting and cardinality in Unit 3 as they count and compare quantities.

Potential Instructional Strategies/Lessons

Kindergarten is the pivotal grade for creating a mathematical classroom which encourages collaboration and builds community. Students who are college-and-career-ready take a productive and confident approach to mathematics by communicating about mathematics to gain understanding. Students in kindergarten can begin developing their communication skills by:

- Acting out mathematical scenarios/problems
- Frequently exchanging mathematical ideas and problem solving strategies
- Listening to understand one another. This involves thinking about what a person is saying so that you can explain it yourself or to help them explain it more clearly. It is not just being quiet when someone else is talking. Also, children need to listen so that they can ask a question or help the explainer.
- Utilizing *Math Talk* in the classroom before being asked to follow procedures

Kindergarten students will naturally want to do many things on their own, however it is encouraged to have students begin working in pairs or small groups to build reasoning and communication skills.

Students should be provided many, meaningful opportunities to count throughout the day. Provide settings which connect mathematical language, quantities, and symbols to kindergartners’ everyday lives. Support the natural ability of young children to mathematize their world. Students should be provided with daily, meaningful opportunities to continue counting and demonstrating one-to-one correspondence with concrete objects, in addition to being asked to reason about the quantities they count as well as count sets of objects (organized and unorganized). While students should be provided opportunities to answer questions about “How Many?”, they should not be expected to answer how many altogether? How many left? Those questions will be addressed later with operations in Units 4 & 5.

Possible Introductory Lesson

Counting Stories

Standard: K.NS.4 and K.NS.5

Objective: Students will be able to act out number stories using manipulatives to represent the objects in the stories. After students have acted out the stories, they will be able to answer questions about “How Many?” Students will also be able to count the objects in their stories and tell the corresponding number to the quantity counted, justifying their count.

Materials:

Provide each student with

*connecting cubes (or counters)

*blank paper or blank story setting backgrounds (such as a barn, lake, tree, garden, classroom)

Glencoe Virtual Manipulatives This website has virtual story setting backgrounds

http://www.glencoe.com/sites/common_assets/mathematics/ebook_assets/vmf/VMF-Interface.html

Procedure:

1. Tell students a counting story such as,
“Three children are playing on the slide. Two children are playing in the sandbox. Count the children.”
2. Provide time for students to act out the story placing their counters on the story setting or blank piece of paper.
3. Tell students another counting story, “A mama bear and a daddy bear are walking in the woods with their two babies. Count the bears.
4. Provide time for students to act out the story placing their counters on the story setting or blank piece of paper.
5. Repeat telling students stories to act out with the counters.
6. Allow students to make up their own counting stories to have the class act out.

Possible Extensions:

For students who are ready, ask them to write the number that matches how many counters they put out for each object in the story. For example, *“Three children are playing on the slide. Two children are playing in the sandbox. Count the children.”* Children would write 3 and write 2 to represent the children playing, along with placing their counters on the paper. They could also write 5 for the number of children they counted.

Possible Instructional Strategies:

- **Read Alouds and Counting Books**

Book: The Very Hungry Caterpillar by Eric Carle <http://www.k-5mathteachingresources.com/support-files/the-very-hungry-caterpillar.pdf>

<https://www.youtube.com/watch?v=vkYmvxPOAJI> The author, Eric Carle reads the book aloud.

Standard: K.NS.4 and K.NS.5

Objective: Students will be able to count a set of objects and match the quantity with a numeral.

Materials:

*Copy of the book The Very Hungry Caterpillar to read aloud to the class. If possible, a copy for each pair of students or small group working together as well to refer back to story.

*Counters

Procedure:

1. Build students background knowledge by asking, “What are some foods you like to eat? How much of that food would you eat if you are very hungry?”
2. Tell students you are going to read aloud the story, The Very Hungry Caterpillar by Eric Carle 2 times, the first time you just want them to listen to what is happening in the story.
3. Ask students, “What happened in the story?”
4. Tell students you are going to read the story a second time and this time you want students to listen for the quantity or how many fruits/foods the caterpillar eats on the different days of the week.
5. Ask students to share what they heard for how many fruits the caterpillar ate on different days of the week, refer back to the pictures in the book as necessary for students to see the pictures.
6. Tell students they are going to solve a problem today about the caterpillar’s eating. Show the following problem and read it aloud to students:*The Very Hungry Caterpillar was very hungry so he ate... One apple, two pears, three plums, four strawberries, and five oranges. How many pieces of fruit did he eat?*
7. Provide partners or small groups with counters and ask them to show the number of each fruit with their counters.
8. As students represent the number of fruits with their counters ask them, “How many apples did the caterpillar eat? How many pears? How many _____?” Checking to see if students orally count and use one-to-one correspondence, matching quantities with the objects.
9. Wrap up the lesson by discussing with students how they represented the number of fruits the caterpillar ate. “How does the number you say relate to the quantity of objects you put out?”

Possible Extensions:

- Provide students with a blank BLM with the phrase, “On (day of the week), the caterpillar ate (number) pieces of (name of food). Allow students to insert a day of the week, number, and name of food, then illustrate the page. Combine all the students’ pages into a class book.

- **Grab Bag Counting**

Standard: K.NS.5

Objective: Students will be able to count a set of objects and match the quantity with a numeral.

Materials:

Provide students (individually or in small groups) with

*brown paper bags filled with up to 20 objects to count (pennies, beans, unifix cubes, buttons, anything that can be counted).

*Numeral Cards 1-20 with a picture of the quantity in an organized arrangement one one side of the card and the numeral on the other

Procedure:

1. Student grabs a handful of objects out of the bag, putting the objects on the table in front of them.
2. Student counts the objects
3. Student matches a numeral card with the quantity and verifies the match by using one-to-one correspondence with the cubes and number picture on the back side of the card.
4. Students repeat steps 1-3 taking turns grabbing, counting, matching and verifying.

Possible Extensions:

1. Increase the number of objects in the Grab Bags
2. Have students who are ready write the numerals instead of matching with the card. In order for teacher to verify, have students also draw the correct quantity with the written numeral.

- **Pick a Number**

Standard: K.NS.4 and K.NS.5

Objective: Students will be able to count out a specific number of objects

Materials: Provide students (individually or in small groups) with:

*counting cubes

*paper bags

*Numeral cards 0-20

Procedure:

1. Student picks a number card out of the brown bag
2. Student counts out the number of cubes to match the numeral card drawn and verifies the count by a one-to-one correspondence with

the picture on the back of the numeral card.

3. Repeat steps 1-2 for students to take turns.

Possible Extensions:

1. Include higher numbers beyond 20 on the cards and in the bags.
2. In pairs, have one student write a numeral and the partner student counts out the correct number of objects.

● **Favorite Numbers Routine :**

1. Ask students to tell the class their favorite number. Teacher writes the student's name and favorite number on an index card. (Or students write it if able)
 2. Teacher places all of the favorite numbers in a jar, and draws one out each day.
 3. Each day, when teacher draws out a favorite number, he/she tells the class whose number it is and what number it is.
 4. Then teacher asks students to count out the number of objects with the class.
 5. As favorite number cards are drawn, teacher can post in classroom to begin creating an organic number line.
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Possible Culminating Lesson

The Right Number of Elephants (adapted from Teaching Number Sense in Kindergarten by Chris Confer)

Standards: K.NS.4 and K.NS.5 and Mathematical Processes

Objective: Students will be able to think about numbers of items that might typically be found in the world, such as the number of legs on an animal, the number of pancakes on a plate, or earrings on a person. Students will be able to engage in mathematical discussions about reasonable and unreasonable numbers of things.

Materials:

*Book, The Right Number of Elephants by Jeff Sheppard

*Half sheets of paper containing a descriptive phrase, (pancakes on a plate, feet on an animal, birds in a tree, hair braids, tires on a truck, people in a car, apples in a bowl, books on a table, fingers on a person, buttons on a shirt, etc)

* BLM that says, "The right number of _____ is" (1 per pair of students)

Procedure:

1. Read the story, The Right Number of Elephants by Jeff Sheppard to the class.
2. Discuss how the author of the story wrote the story to be funny, but that there are reasonable or unreasonable numbers of things and it's our job as mathematicians to decide when a number is "the right number" of objects.
3. Choosing different parts of the story, discuss why the number in the story was the "right" or not right number for those objects.

4. Explain to students they will be illustrating “the right number” of one of the phrases and then you will compile them into a class book.
5. Provide pairs of students with one of the descriptive phrase papers and BLM that says, “The right number of _____ is _____.” instructing students to illustrate and write the number.
6. Combine all pages into a class book and read aloud, then place in classroom library.

Resources

Teacher Resources

Number Early Learning Progression <http://nzmaths.co.nz/sites/default/files/Number-Early-Learning-Progression.pdf>

- This chart provides the learning progression for learning numbers and the count sequence.

The Principles of Counting <http://math.about.com/od/counting/a/The-Principles-Of-Counting.htm>

- Explanation of the different aspects of counting such as cardinality, conservation of number, and unitizing.

Number Talks with Tens Frames and Dot Cards <http://www.cleanvideosearch.com/media/action/yt/watch?v=62epCIFdRa0>

- A video showing a number talk around numbers on tens frames and dot cards

Lesson Planning Resources

K.NS.3 & K.NS.5 Building Sets of Ten <http://illuminations.nctm.org/Lesson.aspx?id=1649>

- A lesson plan for exploring sets of up to 10 items, and practice writing numbers 0-10.

K.NS.3 Building Numbers to Five <http://illuminations.nctm.org/Lesson.aspx?id=1616>

- Detailed lesson plan from NCTM for students to work on building and understanding numbers to 5.

Howard County Kindergarten Math Wiki <https://gradekcommoncoremath.wikispaces.hcps.org/kindergarten+home>

- This website has a wide variety of daily number routines, vocabulary cards, lesson plans/activities, and assessment tasks including rubrics for proficiency.

Department of Education, Virginia Number and Number Sense Module

http://www.doe.virginia.gov/instruction/mathematics/elementary/number_sense_module/nns_gradeK.pdf

- This is a lesson plan module for Kindergarten teaching number and number sense, it has several lesson ideas and plans.

Children’s Books for Math <http://www.the-best-childrens-books.org/math-for-kids.html>

- This website has lists of children’s books for different concepts in math that make learning the concepts engaging and relatable to small children.

Interactive Resources

K.NS.4 and K.NS.5 Find the Numbers 0-5 or 5-10 <https://www.illustrativemathematics.org/content-standards/K/CC/A/tasks/403>

- Game which students can play in groups of 2 or 3 to practice identifying numbers and matching quantities.

K.NS.4 and K.NS.5 The Gingerbread Man Game <http://www.topmarks.co.uk/learning-to-count/gingerbread-man-game>

- Interactive game for students to practice counting, match numeral to quantity, and order sets

K.NS.4 and K.NS.5 Ladybird Counting <http://www.topmarks.co.uk/learning-to-count/ladybird-spots>

- Interactive game for students to count, read numerals and number words, and match numeral with quantity by dragging and dropping spots on ladybugs.

Sample Formative Assessment Tasks/Questions

Dots and Numeral Card Match: <https://ccgpsmathematicsk-5.wikispaces.com/file/view/Elementary+FAL+packet+for+fall+2011+1.pdf>

Apples in a Bag:

<http://www.cpalms.org/Public/PreviewResourceAssessment/Preview/36568>

Books and Bookmarks:

<http://www.cpalms.org/Public/PreviewResourceAssessment/Preview/36564>

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