Kindergarten Mathematics
Instructional Focus Documents

Introduction:

As districts adopt and implement high-quality instructional materials (HQIM) in mathematics, these Instructional Focus Documents (IFD) are intentionally designed to provide a lens into what effective mathematics instruction looks and sounds like in Tennessee classrooms. They are written to support all levels of leadership within a district and complement both the Math Implementation Framework and the Tennessee-specific Instructional Practice Guide (IPG). When used as a suite of resources, the IFDs, the Math Implementation Framework, and the IPG provide guidance and aligned measures with which to track and support district implementation of HQIM in mathematics.

Mathematical rigor does not simply mean increased difficulty or complexity of problems. Rigorous mathematical instruction and learning means deep thinking and exploring at a greater depth. The three aspects of rigor are Conceptual Understanding, Procedural Skill and Fluency, and Application. Each aspect is equally important and necessary for deep mathematical understanding and mastery. These aspects of rigor work in conjunction with the HQIM to provide a meaningful learning experience for students.

Aspects of Rigor:

Conceptual Understanding helps students understand the "how" and the "why" of mathematics. This aspect of rigor focuses on mathematical thinking and reasoning as opposed to answer-getting. Students should understand how and why the math works using mathematical models and manipulatives to aid in achieving conceptual understanding. Instruction should connect prior learning to new ideas and concepts. Opportunities for discussion and reflection may correct and unscramble common misconceptions. Flexible reasoning and fluency grow from conceptual understanding.

Procedural Skill and Fluency is the ability to apply mathematical knowledge accurately, flexibly, and efficiently. It is important to note that the phrase "procedural skill and fluency" is inclusive. The inclusive definition of procedural skill and fluency is *not* the rote use of an algorithm or the recall of facts, but a continuum of understanding. The continuum involves learning or developing algorithms and strategies, executing procedures accurately and efficiently, and learning how to use models and tools. Fluent mastery of a mathematical concept involves the ability to connect and use the Standards for Mathematical Practice while using algorithms and strategies for problem-solving. Students who have achieved fluency can link learned or developed algorithms and strategies to conceptual understanding to explain the "why" behind the procedures. Mathematically proficient students can understand the approaches to solving complex problems and identify correspondences between different approaches to select and use the most appropriate strategy to form an accurate solution path.

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Application refers to applying prior knowledge in new and unique situations, other subject areas, and mathematical and contextual problems. Application also includes intentionally integrated content that provides learning opportunities for students to apply and extend their knowledge of multiple standards, clusters, and/or domains within the grade level. The goal is for students to activate their prior knowledge in order to bring a sense of understanding to new mathematical and/or contextual situations.

Evidence of Learning Statements:
The evidence of learning statements provide guidance to connect the Tennessee Mathematics Standards with evidence of learning outcomes that can be collected through classroom activities, observations, or assessments, providing an indication of how students are tracking towards the grade-level expectations that are encompassed within the Tennessee Mathematics Standards. Within the evidence of learning statements, level 3 statements demonstrate on-grade level expectations for all Tennessee students.

The statements are designed to provide a continuum of concrete examples demonstrating what a student who has a particular level of conceptual understanding of the Tennessee mathematics standards will most likely be able to do in a classroom setting. Further, they provide a lens to help offer scaffolding to move a student with unfinished learning up to grade level expectations.

When used alongside high-quality instructional materials, these concrete examples serve to reinforce the grade level expectations and rigor that should be present within the materials and reinforce their inclusion within instruction, ensuring all students have access to on-grade level activities.

Instructional Focus Statements:
Instructional focus statements provide guidance to clarify the types of instruction that will help a student progress along a continuum of learning. These statements are written to provide strong guidance with a focus on Tier I, on-grade level instruction. Thus, the instructional focus statements are written for level 3 and 4.

When used in conjunction with HQIM, instructional focus statements support teacher understanding as they plan and implement HQIM to the depth and rigor of the Tennessee mathematics standards. Additionally, they serve as a benchmark for district and school leaders to use alongside the IPG as they are monitoring HQIM implementation.

Counting and Cardinality (CC)

Standard K.CC.A.1 Cluster Heading: A. Know number names and the counting sequence.

Count to 100 by ones, fives, and tens. Count backward from 10.

Aspect of Rigor Alignment

Conceptual Understanding	Procedural Skill and Fluency	Application
X	X	

Evidence of Learning Statements

Students with a level 1 understanding of this standard will most likely be able to:	Students with a level 2 understanding of this standard will most likely be able to:	Students with a level 3 understanding of this standard will most likely be able to:	Students with a level 4 understanding of this standard will most likely be able to:
Begin counting as students are emergent counters at this level. Begin rote counting at 1 (or is directed by the teacher to start at 1) and count to any number less than 100. Some numbers in the number sequence may be out of order or skipped.	Count to 100 by ones, count to 100 by fives, count to 100 by tens, or count backward from 10. Complete two of the above counting tasks but may only be able to start and partially complete the other above counting tasks.	Count to 100 by ones (start at 1). Count to 100 by fives (start at 5). Count to 100 by tens (start at 10). Count backward from 10 to 1 by ones.	Identify at least three missing consecutive and nonconsecutive numbers from a given counting sequence which counts by ones and starts at 1 (e.g., Identify missing numbers on a hundreds chart). Identify at least three missing consecutive and nonconsecutive numbers from a given counting sequence which counts by fives (starts at 5) and tens (starts at 10). Count backward from 20 to 1 by ones.

Instructional Focus Statements

Level 3:

Standard K.CC.A.1 is foundational in that several learning progressions within the math standards are grounded in students first knowing number names and the counting sequence. Specifically, a conceptual understanding of counting and cardinality will be necessary before students can develop a deep conceptual understanding of the standards within both the Operations and Algebraic Thinking (OA) and Numbers and Operations in Base Ten (NBT) domains throughout grades K through 2.

That said, the instructional focus for standard K.CC.A.1 should initially be on having students count by ones over a small range of numbers. The range will increase over time depending on the needs of each individual student. It is helpful to associate number sequences with situations in which students are already familiar. Additionally, this standard provides an opportunity to bring literature into the classroom as there are many nursery rhymes and counting based books available.

As students begin to rote count more fluently, introducing them to the numeral representations for each number will allow more avenues for students to conceptually develop their understanding of the number system. Incorporating a number chart (e.g., 20-chart, 50-chart, 100-chart) when counting by ones offers a manipulative for students to connect the verbal and written forms of numbers. Additionally, it offers a very nice extension when students move to skip counting allowing students an opportunity to discover the patterns that exist when skip counting first by tens and then by fives. It is important to note that a strong understanding of skip counting is foundational to students when they begin learning about multiplication in grade 3.

The goal for this standard is for students to count in these different ways by the end of the grade. These skills should develop over time due to the readiness of the student. The most natural progression is for students to count by ones, tens, fives, and then backwards. It is also important to note that it is not necessary for a student to completely master one prior to beginning to work with another.

Students can usually say the counting words up to a given number before they use these numbers to count objects or to identify the number of objects in a group. Students become fluent in saying the counting sequence so that when instruction shifts to connecting counting to cardinality, they can focus on, for example, the one-to-one aspects of cardinality in standard K.CC.B.5 without having to deeply focus on simply naming the numbers.

Level 4:

As students demonstrate their ability to rote count in multiple ways, instruction should shift to provide multiple opportunities for students to interact with sequences that begins with the starting number in the counting sequence (1, 5, or 10) and have them identify missing numbers (both consecutive and non-consecutive) within the sequence. Number charts are a particularly helpful tool for this task. Additionally, students can be challenged to count backward from numbers greater than 10.

Counting and Cardinality (CC)

Standard K.CC.A.2 Cluster Heading: A. Know number names and the counting sequence.

Count forward by ones beginning from any given number within the known sequence (instead of having to begin at 1).

Aspect of Rigor Alignment

Conceptual Understanding	Procedural Skill and Fluency	Application
X	X	

Evidence of Learning Statements

Students with a level 1 understanding of this standard will most likely be able to:	Students with a level 2 understanding of this standard will most likely be able to:	Students with a level 3 understanding of this standard will most likely be able to:	Students with a level 4 understanding of this standard will most likely be able to:
Begin counting. Students are emergent counters at this level. Begin rote counting at 1. Some numbers in the number sequence may be out of order or skipped.	Count forward from a given number greater than 20 by ones providing at least the next ten numbers in the sequence.	Given any number greater than 1, provide the next fifteen numbers in the sequence.	Use a given set of consecutive, two-digit number cards to place the cards in the correct counting order.

Instructional Focus Statements

Level 3:

The instructional focus for this standard should be extending a student's rote counting skills developed in standard K.CC.A.1 so that they are able to start at any number that is not at the beginning of a counting sequence and count by ones to 100. As the teen numbers are particularly difficult for students, it is important to make sure that students have ample opportunity to work with these numbers. Students need to be able to count across place values accurately with ample opportunities and different given numbers. Being able to count forward, beginning from a given number within the known sequence is foundational for students to be able to access addition and subtraction strategies such as counting on in subsequent grades.

Level 4:

Developing a conceptual understanding of ordering is relevant to this standard. Students can demonstrate an understanding of sequencing by correctly ordering a group of consecutive numbers in a counting sequence. As with standard K.CC.A.1, while connecting written numbers and verbal numbers is not explicit in this standard (a limited set appears in standard K.CC.A.3), when students develop the ability to connect the two, there are more avenues for students to conceptually develop their understanding of the number system.

Counting and Cardinality (CC)

Standard K.CC.A.3 Cluster Heading: A. Know number names and the counting sequence.

Write numbers from 0 to 20. Represent a quantity of objects with a written numeral 0-20.

Aspect of Rigor Alignment

Conceptual Understanding	Procedural Skill and Fluency	Application
X	X	

Evidence of Learning Statements

Students with a level 1 understanding of this standard will most likely be able to:	Students with a level 2 understanding of this standard will most likely be able to:	Students with a level 3 understanding of this standard will most likely be able to:	Students with a level 4 understanding of this standard will most likely be able to:
Print the distinctive features of a number but may not correctly form each number from 0 to 10. Represent a quantity of objects with a written numeral 0-10 (may not be correctly formed) or select the correct number that represents the number of objects.	Write numbers from 0 to 10. Represent a quantity of objects with a written numeral 0 to 10.	Write numbers from 0 to 20. Represent a quantity of objects with a written numeral 0 to 20.	Use a given printed number from 10 to 20 to correctly identify the number and represent the number with counters.

Instructional Focus Statements

Level 3:

Instruction for this standard should focus on developing a student's ability to write the numerals from 0 to 20 while also connecting the written form to the number of objects represented by a group. Students need to first begin recognizing written numerals before they begin generating them on their own. While they are learning what the written numerals look like, it is helpful for them to begin connecting this to the number of objects in a group. Students should be provided with a wide variety of opportunities to recognize written numerals. This can be accomplished in a variety of ways. One particularly helpful tool is a deck of cards where each card displays not only the printed number, but also a picture representing a count of that many objects.

Once students are comfortable identifying written numerals, they progress to looking at a collection and matching the number of items in the collection with the appropriate count. Simultaneously, students should be given the opportunity to practice writing their numerals. This does not have to be strictly done with paper and pencil. There are many other tactile methods, such as writing numbers in sand, that will help solidify for students how to write

numbers. It is important to note that it is developmentally appropriate for students to reverse digits, but place value must be maintained (e.g., 21 may not be accepted for 12). Giving students kinesthetic experiences where they can form numerals may help overcome this.

Finally, instruction should focus on connecting the two skills: determining the number of objects in a group and providing a written numeral to represent the count. It is beneficial to teach this standard alongside standard K.CC.B.5 so that students count the objects and then represent what they have counted with a written numeral that they understand represents the number of objects in the group. It is important that students understand that the numeral is the written representation of a number.

Level 4:

Once students understand the connection that exists between written numerals and the number of objects in a group, they should be able to extend their thinking to flexibly work with verbal, written, and concrete representations of numbers. One such way would be to provide a written numeral (10-20), have students identify the numeral, and count a collection that represents the given numeral. Students at this stage may reverse digits but must maintain place value. It is important to push students thinking so that they seamlessly connect verbal, written, and concrete representations of numbers.

Counting and Cardinality (CC)

Standard K.CC.A.4 Cluster Heading: A. Know number names and the counting sequence.

Recognize, describe, extend, and create patterns and explain a simple rule for a pattern using concrete materials. Analyze the structure of the repeating pattern by identifying the unit (core) of the pattern.

Aspect of Rigor Alignment

Conceptual Understanding	Procedural Skill and Fluency	Application
X		

Evidence of Learning Statements

Students with a level 1 understanding of this standard will most likely be able to:	Students with a level 2 understanding of this standard will most likely be able to:	Students with a level 3 understanding of this standard will most likely be able to:	Students with a level 4 understanding of this standard will most likely be able to:
Extend simple patterns of sound and movement. Display awareness of colors, size, and numbers to be able to create a pattern. Sort, classify, and order objects by size, number, and other properties.	Model a pattern from a simple given rule using concrete materials. Extend a pattern from a simple given rule using concrete materials.	Recognize, describe, extend, and create patterns and explain a simple rule for a pattern using concrete materials. Analyze the structure of the repeating pattern by identifying the unit (core) of the pattern.	Recognize, describe, extend, create, and explain a simple rule for growing and shrinking patterns. Recognize patterns in counting and numbers.

Instructional Focus Statements

Level 3:

Students become aware of patterns very early in their lives through repetitive daily routines and consistent phenomena. Breakfast, lunch, and dinner are offered in the same order every day as the sun rises and sets repeatedly. Children's books are filled with repetitive phrases and songs often feature patterns of sounds and accompanying actions. Young children love to imitate rhythmic patterns in sound and language and should be encouraged to create their own. Music, language, and physical activity offer many opportunities to engage in pattern making. Students need to build on these early experiences by recognizing, describing, extending, and creating patterns in a variety of contexts.

In addition to kinesthetic and auditory patterns, students should be exploring patterns with objects, shapes, attributes, and numbers. Identifying attributes of objects and using them for categorization and classification (K.MD.A.1) are skills that are closely related to the ability to create and discover patterns. Kindergartners should have numerous opportunities to sort, classify, describe, and order collections of many different types of objects.

This standard builds conceptual understanding as students identify repeating visual patterns and develop a foundation for labeling the patterns they recognize and build. Understanding simple repeating patterns is a crucial building block for future work with number patterns. To support this understanding, kindergarteners need to see the same pattern represented in more than one way. Instruction should focus on recognizing, describing, extending, and creating patterns using concrete materials such as beans, craft sticks, pattern blocks, attribute blocks, multi-link cubes, and other concrete materials. Students should be challenged to explain the simple rule of a given pattern and extend patterns begun by others.

Kindergarten students should identify pattern elements and recognize the core (the shortest string of elements that repeat over and over in the pattern). They identify and label repeating patterns as AB (red, blue, red, blue), ABB (red, blue, blue, red, blue, blue), STR (square, triangle, rectangle), etc., and recognize the same repeating pattern when it is represented using different elements (objects, sounds, movements).

Level 4:

After students have demonstrated a strong conceptual understanding of simple repeating patterns, kindergarten students expand their thinking to include patterns of change. Patterns of change include growing patterns (*, **, ***. ****...) and shrinking patterns (******, *****, ****...). Students should model and describe the change and extend the pattern of change. The counting sequence is one of the first number patterns Kindergartners experience. Students should be encouraged to explain what is happening as we count forward to 100 and backward from 10 (K.CC.A.1).

TN Department of Education

Counting and Cardinality (CC)

Standard K.CC.B.5 Cluster Heading: B. Count to tell the number of objects.

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

K.CC.B.5a. When counting objects 1-20, say the number names in the standard order, using one-to-one correspondence.

K.CC.B.5b. Recognize that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted.

K.CC.B.5c. Recognize that each successive number name refers to a quantity that is one greater and each previous number is one less.

Aspect of Rigor Alignment

Conceptual Understanding	Procedural Skill and Fluency	Application
X		

Evidence of Learning Statements

Students with a level 1 understanding of this standard will most likely be able to:	Students with a level 2 understanding of this standard will most likely be able to:	Students with a level 3 understanding of this standard will most likely be able to:	Students with a level 4 understanding of this standard will most likely be able to:
Say the number names in the standard order, using one-to-one correspondence, when counting up to 10 objects in rectangular arrays, circles, and random arrangements. Recognize that the last number name said tells the number of objects up to 10 objects. The student may have to recount the set. Inconsistently demonstrate that they understand each successive number name refers to a quantity that is one greater.	Say the number names in the standard order, using one-to-one correspondence when counting up to 15 objects in rectangular arrays, circles, and random arrangements. Recognize that the last number name said tells the number of objects up to 15 objects. The student may have to recount the set. Inconsistently demonstrate that they understand each successive number name refers to a quantity that is one greater and each previous number name refers to a quantity that is one less.	Say the number names in the standard order, using one-to-one correspondence when counting up to 20 objects in rectangular arrays, circles, and random arrangements. Recognize that the last number name said tells the number of objects counted up to 20 without recounting the set and identify that the number of objects is the same regardless of their arrangement or the order in which they were counted. Demonstrate that they understand each successive number name refers to a quantity that is one greater and each	Mentally count on one and count back one from the original number of items in a set without exceeding 20. Count out a given number of objects. Quickly recognize and name (subitize) how many objects are in a group without counting from multiple representations of the same number.

Students with a level 1 understanding of this standard will most likely be able to:	Students with a level 2 understanding of this standard will most likely be able to:	Students with a level 3 understanding of this standard will most likely be able to:	Students with a level 4 understanding of this standard will most likely be able to:
		previous number name refers to a quantity that is one less.	

Instructional Focus Statements

Level 3:

When considering types of rigor (conceptual, procedural, application), this standard is conceptual in nature. In the previous cluster, students mastered rote counting but did not develop an understanding of what the numbers mean. The standards in this cluster move instruction towards connecting number names and *cardinality*. *Cardinality* refers to the actual count or number of items in a set. As students rote count, we count physical objects and connect the physical objects *(five counters)* to the oral number *(five)* and the numeral (5). Physically moving one item for each number named helps students understand one-to-one correspondence (one object goes with one number name) and addresses the common mistakes of double counting and confusing one number name with one object during the count sequence. The C-R-A approach (Concrete, Representation, Abstract) should be used to develop conceptual understanding. Instruction at this level will support the C and R stages. Provide multiple opportunities for students to count using a variety of objects such as stickers, erasers, shells, coins, counters, Rekenreks, shapes, solids, and buttons. Five frames, ten frames, and double-ten frames should be used to model linear representations of the count sequence. Move to representations (dot cards and pictures) as students demonstrate proficiency in counting physical objects.

Students need to develop an understanding that the last number name said when counting objects in a set tells the number of objects counted. Prior to reaching this conceptual understanding, a student who is asked “How many blocks?” may regard the counting process itself as the answer, as opposed to the number corresponding to the final object in the set. Students should be allowed to experience counting and discuss what happens when the same number of objects are arranged in differing ways allowing them to discover the second part of standard K.CC.4b—that the number of objects is the same regardless of their arrangement or the order in which they were counted.

Finally, students develop an understanding that each successive number name refers to a quantity that is one larger and each previous number is one less. As students are developing this understanding, they may have to entirely recount a set when an object is added or removed. It is important that students gain this understanding as it is a conceptual start for the addition strategy of counting on in grade 1.

Level 4:

As students solidify their understanding of cardinality, it is important that they develop the skill of quickly being able to recognize the number of objects in small groups without counting (subitizing). This skill will be very beneficial to students in subsequent grades because it allows them to develop strong number sense strategies such as unitizing, counting on, composing numbers, and decomposing numbers. Additionally, students should be challenged to think about what happens when an object is removed from a set. How does this affect the cardinality? Ultimately the more opportunities students have to work with varying representations of numbers, the more prepared they will be for future work.

Counting and Cardinality (CC)

Standard K.CC.B.6 Cluster Heading: B. Count to tell the number of objects.

Count to answer "how many?" questions about as many as 20 things arranged in a line, a rectangular array, a circle, or as many as 10 things in a scattered configuration. Given a number from 1-20, count out that many objects.

Aspect of Rigor Alignment

Conceptual Understanding	Procedural Skill and Fluency	Application
X	X	

Evidence of Learning Statements

Students with a level 1 understanding of this standard will most likely be able to:	Students with a level 2 understanding of this standard will most likely be able to:	Students with a level 3 understanding of this standard will most likely be able to:	Students with a level 4 understanding of this standard will most likely be able to:
Count to answer "How many?" questions about as many as 10 things when arranged in a line, a rectangular array, and a circle. Given a number 1-10, count out that many objects.	Count to answer "How many?" questions with up to 15 things arranged in a line, a rectangular array, and a circle. Count to answer "How many?" questions with 5 things in a scattered configuration. Given a number 11-15, count out that many objects.	Count to answer "How many?" questions with 11-20 things arranged in a line, a rectangular array, and a circle. Count to answer "How many?" questions with 10 things in a scattered configuration. Given a number from 16-20, count out that many objects.	Given a collection of objects (between 10-20) and an incorrect count of the collection, accurately identify the correct count.

Instructional Focus Statements

Level 3:

One instructional focus for this standard should revolve around extending students' understanding of one-to-one correspondence (K.CC.B.4a) to count out up to twenty objects. As with counting objects, students should continue to pair each word said with one object as they count out the specified number of objects. This is usually facilitated by an indicating act such as moving each object keeping each word said paired with one and only one object. Keeping this in place as students work to count out objects reinforces their learning from standard K.CC.B.4a. Additionally, students should be asked to count out objects in a variety of ways. They should be asked verbally to "Count out 5 cars" and they should also be handed a card with the numeral 5 printed on it and asked, "Count out this number of cars". Give a drawing of countable items, such as stickers, teddy bears or sets of same coins, shapes, and solids,

then ask students to circle a number of items and write the numeral. It is important that students interact with both orally provided and written numerals. As students become confident with the count sequence and one-to-one correspondence, they begin to quickly recognize the cardinalities of small groups without having to count them. This is called *perceptual subitizing*, where students recognize the numbers 1-5 using 5 frames, number cubes, and various arrangements without counting. Perceptual subitizing develops into *conceptual subitizing,* which is the ability to break a larger group of objects into subgroups and quickly combine their cardinalities to find the total for the whole. Repeated use of five frames, ten frames, double ten frames, and Rekenreks allows students to recognize quantities from memory (subitizing) and builds toward more advanced strategies in later grades.

A second instructional focus should emphasize counting objects displayed in several ways to answer "How many?" questions. For the different arrangements exclusively called out in the standard, counting objects arranged in a line is easiest for students as it lessens the propensity to double count an object or skip an object all-together. With more practice, students learn to count objects in more difficult arrangements, such as rectangular arrays, circles, and scattered configurations. Each brings its own challenge for students. With rectangular arrays, students often either fail to count every row or column or they will count a row or column twice. With circular arrangements, students need to stop just before the object they started with causing students to often count objects twice or not count objects right before their starting point. With scattered configurations, students need to make a single path through all of the objects so that they avoid skipping or double counting objects.

Level 4:

As students become comfortable counting out a specified number of objects, instruction should shift so that students are provided sets and an incorrect count of the members. They should be tasked with identifying the mistake and identifying the necessary steps to fix the mistake. This higher level of thinking pushes students to make sense of the problem, strategically use the manipulatives provided, and attend to precision by correcting the error, further deepening their conceptual understanding of the numbers 1-20.

Counting and Cardinality (CC)

Standard K.CC.C.7 Cluster Headings: C. Compare numbers.

Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group.

Aspect of Rigor Alignment

Conceptual Understanding	Procedural Skill and Fluency	Application
X		

Evidence of Learning Statements

Students with a level 1 understanding of this standard will most likely be able to:	Students with a level 2 understanding of this standard will most likely be able to:	Students with a level 3 understanding of this standard will most likely be able to:	Students with a level 4 understanding of this standard will most likely be able to:
Compare two groups to determine which has more or less where counting is not required. Match the number of objects in one group to the same number of objects in another group (up to 5 objects) in order to identify that the number of objects in the two groups are *same as* or *equal*.	Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group (includes groups with up to 5 objects). Students should be able to compare collections that are greater than, less than, and equal to other collections.	Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group (includes groups with 6-10 objects). Students should be able to compare collections that are greater than, less than, and equal to other collections.	Analyze a given collection of objects to create sets that are greater and less than the given set. Students should identity the number of objects in each collection and use comparative language to describe each relationship.

Instructional Focus Statements

Level 3:

This is a conceptual standard and instruction should initially focus on applying and extending students' conceptual understanding of counting and one-to-one correspondence from earlier kindergarten Counting and Cardinality standards to comparing two concrete quantities represented by sets of objects. It is very important that kindergarten students begin developing a strong concept of equality, using the phrases "same as" and "equal to". Instruction then moves to focusing on matching each item in one group with each item in a second group in order to identify which group has an item(s) left over. Have students compare sets of objects that will be the focus of later standards such as sets of the same types of coins, sets of the same solids, and sets of the same shapes. As students work with a wide variety of different objects and groupings*, it is important that they are using the vocabulary "same as", "equal to", "greater than" and "less than"* to describe what they see. It is **not** the expectation that students notate their findings using symbolic representations for inequalities. Students need to be given multiple opportunities to not only describe the relationship that exists between the size of sets *using appropriate*

mathematical vocabulary, but it is also very important that they are asked to justify their thought processes and explain why a set is greater than, less than, or equal to another set.

It is important that students develop multiple strategies when they are comparing the number of objects in sets. Instruction should include strategies such as *matching* the objects where students line up both groups and compare using one-to-one correspondence. *Observation* is a strategy where students see that there are more in one set than another. When using the o*bservation* strategy, it is necessary for students to explain "how" they see that one set is larger than another. Students may use the *take away/fair share* method where each time one person removes an object from one set another person removes an object form the other set. Finally, *compare counts* can also be used when students count the members of both sets and compare the numeric counts.

As students encounter a wider range of groupings, it is important that they develop an understanding that looks can be deceiving. One group of objects that is very spread out may appear to have more members than a very tightly compacted group of objects. It is important for students to experience groupings that visually appear in a wide variety of ways.

Level 4:

As students become more proficient in comparing the number of objects in sets, extend the range of numbers of items students are working with to include the teen numbers. The language of greater than and less than should extend to "how many more?" and "how many less?" questions which begins the foundation for additive thinking (one more than, two more than, one less than etc.). Developing this language and providing a wide range of opportunities helps build a strong foundation for future work with addition and subtraction strategies, particularly adding and subtracting compare situations in grade 1.

Counting and Cardinality (CC)

Standard K.CC.C.8 Cluster Headings: C. Compare numbers.

Compare two given numbers up to 10, when written as numerals, using the terms *greater than, less than*, or *equal to.* (Students need not use comparison symbols here.)

Aspect of Rigor Alignment

Conceptual Understanding	Procedural Skill and Fluency	Application
X		

Evidence of Learning Statements

Students with a level 1 understanding of this standard will most likely be able to:	Students with a level 2 understanding of this standard will most likely be able to:	Students with a level 3 understanding of this standard will most likely be able to:	Students with a level 4 understanding of this standard will most likely be able to:
Match the number of objects in one group to the same number of objects in another group in order to identify that the number of objects in the two groups are equal.	Inconsistently compare two given numbers, when written as numerals, using the terms *greater than, less than,* or *equal to*. Label two sets of concrete materials of up to 10 items with the appropriate given numerals. Use comparison language (*greater than*, *less, than*, or *equal to*) to describe the sets.	Compare two given numbers up to 10, when written as numerals, using the terms *greater than*, *less than*, or *equal to.*	Name a number that is greater than and a number that is less than a given number less than 10. Choose all cards that represent numbers greater than, less than, and equal to a given number up to 10 from a set of 10 cards with the numerals 1-10 printed on the cards.

Instructional Focus Statements

Level 3:

This is the culminating conceptual standard in the Counting and Cardinality domain because it incorporates all the previous mathematical understandings. Students must have a strong conceptual understanding of counting items in a set, recognizing numeral representations, comparing the number of objects in two sets, and associating numbers with the count in each set before they can begin understanding the abstract nature of comparing numbers when they are exclusively presented numerals. Students should have a variety of experiences with concrete and pictorial representations and then make explicit connections to the number name and numerals. As with standard K.CC.C.7, it is imperative that students be given the opportunity to not only verbalize the answer to a comparison question, but also that they are afforded the opportunity to explain their thinking. As students develop their conceptual

understanding of comparing the value of numerals, it is developmentally appropriate for them to build sets of objects and use the strategies mentioned in standard K.CC.C.7 in order to further solidify their understanding. Students need not use comparison symbols.

Level 4:

As with standard K.CC.C.7, students should develop an understanding of ordering, which is a natural application of comparisons. This involves students being able to discern between multiple numbers, which is greater, and placing them in a sequential order. Initially students may need to build sets of objects in order to validate their thinking.

The language of greater than and less than should extend to how many more and how many less questions which begins the foundation for additive thinking (one more than, two more than, one less than etc.). Developing this language and providing a wide range of opportunities helps build a strong foundation for future work with addition and subtraction strategies particularly adding and subtracting *compare situations* in grade 1.

Operations and Algebraic Thinking (OA)

Standard K.OA.A.1 Cluster Heading: A. Represent and solve problems involving addition and subtraction.

Represent addition and subtraction with objects, fingers, drawings, acting out situations, verbal explanations, expressions, or equations.

Aspect of Rigor Alignment

Conceptual Understanding	Procedural Skill and Fluency	Application
X		

Evidence of Learning Statements

Students with a level 1 understanding of this standard will most likely be able to:	Students with a level 2 understanding of this standard will most likely be able to:	Students with a level 3 understanding of this standard will most likely be able to:	Students with a level 4 understanding of this standard will most likely be able to:
Compose or decompose numbers up to 5 using concrete objects and counting.	Represent addition **and** subtraction (within 5) with objects, fingers, drawings, acting out situations, verbal explanations, expressions, **or** equations.	Represent addition **and** subtraction (within 10) with objects, fingers, drawings, acting out situations, verbal explanations, expressions, **or** equations.	Represent and solve expressions using mathematical drawings and equations when given addition expressions (within 10). Justify the solutions. References may be made to the student's mathematical drawings and equations. Represent and solve expressions using mathematical drawings and equations when given subtraction expressions (within 10). Justify the solutions. References may be made to the student's mathematical drawings and equations.

Instructional Focus Statements

Level 3:

The Operations and Algebraic Thinking (OA) standards in kindergarten focus on developing students' strong conceptual understanding of addition and subtraction within 10. Standard K.OA.A.1 focuses on the various concrete and representational tools students should use as they are modeling addition

and subtraction. This standard naturally integrates with the other four OA standards as this standard calls out the modeling techniques that need to be employed and embedded within instruction for the other OA standards. This standard is not intended to be taught in isolation.

As students are developing an understanding of adding and subtracting within 10, they should first work with small numbers (1-5), building to larger numbers across time. Students should be composing and decomposing numbers using both addition and subtraction up to 10 using a wide variety of manipulatives such as fingers, chips, linking cubes, five frames, and 10-frames. Using fingers is not a concern and is developmentally appropriate in kindergarten. Further, when students use drawings in order to explain their thinking, they need not show detail, but their drawings should represent the mathematics in the problem. After students develop a conceptual understanding of the operations of addition and subtraction through direct modeling with concrete objects and representational tools, introduce symbolic representations with expressions and equations.

Students should develop a conceptual understanding of addition as the joining of sets and subtraction as taking items from a set or taking a set apart. Instruction should have some focus on conceptual subitizing. Students need opportunities to experience conceptual subitizing where they see and say the addends and the total (e.g., “two and three make five”) when the student sees an arrangement of five dots. This can be accomplished with Number Talks. Additionally, this standard offers a good opportunity to bring literature into the classroom as there are many appropriate children’s books that focus on adding and subtracting within 10. These can be effective mathematical task starters in the classroom.

Students need opportunities to explain their thinking. Students at this grade should be provided with ample opportunities to both speak about and write about mathematics. It is important to build a student’s vocabulary using appropriate addition and subtraction vocabulary such as join, combine, plus, minus, take apart, subtract, difference, separate, etc. Note that “total” is an appropriate word to use at this level as opposed to “sum” to avoid confusion with the homonym “some.”

Level 4:

Instruction at this level should be focused in a way so that it continues to help students move along the continuum from concrete to representative strategies. This is accomplished by evolving from direct modeling to representing the mathematics with equations and expressions. It is important to note that the focus should continue to be keeping the element of explanation, whether written or spoken.

Operations and Algebraic Thinking (OA)

Standard K.OA.A.2 Cluster Heading: A. Represent and solve problems involving addition and subtraction.

Add and subtract within 10 to solve contextual problems with result/total unknown involving situations of add to, take from, and put together/take apart. Use objects, drawings, or equations to represent the problem.

Aspect of Rigor Alignment

Conceptual Understanding	Procedural Skill and Fluency	Application
X		X

Evidence of Learning Statements

Students with a level 1 understanding of this standard will most likely be able to:	Students with a level 2 understanding of this standard will most likely be able to:	Students with a level 3 understanding of this standard will most likely be able to:	Students with a level 4 understanding of this standard will most likely be able to:
Add or subtract **within 5** to solve one-step contextual problems with result/total unknown, using one of the situations of *add to-result unknown, take-from-result unknown, and put together/take apart-total unknown.* Use concrete objects or mathematical drawings to represent the problem.	Add or subtract **within 10** to solve one-step contextual problems with result/total unknown, using two of the situations of *add to-result unknown, take-from-result unknown, put together/take apart-total unknown, and put together/take apart-addend unknown.* Use concrete objects or mathematical drawings to represent the problem.	Add or subtract **within 10** to solve one-step contextual problems with result/total unknown, using four of the situations of *add to-result unknown, take-from-result unknown, put together/take apart-total unknown, and put together/take apart-addend unknown.* Use concrete objects or mathematical drawings to represent the problem.	Create addition and subtraction **within 10** one-step contextual problems with result/total unknown, using four different situations of *add to-result unknown, take-from-result unknown, put together/take apart-total unknown,* and *put together/take apart-addend unknown.* Use concrete objects or mathematical drawings to represent the problem.

Instructional Focus Statements

Level 3:

While standard K.OA.A.1 focuses on solidifying an understanding of how to model addition and subtraction while also developing a conceptual understanding of the meaning behind the operations of addition and subtraction, standard K.OA.A.2 focuses on students being able to identify addition and subtraction embedded in contextual problems. Students should still be employing the direct modeling techniques that were introduced in standard K.OA.A.1 to solve the problem once the mathematics is extracted from contextual problems. It is developmentally appropriate to read contextual problems to students as the focus of this standard is for students to be able to solve contextual problems not on their ability to read the problem in the first place.

Students should experience problems embedded in a variety of problem-solving situations. Focus should be placed on the following situations: *add to-result unknown, take-from-result unknown, put together/take apart-total unknown, and put together/take apart-addend unknown*. The table for common addition and subtraction situations is located within the Tennessee Mathematics Standards document. While certain situations are designated within the standards to be mastered by the end of kindergarten, these are not the only situations to which students should be exposed.

It is important to note that teaching key words does not help students develop an understanding of these situations. Students can relate their actions to whether the situation calls for addition or subtraction by using concrete models and drawing pictures.

Level 4:

As students deepen their understanding of problem-solving situations, they should continue to experience varying situations with increasing rigor over time. Eventually, students should be challenged to create one-step addition and subtraction problems that arise from different types of situations. Students should continue to employ drawings, diagrams, and even use manipulatives alongside equations as they continue developing their understanding of problem-solving situations.

Operations and Algebraic Thinking (OA)

Standard K.OA.A.3 Cluster Heading: A. Represent and solve problems involving addition and subtraction.

Decompose numbers less than or equal to 10 into addend pairs in more than one way (*e.g., 5 = 2 + 3 and 5 = 4 + 1*) by using objects or drawings. Record each decomposition using a drawing or writing an equation.

Aspect of Rigor Alignment

Conceptual Understanding	Procedural Skill and Fluency	Application
X		

Evidence of Learning Statements

Students with a level 1 understanding of this standard will most likely be able to:	Students with a level 2 understanding of this standard will most likely be able to:	Students with a level 3 understanding of this standard will most likely be able to:	Students with a level 4 understanding of this standard will most likely be able to:
Decompose a number less than or equal to 5 into **1** addend pair (e.g., 5 = 1 + 4) by using objects or drawings.	Decompose a number less than or equal to 10 into addend pairs in at least **2** ways (e.g., 10 = 0 + 10, 10 = 1 + 9) by using objects or drawings or writing an equation.	Decompose a number less than or equal to 10 into addend pairs in at least **5** ways (e.g., 5 = 2 + 3, 5 = 3 + 2, 5 = 4 + 1, 5 = 1 + 4, 5 = 0 + 5, or 5 = 5 + 0) by using objects or drawings or writing an equation.	Decompose a number between 6 and 10 into addend pairs in at least **7** ways by using objects or drawings and record each decomposition with an equation or expression.

Instructional Focus Statements

Level 3:

Developing a conceptual understanding that numbers can be put together and taken apart in different ways is foundational for future mathematics work. Students need the opportunity to take apart numbers using a wide variety of direct modeling techniques utilizing 5 frames, 10 frames, linking cubes, two-colored counters, etc. Additionally, students need opportunities to explain their thinking and discuss any patterns that they see when working within 10. Students can find patterns in all of the decompositions of a given number and eventually summarize these patterns for several numbers.

This standard helps students develop their ability to think flexibly with numbers. Students should be looking for and making use of structure (MP 7) while looking for and expressing regularity in repeated reasoning (MP 8) as they decompose numbers.

As students decompose a given number to find all of the partners that compose the number, each decomposition can be recorded with an equation such as 5 = 4+1 by either the teacher or the student. By showing the total on the left and the two addends on the right, this reinforces the concept of 5 being decomposed into say, 4 and 1 while also allowing students to understand equations as equal quantities on both sides of the equality symbol.

This standard helps support standard K.OA.A.2, particularly when students are working with the following situations: *put together/take apart* and *both addends unknown*. This problem situation plays an important role in kindergarten as it allows students a contextual situation in which to explore various compositions that make each number. Additional connections exist between this standard and standard K.NBT.A.1 where students focus on composing and decomposing the teen numbers.

Level 4:

Instruction at this level should focus on students independently, symbolically representing decomposition with equations. Students develop an understanding that decomposing 8 into a 5 and 3 can be represented by the equation 8=5 + 3. At this level, the equations need to mirror the mathematics as this helps students build a conceptual understanding of the connection that exists between the numbers, their models, and the mathematical equation.

Ultimately students should be looking for and expressing regularity in repeated reasoning (MP 8) so that they develop a systematic way to list all of the decompositions of any number up to 19 when this standard is paired with standard K.NBT.A.1.

Operations and Algebraic Thinking (OA)

Standard K.OA.A.4 Cluster Heading: A. Represent and solve problems involving addition and subtraction.

Find the number that makes 10, when added to any given number, from 1 to 9 using objects or drawings. Record the answer using a drawing or writing an equation.

Aspect of Rigor Alignment

Conceptual Understanding	Procedural Skill and Fluency	Application
X		

Evidence of Learning Statements

Students with a level 1 understanding of this standard will most likely be able to:	Students with a level 2 understanding of this standard will most likely be able to:	Students with a level 3 understanding of this standard will most likely be able to:	Students with a level 4 understanding of this standard will most likely be able to:
Begin counting because students are emergent counters at this level. When given a set of less than 5 objects, the student begins counting the objects.	Find the number that makes 5, when added to any given number from 1 to 4 using concrete objects, drawings, or writing an equation or expression.	Find the number that makes 10, when added to any given number from 1 to 9 using concrete objects, drawings, or writing an equation or expression. Demonstrate understanding with at least two numbers, one number should be 1- 4 and one number should be 5 - 9.	Find the number that makes 10, when added to any given number from 1 to 9 using concrete objects, drawings, and writing an equation or expression. Demonstrate understanding with at least two numbers, one number should be 1 - 4 and one number should be 5 - 9. Students write an equation for each that shows these two numbers equal a total of 10.

Instructional Focus Statements

Level 3:

Ten is one of the most important numbers in our number system. This standard is building upon the progression of learning begun in the other OA standards. Students experience decomposing 10 in a variety of ways (K.OA.A.3), recognizing number pairs that add to 10 (K.OA.A.2), and now they will be extending their conceptual understanding by being given any number less than 10 and then identifying the other part of the pair so that the sum of the two numbers is 10. Instruction should allow for students to continue utilizing direct modeling with ten frames, linking cubes, two colored counters, Rekenreks, etc. This will be a crucial foundational understanding when students begin using additional addition strategies such as compensation in

subsequent grades. It is important to note that the focus for this standard is on identifying the number that makes 10 more so than a student being able to correctly write an equation or expression.

This standard supports the thinking students will need when working with *put together/take apart addend unknown* problem situations in standard K.OA.A.2.

As with many of the other kindergarten standards, this standard offers a good opportunity to bring literature into the classroom as there are many appropriate children's books that can give context to problems. These can be useful mathematical task starters in the classroom.

Level 4:

Instruction at this level should be focused in a way so that it continues to help students move along the continuum from concrete to representative strategies. This is accomplished by evolving from direct modeling to representing the mathematics with equations and expressions. It is important to note that the focus should continue to be keeping the element of explanation, whether written or spoken. Instruction can also focus on having students create their own addend unknown put together/take apart problem with a sum of ten to further demonstrate their understanding of this standard.

Operations and Algebraic Thinking (OA)

Standard K.OA.A.5 Cluster Heading: A. Represent and solve problems involving addition and subtraction.

Use mental strategies flexibly to develop fluency in addition and subtraction within 10.

Aspect of Rigor Alignment

Conceptual Understanding	Procedural Skill and Fluency	Application
	X	

Evidence of Learning Statements

Students with a level 1 understanding of this standard will most likely be able to:	Students with a level 2 understanding of this standard will most likely be able to:	Students with a level 3 understanding of this standard will most likely be able to:	Students with a level 4 understanding of this standard will most likely be able to:
Add and subtract within 5 using concrete objects.	Add and subtract within 10 using mathematical drawings.	Fluently add and subtract within 10 using mental strategies.	Fluently add and subtract within 10 using mental strategies and explain why the chosen strategies work.

Instructional Focus Statements

Level 3:

As stated in the introduction of the Tennessee Mathematics Standards, fluency is the ability to apply procedures accurately, efficiently, and flexibly. By the end of kindergarten, students will be expected to fluently add and subtract within 10 using mental strategies. By the end of grade 1, students will be expected to fluently add and subtract within 20 using mental strategies and know from memory all sums up to 10. By the end of grade 2, students will be expected to extend this understanding to fluently add and subtract within 30 using mental strategies.

Building fluency that is based on mental strategies is a process. Students begin by developing a conceptual understanding of the operations of addition and subtraction through direct modeling. In kindergarten, students are building conceptual understanding as they are working with standards K.OA.A.1, K.OA.A.2, K.OA.A.3, and K.OA.A.4. Additionally, within these standards, they are working on developing a mathematical understanding that numbers can be composed and decomposed in a wide variety of ways. Before they reach fluency with mental strategies, students must be given the opportunity to interact with direct modeling in order to have the mathematical foundation needed to move along the continuum towards reaching fluency. This process takes time. Students should be exposed to various strategies and then choose the one that is most efficient and makes the most sense to them. It is important to note that timed tests do not build fluency in students. Exposure to flexible thinking, explaining their thoughts, and appropriate scaffolding over time do. It is also important to note that the kindergarten requirement is not for students to know sums or differences from memory. There is a difference between employing mental strategies and knowing sums from memory.

As students become more fluent with adding and subtracting numbers within 10, they should start to produce answers without recording their thinking and explaining their mental thought process. Additionally, students should have many opportunities to practice, explain their thinking, and compare and make connections with multiple strategies. Number Talks, written explanations, and selecting the strategy that makes the most sense to them will allow students to develop conceptual understanding so that they become fluent with adding and subtracting within 10 over time.

Level 4:

As students develop a wider range of mental strategies that they are comfortable with and can explain, they should be able to explain the connections that exist between multiple strategies. It is imperative that as students transition to using mental strategies that they are asked questions that press for the underlying mathematics and that students provide an explanation of their thinking using precise mathematical vocabulary.

Numbers and Operations in Base Ten (NBT)

Standard K.NBT.A.1 Cluster Heading: A. Work with numbers 11-19 to gain foundations for place value.

Compose and decompose numbers from 11 to 19 into a group of ten ones and some more ones by using objects or drawings (*e.g., 18 equals 10 + 8*). Record the composition or decomposition using a drawing or by writing an equation.

Aspect of Rigor Alignment

Conceptual Understanding	Procedural Skill and Fluency	Application
X		

Evidence of Learning Statements

Students with a level 1 understanding of this standard will most likely be able to:	Students with a level 2 understanding of this standard will most likely be able to:	Students with a level 3 understanding of this standard will most likely be able to:	Students with a level 4 understanding of this standard will most likely be able to:
Represent a given number less than 10 with concrete objects and drawings.	Represent a given number from eleven to nineteen using concrete objects. Record the composition using a drawing.	Take a given number from eleven to nineteen and compose the number from a ten and some more ones using objects. Record the composition using a drawing or an equation. Take a given number from eleven to nineteen and decompose the number into a ten and some more ones using objects. Record the decomposition using a drawing or an equation. Model written equations of teen numbers composed (10 + 4 = 14) and decomposed (14 = 10 + 4) and connect the equation to a model or drawing.	Take a given number between eleven and nineteen and represent the number in 3 different ways (as ones, as a ten and some ones, and as an equation) that demonstrates a student's understanding of composing and decomposing the number into a ten and some ones.

TN Department of Education

Instructional Focus Statements

Level 3:

Throughout the early grades, it is imperative that students develop a deep, conceptual understanding of the base ten number system. Instruction in kindergarten should focus on laying this foundation by drawing special attention to 10 and the teen numbers. Students are learning to view the whole numbers 11-19 as a ten and some more ones. The idea of ten as a unit will not be introduced until Grade 1. Teen numbers, in general, are particularly difficult for kindergarten students as the words for teen numbers do not make their base-ten meanings evident. For example, “eleven” and “twelve” do not sound like “ten and one” and “ten and two” while “thirteen, fourteen, fifteen, . . . , nineteen” reverse the order of the ones and tens digits by saying the ones digit first. Also, “teen” must be interpreted as meaning “ten” and the prefixes “thir” and “fif” do not clearly say “three” and “five.”

It is important to note that students in grades K-2 struggle with the base ten rod, not understanding that the segments represent 10 ones. Research suggests using objects that can be physically bundled and unbundled (beans/cups, craft sticks, coffee stirrers, and/or linking cubes) to compose and decompose tens. Other helpful tools include double 10 frames, Rekenreks, and number bonds. Layered place value cards can help children see the 0 “hiding” under the ones place and that the 1 in the tens place really is 10 (ten ones). Students should be writing equations and instruction should focus on connecting the objects (concrete), drawings (representations), and equations (abstract) to each other. By working with teen numbers in this way in kindergarten, students gain a foundation for viewing 10 ones as a new unit called a ten in grade 1.

Additionally, it is important that students are both composing and decomposing the teen numbers. While it seems they are virtually identical, the thought process for students is reversed. Composing is the act of building a number while decomposing is the act of breaking a number apart. The beginning and ending parts of the process are reversed. Composing will be foundational with addition while decomposing is foundational to understanding subtraction.

Level 4:

Students should be making connections between the various models and representations. For example, a student should be able to show the “10” in 15 that has been represented with a Rekenrek, number bond, and with place value cards and explain how the models are similar and how the models are different. Additionally, they may prefer one over the other and the student should be able to explain why.

Measurement and Data (MD)

Standard K.MD.A.1 Cluster Heading: A. Describe and compare measurable attributes.

Describe the measurable attributes of an object, such as length (long/short), height (tall/short), or weight (heavy/light).

Aspect of Rigor Alignment

Conceptual Understanding	Procedural Skill and Fluency	Application
X		

Evidence of Learning Statements

Students with a level 1 understanding of this standard will most likely be able to:	Students with a level 2 understanding of this standard will most likely be able to:	Students with a level 3 understanding of this standard will most likely be able to:	Students with a level 4 understanding of this standard will most likely be able to:
Describe an object without measurable attributes.	Describe one measurable attribute of an object.	Describe more than one measurable attribute of a single object such as: length, height, and weight.	Describe how two or more objects are the same and different using common measurable attributes of length, height, or weight.

Instructional Focus Statements

Level 3:

Kindergarten students are typically able to describe non-measurable attributes of objects such as describing the object by its color, number of sides, or that it is hard or soft. They may also be able to describe objects as small, big, tall, or short. The instructional focus of this standard should be to help students develop an understanding of which of these attributes are measurable and then progress to where students can generate a list of measurable attributes for an object using precise mathematical vocabulary. Students need to be given multiple opportunities to identify and describe the measurable attributes of length, height, and weight of objects. For example, kindergarteners should be supported to understand that height is the distance from the lowest point to the highest point of an object and that length is the distance from one point to another when objects are laid end to end. They will also need experiences with heavy and light objects to discuss the attribute of weight. Attention should be paid to precise vocabulary such as: length, weight, heavy, light, long, big, small, tall, short, etc. Standard K.MD.A.1 lays the foundation for comparing objects in standard K.MD.A.2.

Level 4:

Once students have mastered describing the measurable attributes of two or more objects, the next step is to describe how the attributes of two or more shapes are the same or different using descriptive language. These foundational experiences help students develop an understanding of comparative language, such as longer than/shorter than/equal to, and aligns with standard K.MD.A.2

Measurement and Data (MD)

Standard K.MD.A.2 Cluster Heading: A. Describe and compare measurable attributes.

Directly compare two objects with a measurable attribute in common, to describe which object has more of/less of the attribute. For example, directly compare the heights of two children and describe one child as taller/shorter.

Aspect of Rigor Alignment

Conceptual Understanding	Procedural Skill and Fluency	Application
X		X

Evidence of Learning Statements

Students with a level 1 understanding of this standard will most likely be able to:	Students with a level 2 understanding of this standard will most likely be able to:	Students with a level 3 understanding of this standard will most likely be able to:	Students with a level 4 understanding of this standard will most likely be able to:
Understand that objects have measurable attributes.	Identify which of two given objects is longer/shorter, taller/shorter, or heavier/lighter, etc. with prompting from the teacher.	Directly compare two objects (without measurement) using a common measurable attribute. Compare two objects using common measurable attributes and restate the comparison using "opposite" vocabulary.	Directly compare more than two objects (without measurement) using a common measurable attribute. Compare several items to a single item, all with a common measurable attribute. Determine which objects have more or less of the common attribute.

Instructional Focus Statements

Level 3:

Students previous work with K.MD.A.1 developed the concept of measurable attributes. Instruction for K.MD.A.2 extends that understanding to directly comparing two objects with a common measurable attribute. The type of rigor in this standard is *conceptual understanding.* It is important to note that the focus in kindergarten is not on actually measuring the attributes but comparing concrete objects through sight and touch.

When comparing the attributes of length or height, kindergarten students will need multiple hands-on experiences to discover the importance of lining up the ends of objects in order to have an accurate measurement comparison. Students may initially struggle with *conservation of measure* (the quantity of an attribute does not change when moved). For example, when a red block and a blue block of the same length are lying side by side so their edges line up evenly, students may be able to state that the blue block is longer than the red block. When the red block is moved to extend past the blue block, a student

may think that the red block is now longer. Students should be actively engaged in comparing two objects to determine which object has more than/less than a particular attribute, describing the difference using precise vocabulary. It is important that students participate in conversations when comparing two objects and justify their thinking (MP 3). These discourse conversations will help students make sense of the concept and develop precise measurement comparison vocabulary.

Students at this level should be given opportunities to describe a comparison in more than one way. Students understand that if the book is heavier than the pencil, then the pencil is lighter than the book. Instruction should avoid using vague phrases such as “bigger than” and use more specific language that references a particular attribute such as "longer than" and "heavier than."

Level 4:

Students can also compare using an object as a benchmark. For example, a student can state that the crayon box is about the same length as the scissors, and the tissue box is longer than the scissors, therefore the tissue box is also longer than the crayon box. Additionally, students can be challenged to compare common attributes of more than two objects. Instruction could integrate this standard with standard K.MD.C.4 having students sort a group of objects to show a group of all blocks longer than a given block and all blocks shorter than a given block.

Measurement and Data (MD)

Standard K.MD.B.3 Cluster Heading: B. Work with money

Identify the penny, nickel, dime, and quarter based on their attributes (size and color) and recognize the value of each.

Aspect of Rigor Alignment

Conceptual Understanding	Procedural Skill and Fluency	Application
X		

Evidence of Learning Statements

Students with a level 1 understanding of this standard will most likely be able to:	Students with a level 2 understanding of this standard will most likely be able to:	Students with a level 3 understanding of this standard will most likely be able to:	Students with a level 4 understanding of this standard will most likely be able to:
Analyze a given set of objects containing both coins and counters to identify which objects represent coins and which objects do not represent coins. Students may not be able to distinguish one coin type from another coin type. Inconsistently name pennies, nickels, dimes, or quarters.	Name at least two types of coins (pennies, nickels, dimes, and quarters) based on the attributes of size and color. Inconsistently identify the value of pennies, nickels, dimes, and quarters; not necessarily associating the value to the physical representation of the coin.	Name the penny, nickel, dime and quarter based on the attributes of size and color and recognize the value of each.	Compare and contrast the attributes of a penny, nickel, dime and quarter. Compare the values of a penny, nickel, and dime.

Instructional Focus Statements

Level 3:

Students learn the names of coins the same way that they learn the names of any physical object in their daily environment through exposure and repetition. In order to recognize coins and their value, students need to be given multiple opportunities to see and touch real coins. For coin values to make sense, students must have a solid understanding of the quantities 5, 10, and 25 without needing to count out those amounts. Students should be able to match a name and a value to the head and tail of each coin and be able to relate the value of each coin to one cent. For example, a student should be able to identify a dime and verbalize that its value is 10¢ which is equal to 10 pennies.

Students should discuss the people on the coins and be able to describe the attributes of each coin: color, size, and value. Instruction for this standard integrates nicely with K.MD.C.4 as students should be able to sort coins based on their attributes of size, color, or value.

Students should recognize that there are multiple versions of each coin, but each variation maintains the same name and value. For example, older pennies have the Lincoln Memorial on the back while newer ones feature the Union Shield.

Money is a non-proportional model (i.e., the dime is not physically ten times larger than the penny). Students may have a misconception that the value of a dime is less than a nickel because of the size of the coins. While students identify coins and their value, the ability to count money is not an expectation at the kindergarten level.

Level 4:

Instruction at this level should include opportunities for students to compare and contrast coins. Given two coins, students should be able to compare/contrast them using attributes such as color, the metal the coin is comprised of, the relative size of the coins, the texture of the edge of the coins, and which US president is represented on the coins. Students should also be able to compare the values of pennies, nickels, and dimes. When comparing value, consider pulling in standard K.CC.C.7, comparing two numbers up through 10. It is important that precise mathematical vocabulary be used when comparing the value of coins. Teachers and students should use language that emphasizes value ("the value of a dime is more than the value of a penny") as opposed to names ("a dime is more than a penny"). Students may naturally inquire about the value of a quarter. Since comparing twenty-five exceeds the expectation for kindergarten, students will need to compare the value of a quarter representing the amounts with pennies (a quarter, 25 pennies, is greater than a dime, 10 pennies). This visual will help students solidify the conceptual understanding that the value of the quarter is greater than the value of the other coins.

Measurement and Data (MD)

Standard K.MD.C.4 Cluster Heading: C. Classify objects and count the number of objects in each category.

Sort a collection of objects into a given category, with 10 or fewer in each category. Compare the categories by group size.

Aspect of Rigor Alignment

Conceptual Understanding	Procedural Skill and Fluency	Application
X		

Evidence of Learning Statements

Students with a level 1 understanding of this standard will most likely be able to:	Students with a level 2 understanding of this standard will most likely be able to:	Students with a level 3 understanding of this standard will most likely be able to:	Students with a level 4 understanding of this standard will most likely be able to:
Sort a collection of objects into a given category, with 5 or fewer objects in each sub-category when there are no more than 2 sub-categories represented.	Sort a collection of objects into a given category, with 10 or fewer objects in each sub-category when there are no more than 3 sub-categories represented.	Sort a collection of objects into a given category, with 10 or fewer objects in each sub-category and compare the sub-categories by group size.	Identify how to sort a collection of objects without being given the category to use for sorting, sort the collection into the appropriate sub-categories, use descriptive words to explain the sub-categories in which their collection has been sorted, and justify the attributes that led them to sort the collection in that way. Sort a single collection of objects in multiple ways without being provided any categories for sorting the collection.

Instructional Focus Statements

Level 3:

Instruction should focus on helping students understand what it means to sort a group of objects into smaller groups based on a single pre-determined attribute. Students should be provided experiences where they classify objects using a wide variety of given categories as this lays the foundation for data collection in future grades. For example, given a set of objects that can be sorted by a teacher-identified category such as color, students identify similarities and differences between objects and use the identified similarities and differences to sort the collection of objects into sub-categories

(specific colors) determined by the student. Once the objects are sorted, students should be able to count the number of objects in each set and compare the size of the sets by using precise mathematical language such as least, same, most, more, and fewer. Objects can be sorted into groups using five frames or ten frames to help visualize this comparison. Initially, students may need a group of objects with a limited number of sub-categories represented (e.g., only two colors represented). It is also important to note that standard K.CC.C.7 requires students to compare two given numbers up to ten. Thus, students should be asked to compare two sub-categories at a time. Students should be using varied materials such as pattern blocks, attribute blocks, button collections, shoes, colored blocks, bear counters, and even the students themselves. Additionally, this standard integrates very nicely with other kindergarten standards such as standards K.MD.B.3 (identifying money) and K.G.A.3 (identifying shapes and solids).

Level 4:

Instruction at this level should focus on students evaluating the attributes represented by a set of objects and self-determining the category they will use to sort the group into sub-categories and justifying the category chosen (MP 3). Students should be challenged to sort the same group of objects in more than one way (e.g., first by shape and then by color). Students should continue to compare the sizes of the sub-categories.

Geometry (G)

Standard K.G.A.1 Cluster Heading: A. Identify and describe shapes and solids.

Describe objects in the environment using names of shapes and solids (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres). Describe the relative positions of these objects using terms such as *above*, *below*, *beside*, *in front of*, *behind*, *between*, and *next to*.

Aspect of Rigor Alignment

Conceptual Understanding	Procedural Skill and Fluency	Application
X		

Evidence of Learning Statements

Students with a level 1 understanding of this standard will most likely be able to:	Students with a level 2 understanding of this standard will most likely be able to:	Students with a level 3 understanding of this standard will most likely be able to:	Students with a level 4 understanding of this standard will most likely be able to:
Identify shapes and solids in their environment using informal names such as: balls, boxes, cans, etc. or when asked to name a shape the student states an attribute such as round for a circle. Use the relative position of provided objects in the environment to locate an object but not necessarily independently use a positional word to describe the position of objects.	Describe common and easy to recognize shapes and solids in the environment (e.g., circles and cones). Describe the relative position of shapes and solids in the environment using some of the following terms*: above*, *below, beside*, *in front of*, *behind*, *between* and *next t*o. Students may display an inconsistent understanding of the terms.	Describe shapes and solids (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres) in the environment. Describe the relative position of shapes and solids in the environment using terms such as *above*, *below*, *beside*, *in front of*, *behind*, *between* and *next to*.	Describe shapes and solids in the environment that are made up of multiple shapes and solids and use the correct names. Construct shapes and solids that resemble objects in the environment using manipulatives of multiple different shapes and solids. Describe the relative position of shapes and solids in the environment using multiple positional terms.

Instructional Focus Statements

Level 3:

The study of geometry in kindergarten offers students an ideal, tangible way to interact with their environment by observing shapes in the world around them. The kindergarten geometry standards are progressive in nature in that students will need to understand this standard before they move through the remaining five. Ultimately, the first part of this standard is about helping students develop the appropriate vocabulary for connecting shape and solid

names to objects. Students should be encouraged to look for two-dimensional shapes and three-dimensional solids within their environments. Instruction should also provide opportunities for students to work with manipulatives such as pattern blocks, attribute blocks, Geo blocks, and geometric solids. As students begin developing their academic vocabulary, they should be encouraged to use their own words to describe shapes, associate them with familiar objects, and then learn the formal names of shapes and solids. Teachers should model vocabulary with numerous examples and encourage students to use correct geometric terms over time to develop correct understanding of the properties of shapes and solids and avoid misconceptions. Instruction should focus on the attributes that make shapes unique. For example, confirming that a rectangle and square both have four sides while avoiding the misconception that a square is not a rectangle.

Work with geometric shapes and solids provides students opportunities to use positional words, such as: *above*, *below*, *beside*, etc. to describe objects in the environment, developing their spatial reasoning abilities. Kindergarten students need numerous experiences identifying the location and position of actual two and three-dimensional objects in their environment prior to describing location and position of two and three-dimension representations on paper. Students should also have numerous opportunities to talk to the teacher and each other to make sense of what they are learning. This is an ideal opportunity to integrate literature into the mathematics classroom as there are many books that focus on both shapes in the environment and developing an understanding of positional words.

Level 4:

As students solidify their understanding of simple shapes and solids, they can be challenged to look for complex shapes in their environment and deconstruct the complex objects they find into simple shapes and solids. Additionally, they can be challenged to create objects in their everyday environment by combining shapes. For example, a student might build a house from several rectangles, triangles, and squares. Students should then be asked to name the various shapes represented in their construction. This will help build a foundation for students as they progress to naming shapes regardless of their position or size and modeling shapes in the world. As students grasp a wide variety of positional words, they should be challenged to describe relative positions using multiple positional terms.

Geometry (G)

Standard K.G.A.2 Cluster Heading: A. Identify and describe shapes and solids.

Correctly name shapes and solids (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres) regardless of their orientations or overall size.

Aspect of Rigor Alignment

Conceptual Understanding	Procedural Skill and Fluency	Application
X	X	

Evidence of Learning Statements

Students with a level 1 understanding of this standard will most likely be able to:	Students with a level 2 understanding of this standard will most likely be able to:	Students with a level 3 understanding of this standard will most likely be able to:	Students with a level 4 understanding of this standard will most likely be able to:
Correctly name some 2-dimensional shapes.	Correctly name common 2-dimensional and 3-dimensional shapes. Inconsistently name shapes that are a non-typical size or non-typical orientation (e.g., Not recognize a triangle that is turned upside down as a triangle).	Correctly name shapes and solids (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres) regardless of their orientation or overall size.	Analyze a given 3-dimensional shape to identify 2-dimensional shapes that make up the 3-dimensional shape.

Instructional Focus Statements

Level 3:

This standard builds on the conceptual standard K.G.A.1 where students find and identify shapes and solids in their environment and solidify their understanding that a shape can have different orientations and sizes. Standard K.G.A.2 continues to build conceptual understanding and moves students towards procedural fluency in identifying shapes and solids. Students should have experienced working with geometric terms for shapes and solids (e.g., circle, square, rectangle, triangle, hexagon, cube, cone, cylinder and spheres) as they interacted with standard K.G.A.1. It is important to note that building vocabulary involves much more than seeing a few examples and memorizing names.

Instruction needs to provide a wide variety of opportunities for students to work with shapes and solids in many different orientations and sizes. Students should use manipulatives (pattern blocks, attribute blocks, Power Polygons, Geoblocks, and geometric blocks) to explore shapes and solids and discover that orientation does not change the classification of the shape. One very common misconception is thinking that orientation matters

(e.g., students may believe that a tilted square is no longer a square but a diamond). Students should also work with a wide variety of representations of shapes and solids. For example, they should see rectangles that are more square in shape as well as rectangles that are long and skinny. Instruction that focuses on a wide variety of representations will help students develop a conceptual understanding of the unique attributes of each shape and solid. Teachers should model vocabulary with numerous examples and encourage students to use correct geometric terms over time to develop correct understanding of the properties of shapes and solids and avoid misconceptions. Instruction should focus on the attributes that make shapes unique. For example, confirming that a rectangle and square both have four sides while avoiding the misconception that a square is not a rectangle.

Instruction for this standard integrates well with standard K.MD.C.4 where students sort collections of objects. Sorting activities help students see relationships between different representations of the same shape and solid. Teachers could ask, "What is your sorting rule?" or, "Why did you not include these shapes in the group?" to give students opportunities to discuss geometric principles and attributes. Students could create shapes and solids with sticks or straws and marshmallows and discuss the attributes of their creations. Students should also be given the opportunity to think about non-examples of shapes and solids (e.g., they may be asked to sort a set of shapes identifying what is a triangle and what is not a triangle).

Level 4:

As students demonstrate a deep understanding of naming shapes in various sizes and orientations, they can be challenged to look at three-dimensional shapes and identify the two-dimensional shapes that compose it. For example, they may look at a rectangular prism and notice that it is made up of six shapes: four rectangles and two squares. They may further notice that all four rectangles are the same size and shape. Students may also be challenged to explain the attributes of various shapes and defend their classifications. This may lead to students' beginning to generalize attributes that all varieties of a particular shape have in common. For example, they may begin to generalize that all rectangles have four sides.

Geometry (G)

Standard K.G.A.3 Cluster Heading: A. Identify and describe shapes and solids.

Identify shapes (squares, circles, triangles, rectangles, and hexagons) as two-dimensional and solids (cubes, cones, cylinders, and spheres) as three-dimensional.

Aspect of Rigor Alignment

Conceptual Understanding	Procedural Skill and Fluency	Application
X		

Evidence of Learning Statements

Students with a level 1 understanding of this standard will most likely be able to:	Students with a level 2 understanding of this standard will most likely be able to:	Students with a level 3 understanding of this standard will most likely be able to:	Students with a level 4 understanding of this standard will most likely be able to:
Use a given two-dimensional shape to choose other shapes that are also two-dimensional. Use a given three-dimensional solid to choose other solids that are also three-dimensional.	Inconsistently identify shapes as two-dimensional or three-dimensional (e.g., students may call a sphere two-dimensional because they see it as "circle-like").	Identify shapes as two-dimensional (squares, circles, triangles, and hexagons) and solids as three-dimensional (cubes, cones, cylinders, and spheres). Explain what attributes make a shape two-dimensional (length and width) as opposed to a three-dimensional solid (length, width, and height) and vice-versa.	Describe the similarities and differences between a two-dimensional shape and its related three-dimensional solid (i.e., students can compare and contrast a square and a cube).

Instructional Focus Statements

Level 3:

Instruction for this conceptual standard should focus on deepening the understanding of shapes and solids developed in standards K.G.A.1 and K.G.A.2 to further classify shapes as two-dimensional or three-dimensional. Students will need many opportunities to explore, touch, and discuss the characteristics of a wide variety of shapes and solids to develop a conceptual understanding of the unique differences between the two classifications. Kindergartners often struggle with identifying three-dimensional solids from pictures, even when shaded. Providing students with a physical example of the solid along with the picture can help students make connections between the representations. Students should be given multiple

opportunities to touch and manipulate geometric blocks, Power Polygons, and solids from their everyday experiences (boxes, sticks of glue, ice cream cones, balls, Pringles cans, etc.).

Teachers need to model precise vocabulary and require students to use precise vocabulary as they discuss the classifications. An additional focus of instruction includes having students provide justification for an assigned shape classification. They begin to explain that a two-dimensional shape is flat and has two measurable attributes (length and width) while a three-dimensional object is not flat (it is a solid object/shape) and has three measurable attributes (length, width, and height). To integrate instruction for this standard with standard K.MD.C.4, have students sort a given collection of two-dimensional shapes and three-dimensional solids by the number of dimensions.

Level 4:

Instruction for this level focuses on the similarities and differences of a two-dimensional shape, such as a square, and its related three-dimensional solid, a cube. Students should describe the square as being flat (two-dimensional) and the cube as solid (three-dimensional) having 6 square faces. As precise academic vocabulary is modeled, students will begin to describe geometric shapes with precise mathematical vocabulary.

TN Department of Education

Geometry (G)

Standard K.G.B.4 Cluster Heading: B. Analyze, compare, create, and compose shapes.

Describe similarities and differences between two- and three-dimensional shapes/solids, in different sizes and orientations.

Aspect of Rigor Alignment

Conceptual Understanding	Procedural Skill and Fluency	Application
X		

Evidence of Learning Statements

Students with a level 1 understanding of this standard will most likely be able to:	Students with a level 2 understanding of this standard will most likely be able to:	Students with a level 3 understanding of this standard will most likely be able to:	Students with a level 4 understanding of this standard will most likely be able to:
Choose examples when given the name of a common two-dimensional shape or three-dimensional solid. Informally tell if 2 two-dimensional shapes are different or the same (e.g., a circle is different from a square).	Name characteristics that all types of a specific two-dimensional shape have in common (e.g., all squares have 4 sides). Name characteristics that all types of a specific three-dimensional solid have in common (e.g., all cubes are made up of squares).	Use informal language to describe similarities, differences, and/or parts (e.g., faces/"number of sides" and vertices/"corners") and other attributes (e.g., having sides of equal length) of two-dimensional shapes and three-dimensional solids. Describe similarities and differences between 2 two-dimensional shapes that are the same type but may be different in size or orientation (e.g., "How are 2 rectangles the same and how are they different considering that they may be different in size or orientation?"). Describe similarities and differences between 2 two-dimensional shapes that are different types (e.g., "How are a square and a	Describe and sort related two-dimensional shapes and three-dimensional solids by similarities and differences using informal language (e.g. number of sides, vertices or "corners", and/or having sides of equal length). Draw two-dimensional triangles, rectangles, squares, hexagons, and circles and build three-dimensional cubes, cones, spheres, and cylinders.

Students with a level 1 understanding of this standard will most likely be able to:	Students with a level 2 understanding of this standard will most likely be able to:	Students with a level 3 understanding of this standard will most likely be able to:	Students with a level 4 understanding of this standard will most likely be able to:
		triangle the same and how are they different?"). Describe similarities and differences between two, three-dimensional solids that are the same type but may be different in size or orientation (e.g., "How are 2 cylinders the same and how are they different considering that they may vary in size or orientation?"). Describe similarities and differences between two, three-dimensional shapes that are different types (e.g., "How are a cube and a rectangular prism the same and how are they different?").	

Instructional Focus Statements

Level 3:

As students have had repeated experience visualizing, describing, constructing, combining, and manipulating a variety of two-dimensional shapes and three-dimensional solids in standards K.G.A.1, K.G.A.2, and K.G.A.3, they have developed a familiarity with the characteristics of individual and groups of shapes and solids. Students should be exposed to concrete objects, Geoboards, pictorial representations, and technology to help develop understandings and vocabulary for both two-dimensional shapes and three-dimensional solids. Teachers should use mathematical terms such as vertex, vertices, edge, and face. Instruction for this standard should focus on students relating one shape to another as they note similarities and differences between and among shapes and solids. For example, when comparing a triangle and a square, students note that both are closed figures and have straight sides, but the triangle has three sides and three vertices, or corners, while the square has four vertices. Another example might be, when building with blocks, students notice that the faces on a cube are all square shapes and that squares have sides of equal length.

With numerous experiences and discussions using a wide variety of shapes and solids, students develop a conceptual understanding of how to both identify and articulate the similarities and differences between two-dimensional and three-dimensional objects of any form, size, or orientation. Interactions with concrete solids help students understand that three-dimensional solids are composed of two-dimensional shapes.

Level 4:

This standard integrates well with standard K.MD.C.4. As students are able to identify two-dimensional shapes and three-dimensional solids in any size and orientation, they can begin to articulate their own rules for how objects are sorted based on similarities and differences within the set. They should be able to explicitly explain their reasoning using properties of these shapes. To extend the students' awareness of three-dimensional solids, prisms and pyramids with differently shaped bases could be used in addition to cubes, cones, cylinders, and spheres. Two-dimensional shapes include squares, circles, triangles, rectangles, hexagons, and could be extended to include rhombi, ovals, and trapezoids.

Geometry (G)

Standard K.G.B.5 Cluster Heading: B. Analyze, compare, create, and compose shapes.

Model shapes/solids in the world by building or drawing them.

Aspect of Rigor Alignment

Conceptual Understanding	Procedural Skill and Fluency	Application
X		X

Evidence of Learning Statements

Students with a level 1 understanding of this standard will most likely be able to:	Students with a level 2 understanding of this standard will most likely be able to:	Students with a level 3 understanding of this standard will most likely be able to:	Students with a level 4 understanding of this standard will most likely be able to:
Choose examples when given the name of a common two-dimensional shape or three-dimensional solid. Trace or copy a simple two-dimensional shape.	Build simple three-dimensional solids. Draw simple two-dimensional shapes.	Model solids in the world by building three-dimensional solids. Model shapes in the world by drawing two-dimensional shapes.	Model solids in the world by building three-dimensional solids, identifying the solid built, and justifying its classification using attributes of the shape. Model shapes in the world by drawing two-dimensional shapes, identifying the shape built, and justifying its classification using attributes of the shape.

Instructional Focus Statements

Level 3:

Instruction for this conceptual standard should build upon and connect the understandings developed in standards K.G.A.1, K.G.A.2, K.G.A.3 and K.G.B.4. Constructing requires students to form mental images of shapes and solids while thinking about the attributes of that object before a model can be created. Students apply their understanding of geometric attributes of shapes in order to create given shapes. For example, students may roll a clump of modeling clay into a sphere or use their finger to draw a triangle in the sand table while recalling various attributes in order to create that particular object. Instruction needs to include conversations with students asking them to name the shape created and asking the student about the attributes of the created shape. Questions such as: “What shape did you draw?” or “How do you know that’s a triangle?”

Because two-dimensional shapes are flat and three-dimensional shapes are solid, students may draw or build two-dimensional shapes but only build three-dimensional shapes. Solids could be built using materials such as clay, toothpicks, marshmallows, gumdrops, straws, pipe cleaners, Popsicle sticks, etc. Students should understand and identify two-dimensional shapes used to construct three-dimensional solids.

Geoboards and AngLegs are tools students could use to build different two-dimensional shapes while Polydrons can be used to construct three-dimensional solids.

Level 4:

Students at this level should have numerous opportunities to draw, build, and identify two-dimensional shapes and three-dimensional solids with an emphasis on the student providing justification for what object has been created based on the attributes. For example, a student may state “I know this is a cube because it has six square faces.” As students notice more geometric attributes, they will be able to expand their descriptions of geometric shapes.

TN Department of Education

Geometry (G)

Standard K.G.B.6 Cluster Heading: B. Analyze, compare, create, and compose shapes.

Compose a figure using simple shapes/solids and identify smaller shapes/solids within the figure.

Aspect of Rigor Alignment

Conceptual Understanding	Procedural Skill and Fluency	Application
X		

Evidence of Learning Statements

Students with a level 1 understanding of this standard will most likely be able to:	Students with a level 2 understanding of this standard will most likely be able to:	Students with a level 3 understanding of this standard will most likely be able to:	Students with a level 4 understanding of this standard will most likely be able to:
Create larger shapes by putting together simple two-dimensional shapes. Create larger solids by putting together simple three-dimensional shapes. Identify smaller shapes within a larger two-dimensional shape that has all smaller shapes pre-partitioned within the larger shape.	Compose a given shape by using a provided set of smaller simple two-dimensional shapes which can be used to make the given shape without any extra or missing pieces. Compose a given solid using a provided set of smaller simple three-dimensional shapes which can be used to make the given shape without any extra or missing pieces. Identify smaller shapes within a larger two-dimensional shape that has some of the smaller shapes pre-partitioned within the larger shape.	Compose a given shape using smaller simple two-dimensional shapes. Compose a given solid using smaller simple three-dimensional solids. Identify smaller shapes within a larger two-dimensional shape. Identify smaller solids within a larger three-dimensional solid.	Compose a larger shape using simple two-dimensional shapes in multiple ways (e.g., compose a hexagon out of 6 triangles and also compose the same hexagon out of two trapezoids).

Instructional Focus Statements

Level 3:

The instructional focus for this conceptual standard extends student experience of modeling shapes in the real world, standard K.G.B.5, to intentionally composing shapes and solids from other shapes and solids. This concept begins to develop as students move, rotate, flip, and arrange two-dimensional

shapes to create their own pictures using trial and error. For example, a student may use pattern blocks to create a car or tissue boxes and Pringles cans to create a castle. Over time, as students learn more about the attributes of various shapes and solids, they put them together to intentionally compose other objects. For example, using pattern blocks, a student may intentionally put together two trapezoids to compose a hexagon. This work helps students develop their knowledge about attributes and characteristics of different shapes. Over time, instruction should shift from students using shapes and solids to create their own designs to asking students to use shapes and solids that they are given to compose a given image. For example, when given an outline of a shape, kindergarteners may use pattern blocks or tangrams to fill the shape. They may need to look at a corner or length of a side to determine if a piece will fit in the space.

Level 4:

Instruction at this level should focus on providing numerous opportunities for students to compose increasingly more complex objects from a given image. For example, a teacher displays a picture of a cat made from pattern blocks. The picture is removed, and students try to recreate the picture. Additionally, students should be challenged to compose shapes in multiple ways.

Conversely, as students explore combining shapes and combining solids, they also think about ways to decompose a given object. For example, when using pattern blocks, students may discover that a yellow hexagon may be made up of six green triangles, three blue rhombuses, or two red trapezoids. Initially students may need to decompose the shape by building on top of the shape and later move to building a copy beside the original shape.

Opportunities such as these give students the opportunity to develop spatial sense. Spatial sense includes the ability to mentally visualize objects and spatial relationships, including being able to mentally move objects around. Meaningful experiences with mentally manipulating shapes, when provided consistently over time, help students develop spatial sense.