South Carolina College- and Career-Ready Standards for Mathematics

Standards Unpacking Documents

Kindergarten

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With the final approval of the *South Carolina College- and Career-Ready Standards for Mathematics* on March 11, 2015, educators were provided with clear, rigorous, and coherent standards for mathematics that would prepare students for success in their intended career paths that will either lead directly to the workforce or further education in post-secondary institutions. *South Carolina College- and Career-Ready Standards for Mathematics* contains South Carolina College- and Career-Ready (SCCCR) Content Standards for Mathematics that represent a balance of conceptual and procedural knowledge and specify the mathematics that students will master in each grade level and high school course.

The State Department of Education released Support Documents throughout the 2015-2016 school year to provide support for educators who are implementing the *South Carolina College- and Career-Ready Standards for Mathematics*. The Support Documents, which are organized by grades, are then organized by possible units of study which address all of the standards for that grade. The Support Documents can be found at http://ed.sc.gov/instruction/standards-learning/mathematics/support-documents-and-resources/. The purpose of these documents is to provide guidance as to how all the standards at each grade may be grouped into units. Since these documents are merely guidance, the State Department of Education encourages districts to implement the standards in a manner that best meets the needs of students.

To provide an additional supportive resource for South Carolina mathematics educators and continue to build upon the work of the State Department of Education, the South Carolina Leaders of Mathematics Education organization offered to create grade specific Standards Unpacking Documents. These documents would be organized by grade level and grouped by key concept. The *South Carolina College- and Career-Ready Standards for Mathematics* and the South Carolina grade specific Mathematics Support Documents as well as North Carolina and Kansas resources were utilized in the creation of the grade specific Standards Unpacking Documents. This document was adapted and modified specifically from the North Carolina Department of Education grade specific Mathematics Unpacked Content resources as well as the Kansas Association of Teachers of Mathematics Flip Books.

The Mathematics Standards Unpacking Documents were collaboratively written by South Carolina classroom teachers, instructional coaches, district leaders, and higher education faculty who are members of the South Carolina Leaders of Mathematics Education. It is with sincere appreciation that we humbly acknowledge the dedication, hard work and generosity of time provided by the members of the South Carolina Leaders of Mathematics Education who made the Mathematics Standards Unpacking Documents possible.

The primary purpose and goal of the Mathematics Standards Unpacking Documents are to assist and support educators who are teaching the *South Carolina College- and Career-Ready Standards for Mathematics* and to increase student achievement by ensuring educators understand specifically what the standards mean a student must know, understand and be able to do. These documents 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. These documents, along with on-going professional development, may be one of many resources used to understand and teach *South Carolina College- and Career-Ready Standards for Mathematics*.

South Carolina College- and Career-Ready Standards for Mathematics
Mathematical Process Standards

The South Carolina College- and Career-Ready (SCCCR) Mathematical Process Standards demonstrate the ways in which students develop conceptual understanding of mathematical content and apply mathematical skills. As a result, the SCCCR Mathematical Process Standards should be integrated within the SCCCR Standards for Mathematics for each grade level and course. Since the Process Standards drive the pedagogical component of teaching and serve as the means by which students should demonstrate understanding of the Content Standards, the Process standards must be incorporated as an integral part of overall student expectations when assessing content understanding.

Students who are college- and career-ready take a productive and confident approach to mathematics. They are able to recognize that mathematics is achievable, sensible, useful, doable, and worthwhile. They also perceive themselves as effective learners and practitioners of mathematics and understand that a consistent effort in learning mathematics is beneficial.

The Program for International Student Assessment defines mathematical literacy as “an individual’s capacity to formulate, employ, and interpret mathematics in a variety of contexts. It includes reasoning mathematically and using mathematical concepts, procedures, facts, and tools to describe, explain, and predict phenomena. It assists individuals to recognize the role that mathematics plays in the world and to make the well-founded judgments and decisions needed by constructive, engaged and reflective citizens” (Organization for Economic Cooperation and Development, 2012).

A mathematically literate student can:

1. **Make sense of problems and persevere in solving them.**
    a. Relate a problem to prior knowledge.
    b. Recognize there may be multiple entry points to a problem and more than one path to a solution.
    c. Analyze what is given, what is not given, what is being asked, and what strategies are needed, and make an initial attempt to solve a problem.
    d. Evaluate the success of an approach to solve a problem and refine it if necessary.

2. **Reason both contextually and abstractly.**
    a. Make sense of quantities and their relationships in mathematical and real-world situations.
    b. Describe a given situation using multiple mathematical representations.
    c. Translate among multiple mathematical representations and compare the meanings each representation conveys about the situation.
    d. Connect the meaning of mathematical operations to the context of a given situation.

3. **Use critical thinking skills to justify mathematical reasoning and critique the reasoning of others.**
    a. Construct and justify a solution to a problem.
    b. Compare and discuss the validity of various reasoning strategies.
    c. Make conjectures and explore their validity.
    d. Reflect on and provide thoughtful responses to the reasoning of others.

4. **Connect mathematical ideas and real-world situations through modeling.**
    a. Identify relevant quantities and develop a model to describe their relationships.
    b. Interpret mathematical models in the context of the situation.
    c. Make assumptions and estimates to simplify complicated situations.
    d. Evaluate the reasonableness of a model and refine if necessary.

5. **Use a variety of mathematical tools effectively and strategically.**
    a. Select and use appropriate tools when solving a mathematical problem.
    b. Use technological tools and other external mathematical resources to explore and deepen understanding of concepts.

6. **Communicate mathematically and approach mathematical situations with precision.**
    a. Express numerical answers with the degree of precision appropriate for the context of a situation.
    b. Represent numbers in an appropriate form according to the context of the situation.
    c. Use appropriate and precise mathematical language.
    d. Use appropriate units, scales, and labels.

7. **Identify and utilize structure and patterns.**
    a. Recognize complex mathematical objects as being composed of more than one simple object.
    b. Recognize mathematical repetition in order to make generalizations.
    c. Look for structures to interpret meaning and develop solution strategies.

Number Sense K.NS

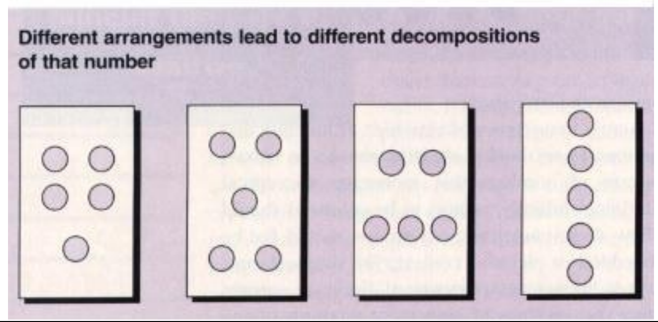
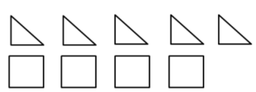
Overview

Students use numbers, including written numerals, to represent quantities and to solve quantitative problems such as counting objects in a set, counting out a given number of objects, and comparing sets or numerals. When learning to count, it is important for kindergarten students to connect the collection of items (4 cubes), the number word ("four"), and the numeral (4), ultimately creating a mental picture of a quantity. If students simply rote-count a collection of objects without connecting these three components, the count becomes meaningless. Also, it is important that students understand the relationship between numbers, i.e., that 4 is one more than 3, not just the next number in the count and that 3 is one less than 4 and not just the previous number in the count.

Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language. The terms students should learn to use with increasing precision are: number words **(zero - twenty), count on, more than, less than, equal to, compare**

SCCCR Mathematics Standard	Unpacking What do these standards mean a child will know and be able to do?
K.NS.1 Count forward by ones and tens to 100.	Students rote count forward orally by starting at 1 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 (10, 20, 30, 40 …). When counting by tens, students need to understand that the next number in the sequence is "ten more" (or one more group of ten). This standard does not require recognition of numerals. It is focused on the rote number sequence up to 100.
K.NS.2 Count forward by ones beginning from any number less than 100.	Students rote count forward orally by starting at a number other than 1. For example when given the number 4, the student would count, "4, 5, 6, 7 …" This standard does not require recognition of numerals. It is focused on the rote number sequence 0-100.
K.NS.3 Read numbers from 0-20 and represent a number of objects 0-20 with a written numeral.	Students write the numerals 0-20 and use the written numerals 0-20 to represent the amount within a set. For example, if the student has counted 9 objects, then the written numeral "9" is recorded. Students can record the quantity of a set by selecting a number card/tile (numeral recognition) or writing the numeral. Students can also create a set of objects based on the numeral presented. For example, if a student picks up the number card "13", the student then creates a pile of 13 counters. While children may experiment with writing numerals beyond 20, this standard places emphasis on numbers 0-20. Due to varied development of fine motor and visual development, reversal of digits is anticipated. For 2 digit numbers such as 13, students might reverse the digits to read 31. It's important to correct this because the value and the number has changed in this type of reversal. Note that the "represent" part of the standard does call for the correct formation of the written numerals.
K.NS.4 Understand the relationship between number and quantity. Connect counting to cardinality by demonstrating an understanding that:	Students count a set of objects and see sets and numerals in relationship to one another. Students implement correct counting procedures by pointing to one object at a time (one-to-one correspondence), using one counting word for every object, while keeping track of objects that have and have not been counted. This is the foundation of counting. These connections are higher-level skills that require students to analyze, reason about, and explain relationships between numbers and sets of objects. The expectation is that students are comfortable with these skills with the numbers 1-20 by the end of Kindergarten.

a. the last number said tells the number of objects in the set (cardinality);	Students answer the question "How many are there?" by counting objects in a set and understanding that the last number stated when counting a set (…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 do you have?" after they count. Often times, children who have not developed cardinality will count the amount again, not realizing that the **10** they stated means 10 objects in all.
b. the number of objects is the same regardless of their arrangement or the order in which they are counted (conservation of number);	Young children believe what they see. Therefore, they may believe that a pile of cubes that they counted may be more if spread apart in a line. As children move towards the developmental milestone of conservation of number, they develop the understanding that the number of objects does not change when the objects are moved, rearranged, or hidden. Children need many different experiences with counting objects before they can reach this developmental milestone.
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.	Another important milestone in counting is hierarchical inclusion. Hierarchical inclusion is the understanding that smaller numbers are part of bigger numbers. It is the understanding that numbers are nested inside each other and that the number grows by one each count. This concept is critical for the later development of part/whole relationships. Students are asked to understand this concept with and without (0-20) objects. For example, after counting a set of 8 objects, students answer the question, "How many would there be if we added one more object?"; and answer a similar question when not using objects, by asking hypothetically, "What if we have 5 cubes and added one more? How many cubes would there be then?" Asking a child, "What is the next number?" implies rote, meaningless counting. On the other hand phrasing the question, "What is one more/less?" implies a relationship between quantities/numbers and helps the child consider that relationship rather than merely focusing on a number sequence.
K.NS.5 Count a given number of objects from 1-20 and connect this sequence in a one-to-one manner.	In order to answer "how many?" students need to keep track of objects when counting. Keeping track is a method of counting that is used to count each item once and only once when determining 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 accurately determine "how many". Depending on the amount of objects to be counted, and the 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. It is important that children develop a strategy that makes sense to them based on the realization that keeping track is important in order to get an accurate count, as opposed to following a rule, such as "Line them all up before you count", in order to get the right answer. As children learn to count accurately, they may count a set correctly one time, but not another. Other times they may be able to keep track up to a certain amount, but then lose track from then on. Some arrangements, such as a line or rectangular array, are easier for them to get the correct answer but may limit their flexibility with developing meaningful tracking strategies. Providing multiple arrangements helps children learn how to keep track.

K.NS.6 Recognize a quantity of up to ten objects in an organized arrangement (subitizing).	Students should experience a variety of organized arrangements of up to 10 objects to build their understanding that the number can be composed of different parts. Subitizing is defined as seeing a small amount of objects and knowing how many there are *without counting*. Subitizing should include perceptual and conceptual subitizing. Perceptual subitizing is instantly seeing how many there are in a small set of 2-3 objects without using any formal mathematical processes to count. Conceptual subitizing is similar to the ability to recognize a number without using any formal mathematical processes to count but with larger sets and recognizing the number as both a whole and as its composite parts. Subitizing, the ability to “instantly see how many” (Clements, 1999), helps students form a mental picture of a number. When students recognize a small collection of objects (e.g., 2 sets of two dots) as one group (e.g., four), they are beginning to unitize. This ability to see a set of objects as a group is an important step toward being able to see smaller groups of objects within a total collection - which is necessary to decompose a number or numbers. Materials such as dot cards, dice, and dominoes provide students opportunities to see a variety of patterned arrangements to develop instant recognition of small amounts. For example with the number 5, students may see the parts 4 and 1 as 5; 2, 1, and 2 as 5; 2 and 3 as 5, or simply as 5. 
K.NS.7 Determine whether the number of up to ten objects in one group is more than, less than, or equal to the number of up to ten objects in another group using matching and counting strategies.	Students use their counting ability to compare sets of objects (0-10). They may use matching strategies (Student 1), counting strategies (Student 2) or equal shares (Student 3) to determine whether one group is greater than, less than, or equal to the number of objects in another group. Students are not expected to use symbols (<, >, =). Student 1 I lined up one square and one triangle. Since there is one extra triangle, there are more triangles than squares.  Student 2 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. Student 3 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 of the shapes away, there was still a triangle left. That means that there are more triangles than squares.

K.NS.8 Compare two written numerals up to 10 using *more than, less than* or *equal to*.	Students apply their understanding of numerals 0-10 to compare one numeral with another. For example when given the numerals 8 and 10, a student is able to recognize that the numeral 10 represents a larger amount than the numeral 8. Students need ample experiences with actual sets of objects (K.NS.3 and K.NS.7) before completing this standard with only numerals. Students are not expected to use symbols (<, >, =) when comparing written numerals.
K.NS.9 Identify first through fifth and last positions in a line of objects.	Ordinal numbers are used to designate the position of objects. Students use objects in a line to identify the ordinal numbers (first through fifth) as well as the last position.

Number Sense and Base Ten K.NSBT

Overview

As students continue to develop number sense, they begin making connections between quantities they count and the written numerals in our language. Students need to understand why we write the number twelve as 12, as it's related to the quantity of 1 ten and 2 ones leftover. In this key concept, kindergarteners keep each count as a single unit as they explore a set of 10 objects and objects left over. This builds a foundation for unitizing a ten (recognizing that a set of 10 objects is a unit called a "ten"), which is a standard for first grade.

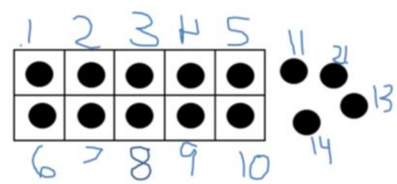
Note: Students should see addition and subtraction equations, and student writing of equations in kindergarten is encouraged, but it is not required.

Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language. The terms students should learn to use with increasing precision with this key concept are: number words (**one, two… thirteen, fourteen, … nineteen**), **leftovers, ones**

SCCCR Mathematics Standard	Unpacking What do these standards mean a child will know and be able to do?
K.NSBT.1 Compose and decompose numbers from 11-19 separating ten ones from the remaining ones using objects and drawings.	Students explore numbers 11-19 using representations such as manipulatives or drawings. Keeping each count as a single unit, kindergarteners use 10 objects to represent "10" rather than creating a unit called a ten (unitizing) as indicated in the first grade standard stating that 10 can be thought of as a bundle (a group) of ten ones — called a "ten."

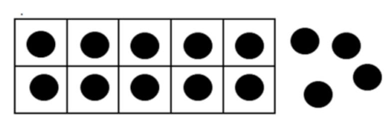
Example:

Teacher: "I am inviting 14 friends over for a party. I am going to bake cupcakes in this pan. (Show them a ten frame.) Will I be able to bake all of the cupcakes at once? Share your thoughts with one another."
Teacher: "Use your ten frame to investigate."
Students: "Look. There's too many to fit on the ten frame. Only ten will fit on it."
Teacher: "So you have some leftovers?"
Students: "Yes. I'll put them over here next to the ten frame."
Teacher: "So, how many do you have in all?"
Student A: "One, two, three, four, five… ten, eleven, twelve, thirteen, fourteen. I have fourteen. Ten fit in the boxes and four didn't."
Student B: Pointing to the ten frame, "See them- that's 10… 11, 12, 13, 14. There's fourteen."



14 is 10 on and 4 off.

ALL	On	Off
14	10	4



$\boxed{14 = 10 + 4}$

Operations and Algebraic Thinking K.ATO

Overview

For numbers 0 – 10, students choose, combine, and apply strategies for answering quantitative questions. This includes quickly recognizing the cardinalities of small sets of objects, counting and producing sets of given sizes, counting the number of objects in combined sets, or counting the number of objects that remain in a set after some are taken away. Objects, fingers, mental images, drawings, acting out situations, verbal explanations, expressions, and equations are used to solve problems and represent thinking.

Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language. The terms students should learn to use with increasing precision are: **join, add, putting together, taking apart, taking from, separate, subtract, and, same amount as, equal, less, more, total, count on.**

Note on vocabulary: The term "total" is used here instead of the term "sum." "Sum" sounds the same as "some," but has the opposite meaning. "Some" is used to describe problem situations with one or both addends unknown, so it is better in the earlier grades to use "total" rather than "sum."

SCCCR Mathematics Standard	Unpacking What do these standards mean a child will know and be able to do?
K.ATO.1 Model situations that involve addition and subtraction within 10 using objects, fingers, mental images, drawings, acting out situations, verbal explanations, expressions, and equations.	Students demonstrate an understanding of how objects can be joined (addition) and separated (subtraction) by representing addition and subtraction situations in various ways. The focus is on understanding the concept of addition and subtraction through modeling, rather than reading and solving number sentences (equations). Before introducing symbols (+, -, =) and equations, students require numerous experiences using joining (addition) and separating (subtraction) vocabulary in order to attach meaning to the various symbols. For example, when explaining a solution, students 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, when equations are modeled and used in kindergarten, students must connect the symbol (=) with its meaning (is the same amount/quantity as).
K.ATO.2 Solve real-world/story problems using objects and drawings to find sums up to 10 and differences within 10.	Students solve four types of problems within 10: Adding to/Joining, Take From/Separating, Part-Part-Whole Total Unknown, Part-Part-Whole Both Addends Unknown. Students use counting to solve the four problem types by acting out the situation with objects and drawings.

Adding To/ Joining	Take From/ Separating	Part-Part-Whole Total Unknown	Part-Part-Whole Both Addends Unknown
Two bunnies sat on the grass. Three more bunnies hopped there. How many bunnies are on the grass now? 2 + 3 = ?	Five apples were on the table. I ate two apples. How many apples are on the table now? 5 – 2 = ?	Three red apples and two green apples are on the table. How many apples are on the table? 3 + 2 = ?	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

Note these examples taken from CCSSM problem structures.

<table>
<tr>
<td>K.ATO.3 Compose and decompose numbers up to 10 using objects, drawings, and equations.</td>
<td>Students develop an understanding of part-whole relationships as they recognize a set of objects (5) can be broken into smaller sub-sets (3 and 2) and still remain the total amount (5). In addition, students realize a set of objects (5) can be broken in multiple ways (3 and 2; 4 and 1). Thus, when breaking apart a set (decomposing), students use the understanding that a smaller set of objects exists within a larger set (hierarchical inclusion).

Example: 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.

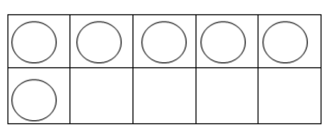
Students could draw pictures of:
4 blue and 1 red button 3 blue and 2 red buttons 2 blue and 3 red buttons 1 blue and 4 red buttons

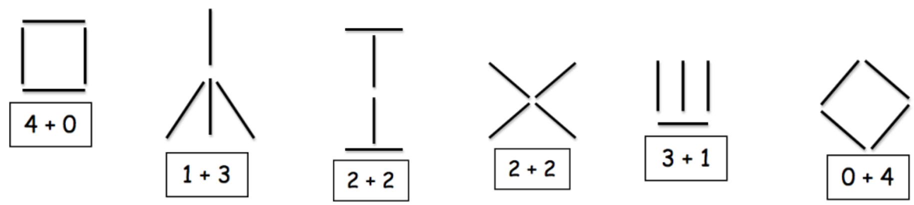
Students need ample experiences breaking apart numbers and using the vocabulary “and” & “same amount as” before symbols (+, =) and equations (5 = 3 + 2) are introduced. If equations are used, a mathematical representation (picture, objects) needs to be present as well.</td>
</tr>
<tr>
<td>K.ATO.4 Create a sum of 10 using objects and drawings when given one of two addends 1-9.</td>
<td>Students build upon the understanding that a number (less than or equal to 10) can be decomposed into parts (K.ATO.3) to find a missing part of 10. Through numerous concrete experiences, students model the various sub-parts of ten and find the missing part of 10.

Example: When working with 2-color beans, a student determines 4 more beans are needed to make a total of 10.

“I have 6 beans. I need 4 more beans to have 10 in all.”

In addition, students use various materials to solve tasks that involve decomposing and composing 10.

Example: A full case of juice boxes has 10 boxes. There are only 6 boxes in this case. How many juice boxes are missing?
<table>
<tr>
<td>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.”
</td>
<td>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.”
</td>
<td>Student C:
Fluently add/subtract
“I know that it’s 4 because 6 and 4 is the same amount as 10.”</td>
</tr>
</table></td>
</tr>
</table>

K.ATO.5 Add and subtract fluently within 5.	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 more than one strategy). Students develop fluency by understanding and internalizing the relationships that exist between and among numbers. Oftentimes, 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. Instead, in order to fluently add and subtract, children must first be able to see sub-parts within a number (hierarchical inclusion, K.NS.4.c). 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. For example, after making various arrangements with toothpicks, students learn that only a certain number of sub-parts exist within the number 4:  Then, after numerous opportunities to explore, represent and discuss “4”, a student becomes able to fluently answer problems such as, “One bird was on the tree. Three more birds came. How many are on the tree now?” and “There was one bird on the tree. Some more came. There are now 4 birds on the tree. How many birds came?” 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 numbers and develop efficient strategies for fact retrieval. * Van de Walle & Lovin (2006). Teaching student centered mathematics K-3 (p.94). Boston: Pearson. **Burns (2000) About Teaching Mathematics; Fosnot & Dolk (2001) Young Mathematicians at Work; Richardson (2002) Assessing Math Concepts; Van de Walle & Lovin (2006) Teaching Student-Centered Mathematics

K.ATO.6 Describe simple repeating patterns using AB, AAB, ABB, and ABC type patterns.	Students should be able to identify the core of the pattern by identifying the string of elements that repeats. Pattern recognition and the extension of the pattern allow students to make predictions. Students should understand that patterns are a way to recognize order and organize their world and to predict what comes next in an arrangement. Patterns could include objects, sounds, drawings, shapes, and color. Examples: “snap, clap, snap, clap”; “red, red, blue, red, red, blue”

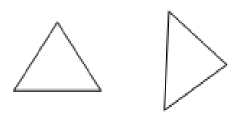
Geometry K.G

Overview

This key concept asks students to identify and describe given shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres) in everyday situations. Students are given the name of a shape, a concrete or visual example of the shape, and asked to describe the shape. Kindergarten students should be given a shape and then asked to find something in the room that has the same shape. Students are building their language for describing shapes, which will lead to them describing defining attributes in 1st grade. Throughout the year, students move from informal language to describe what shapes look like (e.g., "That looks like an ice cream cone!") to more formal mathematical language (e.g., "That ice cream cone looks like a triangle.").

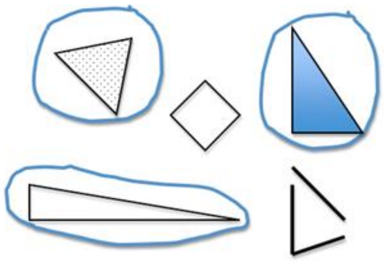
Students need ample experiences exploring various forms of the shapes (e.g., *size*: big and small; *types*: triangles, equilateral, isosceles, scalene; *orientation*: rotated slightly to the left, 'upside down') using geometric vocabulary to describe the different shapes. However, it is not necessary to identify the shape by type such as an isosceles triangle. Nor is it expected to identify a shape based on its number of sides and angles.

Students typically recognize figures by appearance alone, often by comparing them to a known example of a shape, such as the triangle on the left (see below). For example, students typically recognize the figure on the left as a triangle, but claim the figure on the right is not a triangle, since it does not have a flat bottom. Thus, the attributes of a figure are not recognized or known. Students typically make decisions on identifying and describing shapes based on perception, not reasoning. This is why it's essential for students to manipulate shapes and interact with them to develop spatial reasoning.



Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language. The terms students should learn to use with increasing precision are: **squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, spheres, flat, solid, side, corner,** positional vocabulary (e.g., **above, below, beside, between, in front of, behind, inside, outside**).

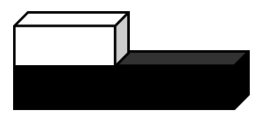
SCCCR Mathematics Standard	Unpacking What do these standards mean a child will know and be able to do?
K.G.1 Describe positions of objects by appropriately using terms including *below, above, beside, between, inside, outside, in front of,* or *behind.*	The intent of the standard is to help students build their geometric/spatial vocabulary to describe objects in their world. Students should be encouraged to locate and identify shapes in their environment. Students use positional words such as *below, above, beside, between, inside, outside, in front of,* or *behind* to describe positions of objects, thus developing their spatial reasoning competencies. Students need numerous experiences identifying the location and position of actual two- and three-dimensional objects in their classroom/school prior to describing location and position of two- and three-dimensional representations on paper.
K.G.2 Identify and describe a given shape and shapes of objects in everyday situations to include two-dimensional shapes (i.e, triangle, square, rectangle, hexagon, and circle) and three-dimensional	The intent of the standard is to lay the foundation for students to begin looking at attributes of shapes. Students will identify and describe shapes on what they notice about the shape and its appearance. Students are not expected to tell the defining attributes of shapes. For example, a student may say, "It's a square because it looks like the square you drew on the board." However, through numerous experiences exploring and discussing shapes, students begin to understand that certain attributes define what a shape is called (e.g., number of sides, number of corners) and that other attributes do not (e.g., color, size, orientation). As the teacher facilitates discussions about shapes ("Is it still a triangle if I turn it like

shapes (i.e., cone, cube, cylinder, and sphere).	this?"), children question what they "see" and begin to focus on the attributes. Students may not yet recognize triangles that are oriented like a yield sign or that have one side longer than the other two sides. Students need ample experiences manipulating shapes and looking at shapes with various typical and atypical orientations. Through these experiences, students will begin to move beyond what a shape "looks like" to identifying attributes that define a shape.
K.G.3 Classify shapes as two-dimensional/flat or three-dimensional/solid and explain the reasoning used.	Students identify shapes as flat (two-dimensional) or solid (three-dimensional). Students are expected to sort and classify shapes based on their dimension and explain the reasoning used, but are not expected to use formal attributes that define a shape as two- or three-dimensional. A student might say, "I put all these together because they stack." Or "These shapes go together because they are straight." However as the teacher embeds the geometric vocabulary into students' exploration of various shapes, students may use the terms two-dimensional and three-dimensional as they discuss the attributes of various shapes.
K.G.4 Analyze and compare two- and three-dimensional shapes of different sizes and orientations using informal language.	Students are beginning to develop spatial reasoning; therefore, they are expected to sort, classify, compare and contrast shapes using informal language. It is not required that students use the terms two-dimensional and three-dimensional for this standard but may be in other standards. Students relate one shape to another as they note similarities and differences (both size and orientation) between and among two-dimensional and three-dimensional shapes using informal language. For example, when comparing a triangle and a square, students note that both have straight sides, but the triangle has 3 sides while the square has 4 sides. Or, when building in the block center, students notice the sides (faces) on the cube are all square shapes. Students also distinguish between the most typical examples of a shape from obvious non-examples. For example, when identifying the triangles from a collection of shapes, a student circles all of the triangle examples from the non-examples. 
K.G.5 Draw two-dimensional shapes (i.e., square, rectangle, triangle, hexagon, and circle) and create models of three-dimensional shapes (i.e., cone, cube, cylinder, and sphere).	Students should draw and model the shapes after they have had experiences with concrete two- and three-dimensional shapes. Students can create shapes based on what they have learned about attributes of shapes in order to create a given shape. For example, students may roll a clump of play-doh into a sphere or use their finger to draw a triangle in the sand table, recalling various attributes in order to create that particular shape. Because 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. Shapes could be built using materials such as clay, toothpicks, marshmallows, gumdrops, straws, pipe cleaners, etc. Students should understand and identify two-dimensional shapes used to construct three-dimensional shapes.

Measurement and Data Analysis K.MDA

Overview

Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language. The terms students should learn to use with increasing precision are: **length, weight, heavy(ier), light(er), long(er), tall(er), short(er),** color words (e.g., **blue, green, red,** etc.**),** descriptive words (e.g., **small, big, rough, smooth, bumpy, round, flat,** etc.), **more, less, same amount, compare, sort.**

SCCCR Mathematics Standard	Unpacking What do these standards mean a child will know and be able to do?
K.MDA.1 Identify measureable attributes (length, weight) of an object.	Students describe measurable attributes of objects, such as length, weight, and size. 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." Students often initially hold undifferentiated views of measurable attributes, saying that one object is "bigger" than another whether it is longer, or greater in area, or greater in volume, and so forth. For example, two students might both claim their block building is "the biggest." Conversations about how they are comparing- one building may be taller (greater in length) and another may have a larger base (greater in area)- help students learn to discriminate and name these measureable attributes. As they discuss these situations and compare objects using different attributes, they learn to distinguish, label, and describe several measureable attributes of a single object. Thus, teachers listen for and extend conversations about things that are "big," or "small," as well as "long," "tall," or "high," and name, discuss, and demonstrate with gestures the attribute being discussed.
K.MDA.2 Compare objects using words such as shorter/longer, shorter/taller, and lighter/heavier.	Direct comparisons are made when objects are put next to each other, such as two children, two books, two pencils. For example, a student may line up two blocks and say, "The black block is a lot longer than the white one." Students are comparing objects that can be moved and lined up next to each other.  Similar to the development of the understanding that keeping track is important to obtain an accurate count, students need ample experiences with comparing objects in order to discover the importance of lining up the ends of objects in order to have an accurate measurement. As this concept develops, children move from the idea that "Sometimes this block is longer than this one and sometimes it's shorter (depending on how I lay them side by side) and that's okay." to the understanding that "This block is always longer than this block (with each end lined up appropriately)." Since this understanding requires conservation of length, students need multiple experiences measuring a variety of items and discussing findings with one another.  "Sometimes this block is longer and sometimes it's shorter."  "The dark block is always longer than this block"

	Conservation of length is the understanding that if one of two objects of equal length is curved, bent or in a horizontal versus vertical position, then the objects are still of equal length. As students develop conservation of length, it is imperative for the teacher to use language such as “It looks longer, but it really isn’t longer.” Children also develop the understanding that when an object is picked up it is heavier/lighter than another object and compare the weight as opposed to the length.
K.MDA.3 Sort and classify data into 2 or 3 categories with data not to exceed 20 items in each category.	Students identify similarities and differences between objects (e.g., size, color, shape) and use the identified attributes to sort a collection of objects. Students need to have experiences with teacher initiated sorting “rules” as well as with student initiated sorting “rules”. Once the objects are sorted, the student counts the amount in each set. For example, when exploring a collection of buttons by color: First, the student separates the 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), and purple (4). Example of 2 categories: Are you a boy or a girl? Example of 3 categories: How do you get to school? (bus, walk, car)
K.MDA.4 Represent data using object and picture graphs and draw conclusions from the graphs.	Students will be able to sort objects by categories, answer simple data collection questions posed by the teacher or a student, and represent their individual response on object and picture graphs. Students will develop data analysis skills by answering questions and drawing conclusions from the object and picture graphs. For example, using the collection of buttons sorted by color data, the student will place the buttons in a grid that is labeled by color to create an object graph. Once students have mastered the object graph, then the same grid with labels provided could be used to transition to a picture graph. Possible questions to help students draw conclusions from the graphs: Which color is most common? Are there any colors that have the same amount? If so, how do you know?