North Carolina Department of Public Instruction
INSTRUCTIONAL SUPPORT TOOLS
FOR ACHIEVING NEW STANDARDS

Kindergarten Mathematics ● Unpacked Contents
For the new Standard Course of Study that will be effective in all North Carolina schools in the 2017-18 School Year.

This document is designed to help North Carolina educators teach the Kindergarten Mathematics Standard Course of Study. NCDPI staff are continually updating and improving these tools to better serve teachers and districts.

What is the purpose of this document?
The purpose of this document is to increase student achievement by ensuring educators understand the expectations of the new standards. This document may also be used to facilitate discussion among teachers and curriculum staff and to encourage coherence in the sequence, pacing, and units of study for grade-level curricula. This document, along with on-going professional development, is one of many resources used to understand and teach the NC SCOS.

What is in the document?
This document includes a detailed clarification of each standard in the grade level along with a *sample* of questions or directions that may be used during the instructional sequence to determine whether students are meeting the learning objective outlined by the standard. These items are included to support classroom instruction and are not intended to reflect summative assessment items. The examples included may not fully address the scope of the standard. The document also includes a table of contents of the standards organized by domain with hyperlinks to assist in navigating the electronic version of this instructional support tool.

How do I send Feedback?
Please send feedback to us here and we will use your input to refine our unpacking of the standards. Thank You!

Just want the standards alone?
You can find the standards alone at https://www.dpi.nc.gov/teach-nc/curriculum-instruction/standard-course-study/mathematics.

North Carolina Course of Study – Kindergarten Standards

Standards for Mathematical Practice

Counting and Cardinality	Operations and Algebraic Thinking	Number and Operations in Base Ten	Measurement and Data	Geometry
Know number names and the counting sequence. NC.K.CC.1 NC.K.CC.2 NC.K.CC.3 *Count to tell the number of objects.* NC.K.CC.4 NC.K.CC.5 *Compare numbers.* NC.K.CC.6 NC.K.CC.7	*Understand addition and subtraction.* NC.K.OA.1 NC.K.OA.2 NC.K.OA.3 NC.K.OA.4 NC.K.OA.5 NC.K.OA.6	*Build foundation for place value.* NC.K.NBT.1	*Describe and compare measurable attributes.* NC.K.MD.1 NC.K.MD.2 *Classify objects and count the number of objects in each category.* NC.K.MD.3	*Identify and describe shapes.* NC.K.G.1 NC.K.G.2 NC.K.G.3 *Analyze, compare, create, and compose shapes.* NC.K.G.4 NC.K.G.5 NC.K.G.6

Standards for Mathematical Practice

Practice	Explanation and Example
1. Make sense of problems and persevere in solving them.	Mathematically proficient students in Kindergarten begin to develop effective dispositions toward problem solving. In rich settings in which informal and formal possibilities for solving problems are numerous, young children develop the ability to focus attention, test hypotheses, take reasonable risks, remain flexible, try alternatives, exhibit self-regulation, and persevere (Copley, 2010). Using both verbal and nonverbal means, kindergarten students begin to explain to themselves and others the meaning of a problem, look for ways to solve it, and determine if their thinking makes sense or if another strategy is needed. As the teacher uses thoughtful questioning and provides opportunities for students to share thinking, kindergarten students begin to reason as they become more conscious of what they know and how they solve problems.
2. Reason abstractly and quantitatively.	Mathematically proficient students in Kindergarten begin to use numerals to represent specific amount (quantity). For example, a student may write the numeral "11" to represent an amount of objects counted, select the correct number card "17" to follow "16" on the calendar, or build a pile of counters depending on the number drawn. In addition, kindergarten students begin to draw pictures, manipulate objects, use diagrams or charts, etc. to express quantitative ideas such as a joining situation (Mary has 3 bears. Juanita gave her 1 more bear. How many bears does Mary have altogether?), or a separating situation (Mary had 5 bears. She gave some to Juanita. Now she has 3 bears. How many bears did Mary give Juanita?). Using the language developed through numerous joining and separating scenarios, kindergarten students begin to understand how symbols (+, -, =) are used to represent quantitative ideas in a written format.
3. Construct viable arguments and critique the reasoning of others.	In Kindergarten, mathematically proficient students begin to clearly express, explain, organize and consolidate their math thinking using both verbal and written representations. Through opportunities that encourage exploration, discovery, and discussion, kindergarten students begin to learn how to express opinions, become skillful at listening to others, describe their reasoning and respond to others' thinking and reasoning. They begin to develop the ability to reason and analyze situations as they consider questions such as, "Are you sure…?" , "Do you think that would happen all the time…?", and "I wonder why…?"
4. Model with mathematics.	Mathematically proficient students in Kindergarten begin to experiment with representing real-life problem situations in multiple ways such as with numbers, words (mathematical language), drawings, objects, acting out, charts, lists, and number sentences. For example, when making toothpick designs to represent the various combinations of the number "5", the student writes the numerals for the various parts (such as "4" and "1") or selects a number sentence that represents that particular situation (such as 5 = 4 + 1)*. *Kindergarten students should see addition and subtraction equations, but it is not required".
5. Use appropriate tools strategically.	In Kindergarten, mathematically proficient students begin to explore various tools and use them to investigate mathematical concepts. Through multiple opportunities to examine materials, they experiment and use both concrete materials (e.g. 3-dimensional solids, connecting cubes, ten frames, number balances) and technological materials (e.g., virtual manipulatives, calculators, interactive websites) to explore mathematical concepts. Based on these experiences, they become able to decide which tools may be helpful to use depending on the problem or task. For example, when solving the problem, "There are 4 dogs in the park. 3 more dogs show up in the park. How many dogs are in the park?", students may decide to act it out using counters and a story mat; draw a picture; or use a handful of cubes.
6. Attend to precision.	Mathematically proficient students in Kindergarten begin to express their ideas and reasoning using words. As their mathematical vocabulary increases due to exposure, modeling, and practice, kindergarteners become more precise in their communication, calculations, and measurements. In all types of mathematical tasks, students begin to describe their actions and strategies more clearly, understand and use grade-level appropriate vocabulary accurately, and begin to give precise explanations and reasoning regarding their process of finding solutions. For example, a student may use color words (such as blue, green, light blue) and descriptive words (such as small, big, rough, smooth) to accurately describe how a collection of buttons is sorted.

7. Look for and make use of structure.	Mathematically proficient students in Kindergarten begin to look for patterns and structures in the number system and other areas of mathematics. For example, when searching for triangles around the room, kindergarteners begin to notice that some triangles are larger than others or come in different colors- yet they are all triangles. While exploring the part-whole relationships of a number using a number balance, students begin to realize that 5 can be broken down into sub-parts, such as 4 and 1 or 4 and 2, and still remain a total of 5.
8. Look for and express regularity in repeated reasoning.	In Kindergarten, mathematically proficient students begin to notice repetitive actions in geometry, counting, comparing, etc. For example, a kindergartener may notice that as the number of sides increase on a shape, a new shape is created (triangle has 3 sides, a rectangle has 4 sides, a pentagon has 5 sides, a hexagon has 6 sides). When counting out loud to 100, kindergartners may recognize the pattern 1-9 being repeated for each decade (e.g., Seventy-ONE, Seventy-TWO, Seventy-THREE… Eighty-ONE, Eighty-TWO, Eighty-THREE…). When joining one more cube to a pile, the child may realize that the new amount is the next number in the count sequence.

Return to Standards

Know number names and the counting sequence. **NC.K.CC.1** Know number names and recognize patterns in the counting sequence by: • Counting to 100 by ones. • Counting to 100 by tens.	
Clarification	**Checking for Understanding**
In this standard, students rote count by starting at one and counting to 100. • When counting by ones, students need to understand that the next number in the sequence is one more. • When students count by tens they are only expected to master counting on the decade (0, 10, 20, 30, 40 …). Students need to understand that the next number in the sequence is "ten more" (or one more group of ten). The focus of this standard is on using patterns in the number sequence to count. It does not require recognition of numerals or writing numerals.	Start at 1 and count by ones. Students should be able to count correctly to 100 by ones without skipping numbers, repeating numbers, or hesitating. Start at 10 and count by tens. Students should be able to count correctly to 100 by tens without skipping numbers, repeating numbers, or hesitating.

Know number names and the counting sequence. **NC.K.CC.2** Count forward beginning from a given number within the known sequence, instead of having to begin at 1.	
Clarification	**Checking for Understanding**
In this standard, students count forward within 100 from a number other than one without having to go back and start at one. This skill is a prerequisite skill for counting on when students begin to work with addition. The standard does not require recognition of numerals or writing numerals. It is focused on the patterns in the number sequence.	Start at 42 and count by ones until I tell you to stop. Students should be able to count correctly starting at the given number without skipping numbers, repeating numbers or hesitating.

Return to Standards

Know number names and the counting sequence.

NC.K.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.

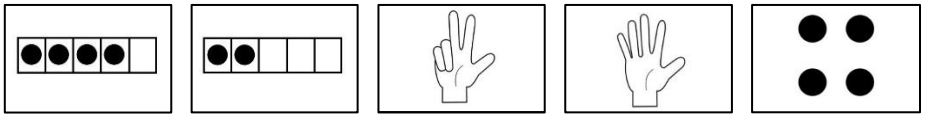
Clarification	**Checking for Understanding**
This standard calls for students to recognize and write numerals 0-20. • When shown a set within 20, students record the quantity by selecting the appropriate number card/tile (numeral recognition) or writing the numeral. • When given a numeral, students create a set of items to represent the numeral presented. Due to variations in the development of students' fine motor and visual skills, reversal of numerals is anticipated and acceptable as long as it does not affect place value. While reversals should be pointed out to students and correct formation modeled in instruction, the emphasis of this standard is on the use of numerals to represent quantities rather than the correct handwriting formation of the actual numeral itself. While children may experiment with writing numbers beyond 20, this standard places emphasis on numbers 0-20.	As the teacher says a number aloud, the student records the written numeral:  After counting a set of objects, student is asked to record the numeral that represents the quantity. The student records the written numeral "19". After counting a set of objects, student is asked to select the number card that matches the quantity. The student selects "13" to represent the set.

Return to Standards

Count to tell the number of objects.

NC.K.CC.4 Understand the relationship between numbers and quantities.

- 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).
- Recognize that the last number named tells the number of objects counted regardless of their arrangement (cardinality).
- State the number of objects in a group, of up to 5 objects, without counting the objects (perceptual subitizing).

Clarification	**Checking for Understanding**
When given frequent opportunities to count sets of objects, students develop counting skills and discover the relationship between quantity and number. • Students implement correct counting behaviors by moving or pointing to one object at a time (one-to-one correspondence) and using one counting word for every object (synchrony/ one-to-one tagging), while keeping track of objects that have and have not been counted. This is the foundation of counting. • Students discover the cardinality principle by counting objects in a set and understanding that the last number stated (…8, 9, **10**) represents the total amount of objects: "There are **10** bears in this pile." Since an important goal for children is to count with meaning, it is important to have children answer the question, "How many?" after they count. Often, children who have not developed cardinality will count the amount again, not realizing that the **10** they stated means 10 objects in all. • One-to-one correspondence and cardinality are higher-level skills, which require students to analyze, reason about, and explain relationships between numbers and sets of objects. The expectation is that students are proficient with these skills (with numbers 1-20) by the end of Kindergarten. • When frequently shown small sets of items, students develop the ability to instantly recognize the quantity in a set without counting (perceptual subitizing). Most individuals can perceptually subitize up to sets of five. Perceptual subitizing is a crucial early skill. It strengthens students' ability to efficiently and flexibly determine "how many" when working with larger sets and supports work with composing and decomposing quantities. Perceptual subitizing is also a precursor to place value (e.g., groupings of tens) as it gives students the opportunity to see a collection of items as a unit, rather than individual items. • There are two types of subitizing: perceptual and conceptual. This standard focuses on perceptual subitizing. See standard NC.K.OA.6 for information about conceptual subitizing.	Student is given a tray of buttons and asked to count the set. After counting, the teacher says, "How many buttons are in this set?" Then, the teacher rearranges the buttons (without adding to or taking from the set). The student is asked, "How many buttons are in the set now?" Student is shown a "quick image" card for 2-3 seconds and asked to tell "how many" without counting. Student instantly recognizes the quantity and states the number (perceptual subitizing). Steps are repeated with additional cards. 

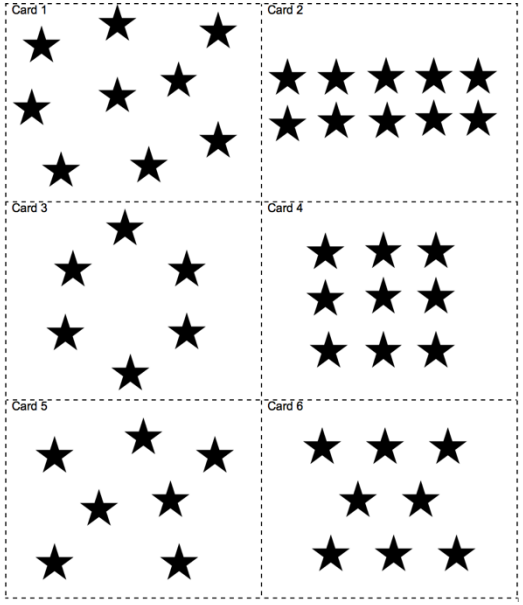
Return to Standards

Count to tell the number of objects.

NC.K.CC.5 Count to answer "How many?" in the following situations:

- Given a number from 1–20, count out that many objects.
- Given up to 20 objects, name the next successive number when an object is added, recognizing the quantity is one more/greater.
- Given 20 objects arranged in a line, a rectangular array, and a circle, identify how many.
- Given 10 objects in a scattered arrangement, identify how many.

Clarification	**Checking for Understanding**

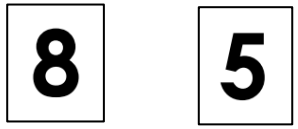
When counting to answer "how many", students employ two big understandings from NC.K.CC.4: one-to-one correspondence and cardinality. They say one number for each item counted (one-to-one correspondence) and know the last number counted tells the quantity of the set (cardinality).
• This standard asks that students are both counters and producers.
  ○ **Producer**: When given a number, a student counts out a set of objects or draw a picture to match.
  ○ **Counter**: When given a set of objects or drawings, a student counts to determine "how many".
• After numerous experiences with counting objects, along with the developmental understanding that a group of objects counted multiple times will remain the same amount, students recognize the need for keeping track in order to determine "how many". Some arrangements, such as a line or rectangular array, are easier to count. However, they may limit students' flexibility with developing meaningful tracking strategies, so providing multiple arrangements help children learn how to keep track. Since scattered arrangements are the most challenging, this standard specifies that students only count up to 10 objects in a scattered arrangement and count up to 20 objects in a line, rectangular array, or circle. Depending on the amount of objects to be counted, and students' confidence with counting a set of objects, students may move the objects as they count each, point to each object as counted, look without touching when counting, or use a combination of these strategies.
• An important component of this standard is that of naming the next successive number when an object is added to a set, which is based on the idea of inclusion. Inclusion is the understanding that numbers build by exactly one each time and that they nest within each other by this amount. A set of three objects is nested within a set of 4 objects; within this same set of 4 objects is also a set of two objects and a set of one. Using this understanding, if a student has four objects and wants to have 5 objects, the student is able to add one more- knowing that four is within, or a sub-part of, 5 (rather than removing all 4 objects and starting over to make a new set of 5). This concept is critical for the later development of part/whole relationships.
	"Producing a Set" Task:
	• Teacher places a bowl of objects on table and asks student to count out a set of 15 objects.
	• Student removes 15 objects from the bowl and places them on the table while counting aloud.
	• Teacher adds one more object to the set of 15, and asks, "How many are there now?"
	Rather than re-counting the entire set, the student says the next number in the counting sequence…16.
	
	"Counting a Set" Task: Given a set of cards, students count the quantity of stars in each arrangement.
	 

Return to Standards

Compare numbers.
NC.K.CC.6 Identify whether the number of objects, within 10, in one group is greater than, less than, or equal to the number of objects in another group, by using matching and counting strategies.

Clarification	**Checking for Understanding**
This standard calls for students to use their counting ability to compare two sets of concrete objects (0 to 10). Early comparisons involve matching objects from each set in order to see if a group has extras, or repeatedly removing one object from each group until only one group is left with extra objects. Later, students apply their knowledge of number to count the objects in each group, determining which group has more/less. An important goal of this standard is to develop comparison language: more/greater, less/fewer, and equal/same amount. This language supports standards in successive grades where students are asked, "How many more?" and "How many less?"	Students are given a set of triangles and a set of squares. They are asked to find which set has more. *Possible responses:* Student A Matching *I lined up one square and one triangle. Since there is one extra triangle, there are more triangles than squares.*  Student B Equal Shares *I put them in a pile. I then took away objects. Every time I took a square, I also took a triangle. When I had taken almost all the shapes away, there was still a triangle left. That means that there are more triangles than squares.* Student C Compare Counts *I counted the squares and I got 4. Then I counted the triangles and got 5. Since 5 is bigger than 4, there are more triangles than squares.*

Compare numbers
NC.K.CC.7 Compare two numbers, within 10, presented as written numerals

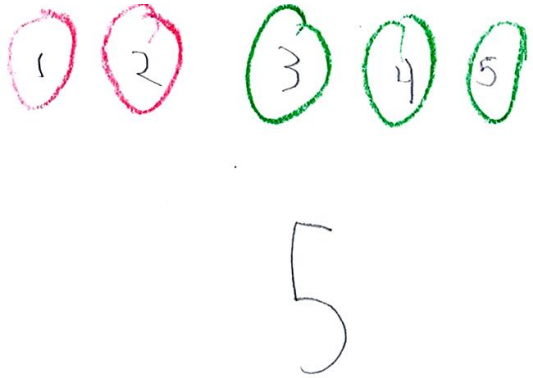
Clarification	**Checking for Understanding**
Students apply their understanding of numerals 1 to 10 to compare one numeral to another. For example, looking at the numerals 8 and 10, a student can recognize that the numeral 10 represents a larger amount than the numeral 8. Students need ample experiences with actual sets of objects (NC.K.CC.3 and NC.K.CC.6) before completing this standard with only numerals.	When shown two numerals, student determines which is greater or if they are both equal. 

Return to Standards

Understand addition and subtraction.

NC.K.OA.1 Represent addition and subtraction, within 10:

- Use a variety of representations such as objects, fingers, mental images, drawings, sounds, acting out situations, verbal explanations, or expressions.
- Demonstrate understanding of addition and subtraction by making connections among representations.

Clarification	**Checking for Understanding**
In this standard, students demonstrate understanding of how objects can be put together (composed) and taken apart (decompose) by modeling addition and subtraction of up to 10 objects in various ways. This standard develops the understanding that addition and subtraction of whole numbers is based on sequential counting with whole numbers. Situations that can be represented by addition or subtraction can be considered as basic applications of counting forward or back. Within this standard, students build on their counting skills and continue to establish one-to-one correspondence by moving, touching, or pointing to concrete objects that they are counting as they say corresponding number words (NCTM). This standard is focused on understanding the concept of addition and subtraction, rather than reading and solving addition and subtraction number sentences (equations). Therefore, before introducing symbols (+, -, =) and equations, kindergarteners require numerous experiences using addition and subtraction vocabulary in order to attach meaning to the various symbols. For example, when explaining a solution, kindergartens may state, "*Three and* two *is the same amount as* 5." While the meaning of the equal sign is not introduced as a standard until First Grade, if equations are going to be modeled and used in Kindergarten, students must connect the symbol (=) with its meaning (is the same amount/quantity as).	Lilly has two pieces of red candy and three pieces of green candy. How many pieces of candy does Lilly have? *Possible response:* *I drew two red candies and three green candies. I put them together to see how many pieces of candy Lilly has.* 

Return to Standards

Understand addition and subtraction.

NC.K.OA.2 Solve addition and subtraction word problems, within 10, using objects or drawings to represent the problem, when solving:

- Add to/Take From-Result Unknown
- Put Together/ Take Apart (Total Unknown and Two Addends Unknown)

Clarification

In this standard, students apply their work from NC.K.OA.1 to solve addition and subtraction problems involving a variety of situations.

Kindergarten students work with four problem types (see chart: *Kindergarten Problem Types*). The first two problem types involve an action; something is physically added to or taken from the starting amount. The last two problem types do not involve an action; students work with part-part-whole relationships. They may know the amounts in each part, and solve to the find whole amount. Or, students may be given the whole amount, and find the amount in each part.

Kindergarten Problem Types

Action	**Add To- Result Unknown**	Two bunnies sat on the grass. Three more bunnies hopped there. How many bunnies are on the grass now? 2 + 3 = ?
	Take From- Result Unknown	Five apples were on the table. I ate two apples. How many apples are on the table now? 5 – 2 = ?
No Action	**Put Together/Take Apart- Total Unknown**	Three red apples and two green apples are on the table. How many apples are on the table? 3 + 2 = ?
	Put Together/Take Apart- Both Addends Unknown	Grandma has five flowers. How many can she put in her red vase and how many in her blue vase? 5 = 0 + 5, 5 = 5 + 0 5 = 1 + 4, 5 = 4 + 1 5 = 2 + 3, 5 = 3 + 2

Early problem solvers should be encouraged to act out the problem situation with concrete objects. Eventually, students will transition to using drawings, numbers, and words to represent their work. Drawings need not show details, but should show the mathematics in the problems.

For a complete chart of problem types, see page 27.

Checking for Understanding

Take From – Result Unknown Problem**:** Nine grapes were in a bowl. Tom ate 3 grapes. How many grapes are in the bowl now?

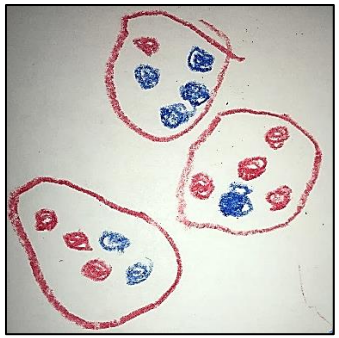
Possible response:

I got 9 "grapes" and put them in the bowl. Then, I took 3 grapes out of the bowl. I counted the grapes still left in the bowl… 1, 2, 3, 4, 5, 6. Six. There are 6 grapes in the bowl.

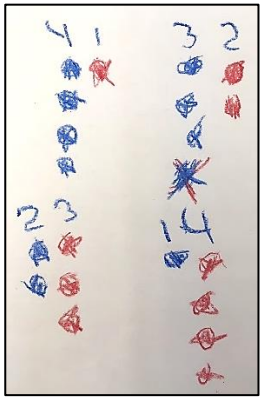
Put Together/Take Apart – Both Addends Unknown Problem: Bobby Bear is missing 5 buttons on his jacket. How many ways can you use blue and red buttons to finish his jacket? Draw a picture of all your ideas.

Possible responses:

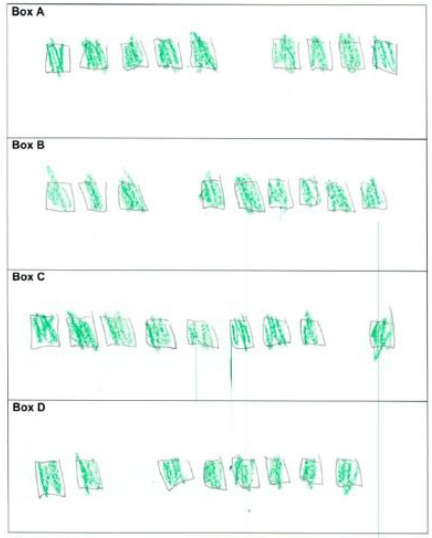
I made five with one red button and four blue buttons. Then I did two blue and three red. Then I did one blue and four red.



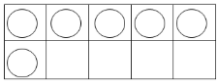
I put four blue buttons and one red button. I took one away from the blue and put one with the red. This makes three blue and two red. I kept doing this.



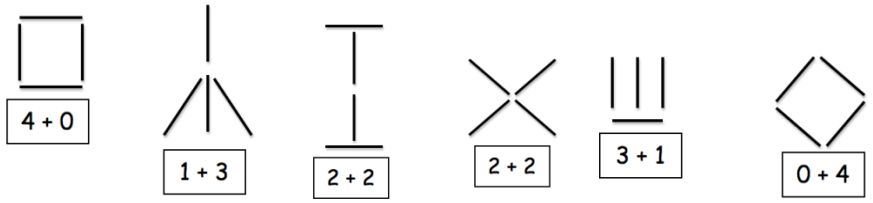
Understand addition and subtraction.
NC.K.OA.3 Decompose numbers less than or equal to 10 into pairs in more than one way using objects or drawings, and record each decomposition by a drawing or expression.

Clarification	**Checking for Understanding**
In this standard, students develop an understanding of part-whole relationships as they recognize that a given group of objects (up to 10) can be decomposed into sub-groups while remaining equivalent to the total amount. For example, a set of 6 cubes can be separated into a set of 2 cubes and a set of 4 cubes while remaining 6 total cubes. Additionally, this standard asks students to recognize that a group can be decomposed (broken apart) in multiple ways. As students use concrete objects and drawings to explore this concept, they search for all partners that compose a number, noticing patterns as they work. Through these experiences, students discover number relationships and begin to internalize addition/subtraction facts. In Kindergarten, students need ample experiences breaking apart numbers and using the vocabulary “and” & “same amount as” before symbols (+, =) and equations (5= 3 + 2) are introduced. If equations are used, a mathematical representation (picture, objects) needs to be present as well.	How many ways can you break 9 into two parts? Use a drawing or numbers to show your work. *Possible responses:* *Student A:* *Creates a list of partners of 9* • *1 and 8* • *2 and 7* • *3 and 6* • *4 and 5* *Student B:* 

Understand addition and subtraction.
NC.K.OA.4 For any number from 0 to 10, find the number that makes 10 when added to the given number using objects or drawings, and record the answer with a drawing or expression.

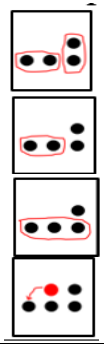
Clarification	**Checking for Understanding**
This standard builds on the work of NC.K.OA.3, where students developed an understanding that a number, less than or equal to 10, can be decomposed into parts. Standard NC.K.OA.4 calls for students to find the number that makes ten when added to a given number. Through numerous concrete experiences, kindergarteners will model the various sub-parts of ten and find the missing part of 10.	John has 6 beans. How many more beans does he need to have 10 beans?  *"I have 6 beans. I need 4 more beans to have 10 in all."* A full case of juice boxes has 10 boxes. There are only 6 boxes in this case. How many juice boxes are missing? *Possible responses:* Student A: *Using a Ten-Frame* *I used a ten frame for the case. Then, I put on 6 counters for juice still in the case. There's no juice in these 4 spaces. So, 4 are missing.*  Student B: *Think Addition* *I counted out 10 counters because I knew there needed to be ten. I pushed these 6 over here because they were in the container. These are left over. So, there's 4 missing.* 

Return to Standards

Understand addition and subtraction. **NC.K.OA.5** Demonstrate fluency with addition and subtraction within 5.	
Clarification	**Checking for Understanding**
This standard calls for students to show they are fluent in addition and subtraction. Students are fluent when they display accuracy (correct answer), efficiency (a reasonable amount of steps in about 3-5 seconds without resorting to counting), and flexibility (using strategies such as the commutative property). Fluency is developed by understanding and internalizing the relationships that exist between and among numbers. Often, when children think of each "fact" as an individual item that does not relate to any other "fact", they are attempting to memorize separate bits of information that can be easily forgotten. In order to fluently add and subtract, children must first be able to see subparts within a number (inclusion). Once they have reached this milestone, children need repeated experiences with many different types of concrete materials (such as cubes, chips, and buttons) over an extended amount of time in order to recognize that there are only particular sub-parts for each number. Therefore, children will realize that if 3 and 2 is a combination of 5, then 3 and 2 cannot be a combination of 6. Traditional flash cards or timed tests have not been proven as effective instructional strategies for developing fluency. Rather, numerous experiences with breaking apart actual sets of objects and developing relationships between numbers help children internalize parts of number and develop efficient strategies for fact retrieval.	One bird was on the tree. Three more birds came. How many are on the tree now? There was one bird on the tree. Some more came. There are now 4 birds on the tree. How many birds came?" *After making various arrangements with toothpicks to represent and discuss "4", students learn that only a certain number of subparts exist within the number 4,* 

Return to Standards

Understand addition and subtraction.
NC.K.OA.6 Recognize and combine groups with totals up to 5 (conceptual subitizing).

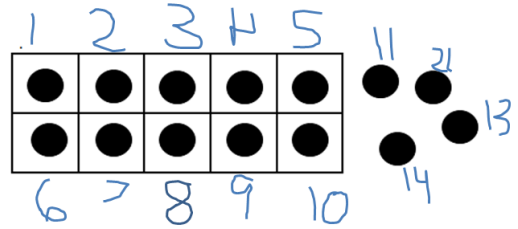
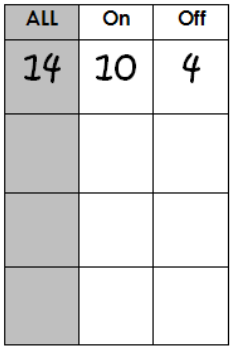
Clarification	**Checking for Understanding**
This standard calls for students to conceptually subitize a group of objects (up to 5). Conceptual subitizing involves recognizing a number pattern as a group composed of subgroups. Students visually see subgroups of quantities within a larger quantity and learn that the subgroups can be combined to compose a whole. This standard is connected to NC.K.CC.4 where students perceptually subitize, as they "instantly see" a set of up to five objects without using other mental processes. Standard NC.K.OA.6 extends the work of NC.K.CC.4 as students notice patterns of dots (subgroups) within the whole set and use other mental processes to determine the whole quantity. For example, a student may instantly see part of the set and count on, or they may see two parts of the set and know the total amount. Conceptual subitizing develops from frequent and varied experiences counting sets of objects and noticing patterning within sets. It helps develop number sense and is the basis for addition and subtraction.	"Quick Image" Task: Teacher displays a dot card for 3-4 seconds and asks students to find the quantity without counting each dot individually.  Student A: *I see two and one. I know that makes three.* Student B: *I saw two. Then, I said "three" because that's one more.* Steps are repeated with additional dot cards.  Task: The teacher displays a dot card and asks students to find "how many" without counting each individual dot. Students explain how they found the quantity. *Possible responses:*  *"I saw 2 and 2. I know that makes 4."* *"I saw 2. Then, I counted 3, 4."* *"I saw 3. One more makes 4."* *"It looked like 4 on a die/dice, but one dot fell down."*

Return to Standards

Build foundation for place value.

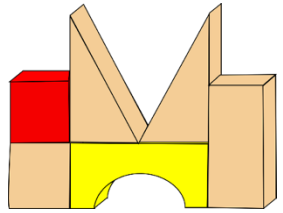
NC.K.NBT.1 Compose and decompose numbers from 11 to 19 into ten ones and some further ones by:

- Using objects or drawings.
- Recording each composition or decomposition by a drawing or expression.
- Understanding that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.

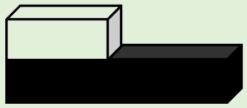
Clarification	**Checking for Understanding**
This standard calls for students to explore numbers 11-19 using representations, such as manipulatives or drawings. They group ten individual objects to represent "10", keeping each count as a single unit (1, 2, 3, 4, 5, 6, 7, 8, 9, 10). In first grade (NC.1.NBT.2), students are introduced the idea that a bundle of ten ones is called a "ten" and seen as a unit (unitizing). This is not the expectation in kindergarten.	Sample Student Interview: Teacher: "I have some chips here. Do you think they will fit on our ten frame? Why? Why Not? Use your ten frame to investigate." Student A: *"There are too many to fit on the ten frame. Only 10 will fit!"* Teacher: "So you have some leftovers?" Student A: *"Yes. I'll put them over here next to the ten frame."* Teacher: "How many do you have in all?" Student A: *"One, two, three, four, five… ten, eleven, twelve, thirteen, fourteen. I have fourteen. Ten fit on and four didn't."* Student B: *Pointing to the ten frame, "See, that's 10… 11, 12, 13, 14. There's fourteen."* Teacher: Use your recording sheet (or number sentence cards) to show what you found out. Sample Student Recording Sheets:  

Return to Standards

Describe and compare measurable attributes.
NC.K.MD.1 Describe measurable attributes of objects; and describe several different measurable attributes of a single object.

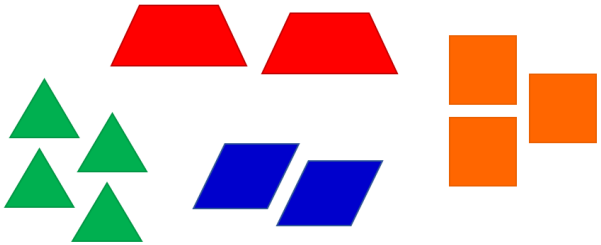
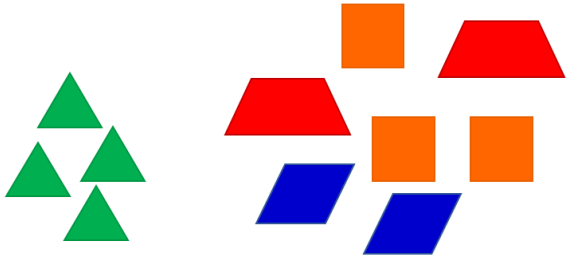
Clarification	Checking for Understanding
This standard calls for students to describe an object's measurable attributes such as length, weight, and size. Students will use words such as heavy/light, long/short, and big/small to describe these attributes. Additionally, students will describe a single object using more than one measurable attribute. For example, a student may describe a shoe with one attribute, "My shoe is heavy!", or more than one attribute, "This shoe is heavy! It's also really long." Initially, students may have undifferentiated views about the size of objects; a student may believe that an object is "bigger" or "smaller" based on a single attribute. For example, a student may state that one book is bigger than another because it is longer. In reality, the other book may be wider and heavier. Through experiences and conversations, students will learn to discriminate and name these specific measurable attributes. Kindergarten students are not expected to measure objects with standard or non-standard units.	Show student a feather and a heavy book (e.g., dictionary). Allow student to examine each object. Say: Tell me about the weight of the feather. Tell me about the weight of the book. Student: *The feather is light. It's easy to lift. The book is heavy. I need my muscles to lift it.* Example: Display two block towers. Say: We've been using measurement words to describe objects in our classroom. Use some measurement words to tell me about this tower (point to bigger tower). Student A: *This tower is tall and big.* Student B: *That tower is long, and it looks heavy!* 

Describe and compare measurable attributes.
NC.K.MD.2 Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference.

Clarification	Checking for Understanding
In this standard, students will make direct comparisons of attributes that can be measured, such as length, weight, and size. Direct comparisons are made when objects are put next to each other (e.g., two children, two books, two pencils). Students must be able to move the objects next to each other to compare their lengths or hold them to compare weights. As kindergarten students continually compare objects by length, they discover the importance of lining up the ends of objects in order to have an accurate measurement. **For example**: A student lines up two blocks and says, "The black block is a lot longer than the white one."  A student picks up two books and says, "The red book is heavier than the blue book," or "The red book is bigger than the blue book."	Find an object in our classroom that is shorter than this straw. Find an object that is longer than this straw. Student A: *A crayon is shorter than the straw, and a pencil is longer. I know because I lined their ends up. The crayon didn't stick out as much as the straw, so it's shorter. The pencil stuck out more than the straw, so it's longer.*   Student B: *This block is shorter than the straw. I know because I stood the straw up next to the block. The straw was longer, so the block is shorter.*

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

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

Clarification	**Checking for Understanding**
This standard calls for students to identify similarities and differences between objects, such as size, color, shape. Using the identified criteria, students will sort the objects into categories. Students will count the number of objects in each category. The sets in each category should be limited to less than or equal to 10. Students will sort (or group) each of the sets by the amount in each set. Like amounts are grouped together, but not necessarily ordered. **For example:** A student separates buttons into different piles based on color (all the blue buttons are in one pile, all the orange buttons are in a different pile, etc.). Then the student counts the number of buttons in each pile: blue (5), green (4), orange (3), purple (4). Finally, the student organizes the groups by the quantity. "I put the purple buttons next to the green buttons because purple also had (4). Blue has 5 and orange has 3. There aren't any other colors that have 5 or 3. So they are sitting by themselves."	Give the student a set of pattern blocks. Can you sort the pattern blocks? *Possible response:* *A student chooses to sort the pattern blocks by putting all of the hexagons in one pile and non-hexagons in a different pile. "I put the hexagons together and there were 6 of them. I put the triangles, trapezoids, and rhombuses together. There were 3 triangles, 2 trapezoids, and 2 rhombuses so there were 7 in that pile. There were 13 objects total."* Provide student with a set of pattern blocks. Say: Here is a set of blocks. Sort these blocks into groups. Tell me how you sorted them. Student A: *I put the colors together. I put the green shapes here, the blue shapes here, the red shapes here, and the orange shapes over here.*  Student B: *I put the shapes with 3 points in one group, and the shapes with 4 points in the other group.* 

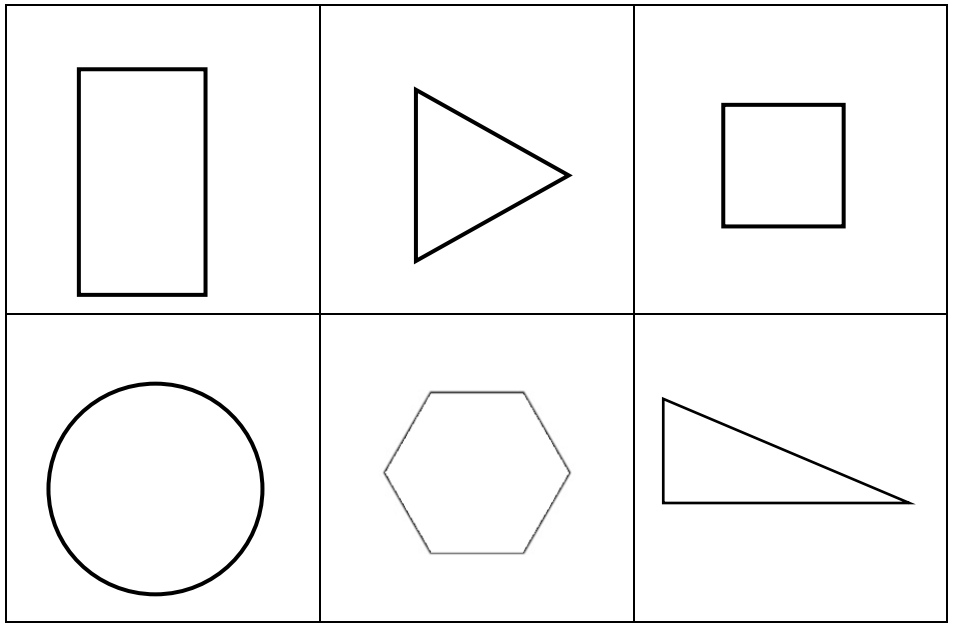
Return to Standards

Identify and describe shapes. **NC.K.G.1** Describe objects in the environment using names of shapes, and describe the relative positions of objects using positional terms.	
Clarification	**Checking for Understanding**
In this standard, students locate and identify shapes in their environment. At first students may use informal names e.g., “balls,” “boxes,” “cans”. Eventually students refine their informal language by learning mathematical concepts and vocabulary and identify, compare, and sort shapes based on geometric attributes. Students also use positional words such as above, below, beside, in front of, behind and next to, to describe objects in the environment. Students should be able to identify the location and position of actual two-and three-dimensional objects in their classroom/school. By the end of Kindergarten, students should be able to describe location and position of two- and three-dimension representations on paper.	Look around the classroom. • Where do you see a cone? • Show an example of a square? • What shape is the door? • Do you see a shape next to the door?

Return to Standards

Identify and describe shapes.

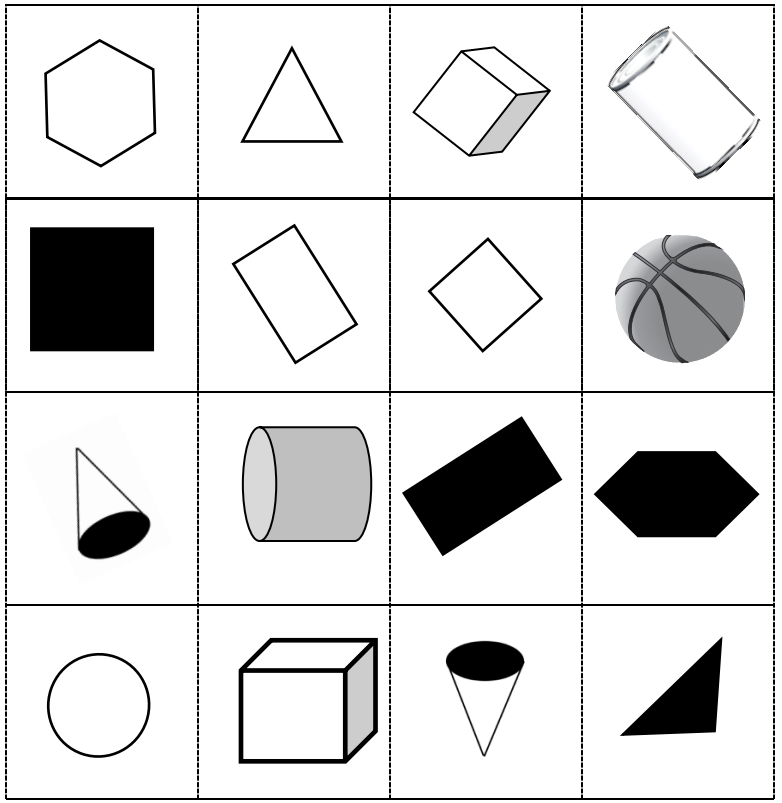
NC.K.G.2 Correctly name squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres regardless of their orientations or overall size.

Clarification	**Checking for Understanding**
In this standard, students begin to understand that certain attributes define what a shape is called (number of sides, number of angles, etc.) and that other attributes do not (color, size, orientation). Students should be familiar with shapes in various forms (isosceles, scalene, equilateral), different sizes (big, small), and different orientations so they can begin to move beyond what a shape "looks like" to identifying particular geometric attributes that define a shape. Note: Students are not expected know the terms isosceles, scalene or equilateral. They should be able to identify those shapes as triangles	Identify each of these shapes: 

Return to Standards

Identify and describe shapes.

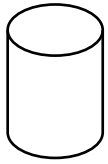
NC.K.G.3 Identify squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres as two-dimensional or three-dimensional.

Clarification	**Checking for Understanding**
In this standard, students identify, analyze, sort, describe, and compare shapes that are two-dimensional and three-dimensional. Students should be able to differentiate between shapes that are flat (2 dimensional) or solid (3 dimensional) and use the terms two-dimensional and three-dimensional as they discuss the properties of various shapes. Students should be able to sort two- and three-dimensional shapes and explain how the shapes are sorted.	Sort these figures in two categories: two-dimensional and three-dimensional. 

Return to Standards

Analyze, compare, create, and compose shapes.

NC.K.G.4 Analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, attributes and other properties.

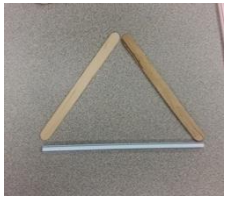
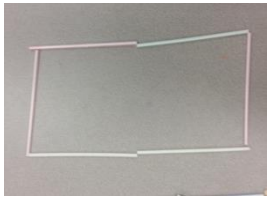
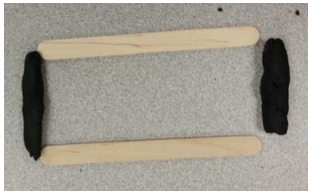
Clarification	**Checking for Understanding**
In this standard, students can sort, compare, and analyze two-dimensional and three-dimensional shapes to note similarities and differences using informal language. Students should be able to describe two-dimensional shapes by telling the number of sides and vertices it has. Students should be able to identify the vertex (corner) as the location where to sides meet; however, it is not necessary for kindergarten students to use the term vertex. Through analysis, students should recognize that the length of sides is an important attribute when naming shapes. Faces of three-dimensional shapes can be identified as specific two-dimensional shapes. Identifying the number of edges and vertices on a three-dimensional shape is not an expectation of kindergarten. In kindergarten, students use informal language to analyze rectangles and squares. For example: *I know this is a rectangle because it has 4 right corners. I know this is a square because all 4 sides are the same length and it has 4 right corners.*	Compare these two shapes. How are they alike and how are they different? *Possible response:* *Both shapes have straight sides. They both have corners and they are both two-dimensional. The hexagon has 6 sides. The square only has 4 sides.*  What do you notice about the sides of these three-dimensional shapes? *Possible response:* *The sides of the cube are squares. I can tell it's a square because it has four sides that are the same size and four corners.*  *I can see that the top and bottom of the cylinder are circles.* 

Return to Standards

Analyze, compare, create, and compose shapes.

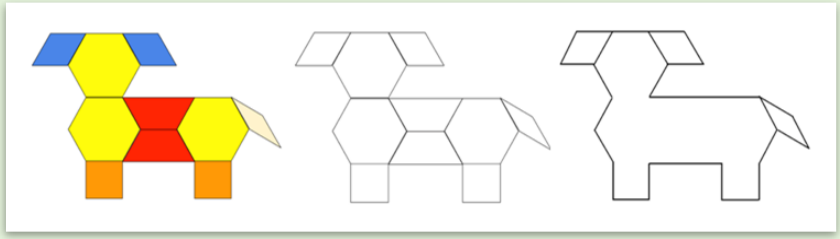
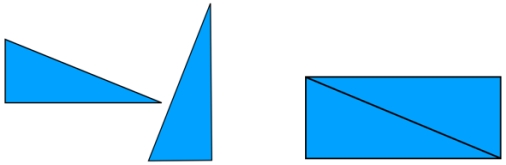
NC.K.G.5 Model shapes in the world by:

- Building and drawing triangles, rectangles, squares, hexagons, circles.
- Building cubes, cones, spheres, and cylinders.

Clarification	**Checking for Understanding**
In this standard, students apply their understanding of geometric attributes of shapes in order to create given shapes. Since two-dimensional shapes are flat and three-dimensional shapes are solid, students may draw or build two-dimensional shapes and only build three-dimensional shapes. Students should identify two-dimensional shapes used to construct three-dimensional shapes.	Using the materials in front of you, build or draw a triangle. *Possible response:*   Using the materials in front, of you, build or draw a rectangle. *Possible response:*   Using the clay, create a sphere. *Possible response:* 

Return to Standards

Analyze, compare, create, and compose shapes.
NC.K.G.6 Compose larger shapes from simple shapes.

Clarification	**Checking for Understanding**
In this standard, students move beyond identifying and classifying two-dimensional shapes to manipulating two or more shapes to create larger shapes and pictures. Students should be able to describe the shapes they have composed using informal geometric terminology. Students also combine shapes to build pictures. Pictures should be described using informal geometric terminology. Students should intuitively explore geometric motions (slides, flips, and turns) to create pictures and solve problems. **For example:** A student may build this figure starting with a color pattern, then a shape outline, and finally a figure outline. 	Using these triangles, can you create a different shape? *Possible response:* *While exploring with triangles, a student flips and turns the triangles to make a rectangle.* 

Return to Standards

Addition/Subtraction Problem Types

The grade level in the right corner of each problem type indicates the grade in which proficiency is expected.

		Result Unknown	Change Unknown	Start Unknown
Action	Add To	Two birds sat in a tree. Three more birds fly to the tree. How many birds are in the tree now? 2 + 3 = ? K	Two birds sat in the tree. Some more birds flew there. Then there were five birds in the tree. How many birds flew over to the first two? 2 + ? = 5 1	In the morning, some birds were sitting in a tree. At lunch time, three more birds flew there. Then there were five birds. How many birds were in the tree in the morning? ? + 3 = 5 2
	Take From	Five birds were in a tree. Two birds flew away. How many birds are in the tree now? 5 - 2 = ? K	Five birds were in a tree. Some flew away. Then there were three birds in the tree. How many birds flew away? 5 - ? = 3 1	In the morning, some birds were in a tree. At lunch time, two birds flew away. Then there were three birds left. How many birds were in the tree in the morning? ? - 2 = 3 2

		Total Unknown	Addend Unknown	Both Addends Unknown
No Action	Put Together/ Take Apart	Three red birds and two blue birds are in a tree. How many birds are in the tree? 3 + 2 = ? K	Five birds are in a tree. Three are red and the rest are blue. How many birds are blue? 3 + ? = 5 5 - 3 = ? 1	Five birds are in a tree. They could either be blue birds or red birds. How many birds could be red and how could be blue? 5 = 0 + 5 5 = 5 + 0 5 = 1 + 4 5 = 4 + 1 5 = 2 + 3 5 = 3 + 2 K

		Difference Unknown	Bigger Unknown	Smaller Unknown
	Compare	***"How many more?" version:*** Lara has two stickers. Jade has five stickers. How many more stickers does Jade have than Lara?	***Version with "more":*** Jade has three more stickers than Lara. Lara has two stickers. How many stickers does Jade have?	***Version with "more":*** Jade has three more stickers than Lara. Jade has five stickers. How many stickers does Lara have?
		"How many less?" version: Lara has two stickers. Jade has five stickers. How many fewer stickers does Lara have than Jade? 2 + ? = 5 5 - 2 = ? 1	***Version with "less":*** Lara has three fewer stickers than Jade. Lara has two stickers. How many stickers does Jade have? 2 + 3 = ? 3 + 2 = ? 2	***Version with "fewer":*** Lara has three fewer stickers than Jade. Jade has five stickers. How many stickers does Lara have? 5 - 3 = ? 2