

First Grade Mathematics

Instructional Focus Documents

Introduction:

The purpose of this document is to provide teachers a resource which contains:

- The Tennessee grade level mathematics standards
- Evidence of Learning Statements for each standard
- Instructional Focus Statements for each standard

Evidence of Learning Statements:

The evidence of learning statements are guidance to help teachers connect the Tennessee Mathematics Standards with evidence of learning that can be collected through classroom assessments to provide an indication of how students are tracking towards grade-level conceptual understanding of the Tennessee Mathematics Standards. These statements are divided into either four or seven levels. For grade 1, the standards that provide seven levels are congruent with the scoring rubrics for the grade 1 portfolio. Standards that only provide four levels are not included as a part of the portfolio scoring rubric.

- Level 1: Performance at this level demonstrates that the student has a minimal understanding and has a nominal ability to apply the grade-/course-level knowledge and skills defined by the Tennessee academic standards.
- Level 2: Performance at this level demonstrates that the student is approaching understanding and has a partial ability to apply the grade-/course-level knowledge and skills defined by the Tennessee academic standards.
- Level 3: Performance at this level demonstrates that the student has a comprehensive understanding and thorough ability to apply the grade-/course-level knowledge and skills defined by the Tennessee academic standards.
- Levels 4-7: Performance at these levels demonstrates that the student has an extensive understanding and expert ability to apply the grade-/course-level knowledge and skills defined by the Tennessee academic standards.

The evidence of learning statements are categorized in the same way to provide examples of 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. The provided evidence of learning statements are examples of what students will most likely be able to do and do not represent an exhaustive list.

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 around Tier I, on-grade level instruction. Thus, the instructional focus statements are written for level 3 and 4.

Operations and Algebraic Thinking (OA)

Standard 1.OA.A.1¹ (Major Work of the Grade)

Add and subtract within 20 to solve contextual problems, with unknowns in all positions, involving situations of *add to*, *take from*, *put together/take apart*, and *compare*. Use objects, drawings, and equations with a symbol for the unknown number to represent the problem. (See Table 1 - Addition and Subtraction Situations)

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:
<p>Add and subtract within 10 to solve contextual problems, involving any of the problem types. Students will typically use concrete objects, mathematical drawings, diagrams or equations.</p>	<p>Inconsistently add and subtract within 20 to solve one-step contextual problems from the situations of <i>add to-change unknown</i>, <i>take-from-change unknown</i>, <i>put together/take apart-both addends unknown</i>, and <i>compare-difference unknown</i>. Students represent these problems with mathematical drawings, diagrams, or equations with a symbol for the unknown number.</p>	<p>Add and subtract within 20 to solve one-step contextual problems, using all four of the following situations: <i>add to-change unknown</i>, <i>take-from-change unknown</i>, <i>put together/take apart-both addends unknown</i>, and <i>compare-difference unknown</i>. Represent these problems with a mathematical drawing, diagram, or equation with a symbol for the unknown number.</p>	<p>Add and subtract within 20 to solve one-step contextual problems, using all eight of the following situations: <i>add to-change unknown</i>, <i>take-from-change unknown</i>, <i>put together/take apart-both addends unknown</i>, <i>compare-difference unknown</i>, <i>compare-bigger unknown (version with more)</i>, <i>compare-smaller unknown (version with fewer)</i>, <i>add to-start unknown</i> or <i>take from-start unknown</i>. Represent these problems with a mathematical drawing, diagram, or equation with a symbol for the unknown number.</p> <p>Add and subtract within 20 to solve two-step contextual problems. Represent these problems with two equations that encompasses both steps needed to solve the problem.</p>

¹ Standard 1.OA.A.1 has four levels of Evidence of Learning statements as it is not a Portfolio Standard.

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 a contextual problems that could be solved given a one-step addition or subtraction equation.

Instructional Focus Statements

Level 3:

Instruction should focus on building upon students’ experiences with problem situations in kindergarten. Students added and subtracted within 10 in kindergarten with a variety of problem situations and should now extend their understanding by working within 20. It is important to note that many of the problem solving situations should be the same as what was experienced in kindergarten using larger numbers. In particular, *compare* type problems, *start unknown* and *change unknown*, will be new for grade 1 students. These are more complex than the other types introduced in kindergarten as students must think about a quantity that is not physically present and must conceptualize that amount. It is important to note that developing an understanding of each situation takes time and should not be rushed. Teachers must plan carefully the introductions of these problem types across the year to allow students time to draw and directly model the situation before eventually moving to writing equations. The table for common addition and subtraction situations is located on page 20 of the Tennessee Mathematics Standards located [here](#).

With all problem situation types, opportunities should be provided for exploration with a variety of modeling strategies intertwined with a wide variety of contextual problems. This standard should be paired with 1.OA.C.5 as it is in this standard that students are working with strategies to add and subtract within 20. These strategies may involve counters, ten-frames, Rekenreks, linking cubes, etc. Additionally, students should represent their thinking through mathematical drawings and number lines. As students show understanding of the problem situations with models and drawings, they should begin to represent them with equations.

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

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 with two-step problems that arise from different types of situations some of which involve exclusively

addition, some involving exclusively subtraction, and some a mixture of both. Students should continue to employ drawings, diagrams, and even use manipulatives alongside equations as they continue developing their understanding of problem solving situations.

Standard 1.OA.A.2² (Major Work of the Grade)

Add three whole numbers whose sum is within 20 to solve contextual problems using objects, drawings, and equations with a symbol for the unknown number to represent the problem.

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:	Students with a level 5 understanding of this standard will most likely be able to:	Students with a level 6 understanding of this standard will most likely be able to:	Students with a level 7 understanding of this standard will most likely be able to:
<p>Add two whole numbers whose sum is within 10 to solve contextual problems, using <u>two</u> different situations of <i>add to-result unknown</i>, and <i>put together/take apart-total unknown</i>. Represent these problems with a mathematical drawing, diagram, <u>or</u> equation with a symbol for the unknown number.</p>	<p>Add two whole numbers whose sum is within 20 (one addend must be greater than 10) to solve contextual problems, using <u>two</u> different situations of <i>add to-result unknown</i>, and <i>put together/take apart-total unknown</i>. Represent these problems with a mathematical drawing, diagram, <u>or</u> equation with a symbol for the unknown number.</p>	<p>Add three whole numbers whose sum is within 20 to solve contextual problems, using <u>two</u> different situations of <i>add to-result unknown</i>, and <i>put together/take apart-total unknown</i>. Represent these problems with a mathematical drawing or diagram, <u>and</u> an equation with a symbol for the unknown number.</p>	<p>Add three whole numbers whose sum is within 20 to solve contextual problems, using <u>four</u> different situations of <i>add to-result unknown</i>, <i>put together/take apart-total unknown</i>, <i>add to-change unknown</i>, and <i>put together/take apart-addend unknown</i>. Represent these problems with a mathematical drawing or diagram, <u>and</u> an equation with a symbol for the unknown number.</p>	<p>Add three whole numbers whose sum is within 20 to solve contextual problems using <i>add to-start unknown</i>. Represent these problems with a mathematical drawing or diagram, <u>and</u> an equation with a symbol for the unknown number.</p>	<p>Add three whole numbers whose sum is within 20 to solve a two-step contextual problem. Represent this problem with a mathematical drawing or diagram, <u>and</u> equations with a symbol for the unknown number.</p> <p>Create an <i>add to-start unknown</i> contextual problem that can be solved given an equation involving addition of three whole numbers whose sum is within 20.</p>	<p>Add three whole numbers whose sum is within 20 to solve an <i>all addends unknown</i> contextual problem. Represent this problem with a mathematical drawing or diagram, <u>and</u> an equation.</p> <p>Create two different situations of contextual problem that can be solved given an equation involving addition of three whole numbers whose sum is within 20.</p>

Instructional Focus Statements

Level 3:

Instruction should focus on building upon students’ experiences with problem situations in kindergarten. Students worked with conceptual problems where the sum of the numbers was within 10 in kindergarten with a variety of problem situations. They should now extend their understanding by

² Standard 1.OA.A.2 has seven levels of Evidence of Learning Statements as it is a Portfolio Standard.

working within 20 and working with three addends. It is important to note that many of the problem solving situations should be the same as what was experienced in kindergarten using larger numbers and using more numbers. Developing an understanding of each situation takes time and should not be rushed. Teachers must plan carefully the introductions of these problem types across the year to allow students time to model the situation and then eventually move to writing equations. The table for common addition and subtraction situations is located on page 20 in the Tennessee mathematics standards located [here](#).

With all problem situation types, opportunities should be provided for exploration with a variety of modeling strategies intertwined with a wide variety of contextual problems. These strategies may involve counters, ten-frames, Rekenreks, linking cubes, etc. Additionally, students should represent their thinking through mathematical drawings and number lines. As students show understanding of the problem situations with models and drawings, they should begin to represent them with equations. Additionally, as properties of addition are introduced in 1.OA.B.3, these problems offer an ideal application of the properties of addition. Students should demonstrate an understanding that the order in which the numbers are combined does not affect the resulting sum. Students should flexibly think about the numbers they are combining and justify why they choose to combine them in a particular order. This critical thinking step will help build fluency with addition.

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

Levels 4-7:

As students deepen their understanding of problem solving situations, they should continue to experience varying situations with increased rigor over time. Students should continue to employ drawings, diagrams, and even use manipulatives alongside equations as they continue developing their understanding of problem solving situations. Eventually, students should be challenged to create their own contextual problems based on a provided equation.

Standard 1.OA.B.3 (Major Work of the Grade)

Apply properties of operations (additive identity, commutative, and associative) as strategies to add and subtract. (Students need not use formal terms for these properties.)

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:	Students with a level 5 understanding of this standard will most likely be able to:	Students with a level 6 understanding of this standard will most likely be able to:	Students with a level 7 understanding of this standard will most likely be able to:
<p>Apply one of the properties of operations (additive identity, commutative, or associative) as a strategy to add within 10 using mathematical tools or representations. (Students need not use formal terms for these properties).</p>	<p>Apply two of the properties of operations (additive identity, commutative, or associative) as strategies to add within 20 using mathematical tools or representations (Students need not use formal terms for these properties).</p>	<p>Apply the three properties of operations (additive identity, commutative, <u>and</u> associative) as strategies to add within 20 (Students need not use formal terms for these properties). Mathematical tools and/or representations may be used.</p> <p>Demonstrate an understanding that these three properties do not apply to the operation of subtraction.</p>	<p>Apply properties of operations (additive identity, commutative, <u>and</u> associative) as strategies to add within 20 (Students need not use formal terms for these properties). Students should explain or defend the accuracy of their answer and the property used. Mathematical tools and/or representations may be used.</p> <p>Demonstrate an understanding that these properties do not apply to the operation of subtraction and provide examples and an explanation as to why.</p>	<p>Apply properties of operations (additive identity, commutative, <u>and</u> associative) as strategies to mentally add within 20 (Students need not use formal terms for these properties). Students should explain or defend the accuracy of their answer.</p>	<p>Explain in either verbal or written form (without using the formal terms for the properties) when one property (commutative, associative, <u>or</u> additive identity) is useful as a strategy for addition and provide an example to justify their thinking.</p>	<p>Explain in either verbal or written form (without using the formal terms for the properties) when each property (commutative, associative, <u>and</u> additive identity) is useful as a strategy for addition and provide an example to justify their thinking.</p> <p>Explain in either verbal or written form (without using the formal terms for the property) why the associative property is not useful as a strategy for subtraction and provide an example to justify their thinking.</p>

Instructional Focus Statements

Level 3:

Instruction for this standard should focus on having students explore different ways to combine numbers looking for and making use of structure (MP 7) and employing repeated reasoning (MP 8) in order to develop an understanding of the additive identity, commutative property of addition, and associative property of addition. It is important to reiterate that students should not learn the formal names for the properties at this grade level. The intent is for students to flexibly think about how to combine numbers when they are adding. Through discovery, they learn that the order two numbers are added doesn't affect the sum and that with three addends where they begin the addition process doesn't affect the sum either. The end result is new strategies students can use when they are working with addition.

To address subtraction, it is equally important for students to realize that the commutative property does not hold true. As students have no understanding of negative numbers, the conversation should be phrased in such a way that students realize that, for example, when they have 10 items and take away 6, 4 items remain. However, if they have 6 items and remove 10 items, there are not enough items and more are being removed than the original amount. Thus $10 - 6$ and $6 - 10$ cannot be equal. It is important not to mislead students by telling them that they cannot subtract 10 from 6 as they will when they work with positive and negative numbers in middle school. The conceptual understanding is simply that $10 - 6$ and $6 - 10$ are not equal.

While the standard does not exclusively call out the identity property for subtraction, it is a nice extension from the identity property of addition for students to realize just like adding 0 to any number yields that number, subtracting 0 from any amount equals the start number as well.

As to the associative property, in grade 1 students are exclusively adding when working with more than two numbers. Subtraction presents many conceptual challenges when there are more than 2 numbers involved, a requirement to employ the associative property. To help students see why in grade 1 they will be only using the associative property with addition, consider using the following example: $7 + 6 - 8$. Students at this grade could work out $(7 + 6) - 8$. However, they do not understand how to simplify $7 + (6 - 8)$ as their current understanding is that if you have 6 objects you cannot remove 8. This makes it conceptually impossible for them to apply the associative property here. The messaging for student is not that you cannot use the associative property when subtraction is involved simply that they will learn how that works in subsequent grades.

Levels 4-7:

As students deepen their understanding of how the properties work, instruction should shift to help students develop an understanding of when applying these ideas is helpful. Students should be able to justify when they might use a property based strategy and why that particular strategy is helpful in that case. They should be able to create examples and construct a viable argument (MP 3) to justify their thinking.

Standard 1.OA.B.4 (Major Work of the Grade)

Understand subtraction as an unknown-addend problem. *For example, to solve $10 - 8 = \underline{\quad}$, a student can use $8 + \underline{\quad} = 10$.*

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 a related addition problem when given a subtraction problem.	<p>Model subtraction and related addition equations using various strategies (i.e. part-whole maps and number lines).</p> <p>Find the missing part by counting up to the whole and explain why this works when given a change unknown problem.</p>	Write a related addition problem and explain how and why this problem helps find the difference when given a subtraction problem.	<p>Provide both an addition and subtraction equation to represent a <i>put together/take apart addend unknown</i> contextual problem. Students should be able to explain why both equations can be used to represent the situation.</p> <p>Write a contextual problem that can be solved by a given subtraction equation. Provide a related addition equation and explanation to justify that the contextual problem can be solved by the given equation.</p>

Instructional Focus Statements

Level 3:

Instruction for this standards should focus on students developing a conceptual understanding of the relationship that exist between addition and subtraction solidifying students understanding of why counting up works as a strategy when solving subtraction problems. This strategy will be very beneficial as students work with larger numbers in subsequent grades specifically when utilizing number lines as a model. Part-part-whole maps can help students develop an understanding of subtraction as finding a missing part (addend) when given the whole and another part. These can be used with either manipulatives of numbers depending on the stage of learning each student is in with respect to their understanding of subtraction. This ultimately helps solidify student understanding of the relationship that exists between addition and subtraction situations. Using the *change unknown* problem

situations will help students make sense of the operation and provide contextual problems to help further develop understanding of the relationship between addition and subtraction.

Embedded in Instruction, students should be introduced to the vocabulary addend, missing addend, and total and relate these to the terms part(s) and whole in addition and subtraction equations and models.

Eventually students will realize any problem that can be solved by subtraction can also be solved by finding a missing addend, and any missing addend problem can be solved by subtracting. Students will see that addition and subtraction are both ways of describing the relationship between two parts and a whole. It is important to note that the focus of this standard should not be on students finding and listing fact families. It is imperative that students cement their conceptual understanding of the relationship that exists between addition and subtraction.

Level 4:

As students are able to work with *change unknown* problem situations, they can be challenged with *put together/take apart addends unknown* problem. These problems provide opportunities for students to see subtraction as the opposite of addition in a different way. These will help students solidify their understanding that subtraction can be used to find the missing part of a whole.

Given a *put together/take apart addend unknown* contextual problem, students should be able to provide both an addition and subtraction equation to solve the problem and explain why both equations can be used to represent the situation. Students can also write a contextual problem when given a subtraction equation and provide the related addition equation providing an explanation of why their contextual problem can be solved both by the original problem given and the related addition equation.

Standard 1.OA.C.5 (Major Work of the Grade)

Add and subtract within 20 using strategies such as counting on, counting back, making 10, using fact families and related known facts, and composing/ decomposing numbers with an emphasis on making ten (e.g., $13 - 4 = 13 - 3 - 1 = 10 - 1 = 9$ or adding $6 + 7$ by creating the known equivalent $6 + 4 + 3 = 10 + 3 = 13$).

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:	Students with a level 5 understanding of this standard will most likely be able to:	Students with a level 6 understanding of this standard will most likely be able to:	Students with a level 7 understanding of this standard will most likely be able to:
<p>Add within 10 using one of the strategies of counting on or making 10 using concrete objects or drawings. Multiple problems may be used to show the strategies listed.</p> <p>Subtract within 10 using the strategy of counting back using concrete objects or drawings. Multiple problems may be used to show the strategies listed.</p>	<p>Add within 20 using two of the strategies: counting on, making 10, using fact families (related known facts), and composing/ decomposing numbers with an emphasis on making ten. Students may use concrete objects or drawings.</p> <p>Subtract within 20 using one of the following strategies: counting back, using fact families (related known facts), and composing/ decomposing numbers with an emphasis on making 10. Students may use concrete objects or drawings.</p>	<p>Add within 20 using three of the strategies: counting on, making 10, using fact families (related known facts), and composing/ decomposing numbers with an emphasis on making ten. Students may use concrete objects or drawings.</p> <p>Subtract within 20 using two of the following strategies: counting back, using fact families (related known facts), and composing/ decomposing numbers with an emphasis on making 10. Students may use concrete objects or drawings.</p>	<p>Add within 20 using all of the strategies: counting on, making 10, using fact families (related known facts), and composing/ decomposing numbers with an emphasis on making ten. Students may use concrete objects or drawings.</p> <p>Subtract within 20 using all of the following strategies: counting back, using fact families (related known facts), and composing/ decomposing numbers with an emphasis on making 10. Students may use concrete objects or drawings.</p>	<p>Add within 20 using all of the strategies: counting on, making 10, using fact families (related known facts), and composing/ decomposing numbers with an emphasis on making ten. Students may use concrete objects or drawings. Defend the solution and explain the strategies with words and/or drawings.</p> <p>Subtract within 20 using all of the following strategies: counting back, using fact families (related known facts), and composing/ decomposing numbers with an emphasis on making 10. Students may use concrete objects or drawings. Defend the solution and explain the strategies</p>	<p>Choose 2 of the 4 strategies for addition: counting on, making 10, using fact families (related known facts), and composing/ decomposing numbers with an emphasis on making ten, create an expression or equation demonstrating when the strategy could be used and explain in either verbal or written form the mathematical benefits gained from using each strategy.</p> <p>Choose 1 of the 3 strategies for subtraction: counting back, using fact families (related known facts), and composing/ decomposing numbers with an emphasis on making 10. Create an expression or equation demonstrating when the strategy could be used and explain in either</p>	<p>Create an expression or equation demonstrating when the strategy could be used and explain in either verbal or written form the mathematical benefits gained from using all four of the strategies for addition: counting on, making 10, using fact families (related known facts), and composing/ decomposing numbers with an emphasis on making 10.</p> <p>Create an expression or equation demonstrating when the strategy could be used and explain in either verbal or written form the mathematical benefits gained from using all three of the strategies for subtraction: counting back, using fact families (related known facts), and composing/</p>

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:	Students with a level 5 understanding of this standard will most likely be able to:	Students with a level 6 understanding of this standard will most likely be able to:	Students with a level 7 understanding of this standard will most likely be able to:
				with words and/or drawings.	verbal or written form the mathematical benefits gained from using each strategy.	decomposing numbers with an emphasis on making 10.

Instructional Focus Statements

Level 3:

The operations of addition and subtraction build on the flexibility in thinking students have gained from composing and decomposing numbers in various ways as they developed an understanding of counting and cardinality in kindergarten. There is a progression that has been determined to help students as they develop a conceptual understanding of any operation. This progression is composed of three stages of learning: concrete, representational, and abstract. Instruction within grade 1 for this standard should focus on representational learning through invented strategies.

Invented strategies are when students begin eliciting their understanding of composing and decomposing numbers in flexible ways in order to more quickly figure out a computation. Some examples of invented strategies are compensation, counting on, counting back, making a ten, and using fact families. It is important to note that for many students, these strategies are easier, more intuitive, and quicker than the standard algorithm that is not introduced until grade 3. Additionally, they are more efficient than direct modeling where students physically manipulate objects or create drawings to solve math problems. The vast majority of the invented strategies are helping students develop an understanding of how and why making a ten is helpful. It is important that students are led to discover these relationships as opposed to being told the relationship. Ultimately, invented strategies play a crucial role in the development of a student’s fluency in both addition and subtraction.

Thus, instruction should focus on helping students discover more efficient ways to combine and break apart numbers. For example, when adding $8 + 7$, a student may have discovered when using direct modeling with ten frames the importance of filling a ten frame to make 10. In the invented strategy stage, they now can build upon that experience to realize without a physical ten frame that 7 can be decomposed into 2 and 5 which provides the 2 needing to be added to the 8 to make a ten. Thus this gives a 10 and a 5 to be combined to get 15. This flexibility in thinking is what builds fluency for students.

Levels 4-7:

Once students demonstrate an understanding of multiple strategies for both addition and subtraction, they should be challenged to construct a viable argument (MP 3) to defend their choice of strategy when solving a particular problem. Additionally, students should be able to critique the reasoning of

others (MP 3) as classmates present their choice of strategy. It is also important that students are able to see and explain the mathematical connections that exist between various strategies. Ultimately, when presented a strategy students should be able to create a problem that could be solved by the given strategy and construct a viable argument (MP 3) to defend and explain their example.

Standard 1.OA.C.6 (Major Work of the Grade)

Fluently add and subtract within 20 using mental strategies. By the end of 1st grade, know from memory all sums up to 10.

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:
<p>Add and subtract within 20 using concrete objects.</p>	<p>Fluently add and subtract within 10 using mental strategies. Students are consistent in their ability to efficiently and accurately produce answers without recording their thinking on paper.</p> <p>Inconsistently add and subtract within 20 using mental strategies. Students can sometimes efficiently and accurately produce answers without recording their thinking on paper.</p>	<p>Fluently add and subtract within 20 using mental strategies. Students are consistent in their ability to efficiently and accurately produce answers without recording their thinking on paper.</p> <p>Know from memory all sums up to 10.</p>	<p>Fluently add and subtract within 20 using mental strategies. Students are consistent in their ability to efficiently and accurately produce answers without recording their thinking on paper. Students can explain or defend their answer in multiple different ways.</p> <p>Given an incorrect work sample of adding two numbers within 20, correct the mistake and explain the mathematical misunderstanding that could cause the mistake to happen.</p> <p>Correct an incorrect work sample of subtracting two numbers within 20 and explain the mathematical misunderstanding that could cause the mistake to happen.</p>

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 were 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 began building conceptual understanding of the operations of addition and subtraction as they worked on direct modeling using a variety of techniques. Additionally they worked on developing a mathematical understanding that numbers can be composed and decomposed in a wide variety of ways.

Before students reach fluency with mental strategies, they must be given the opportunity to interact with both direct modeling and invented strategies 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 there is a difference between employing mental strategies and knowing sums from memory.

As students become more fluent with adding and subtracting numbers within 20, 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 20 over time.

Levels 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. Students should also be able to explain what misconception took place to produce an incorrect answer. 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.

Standard 1.OA.D.7 (Major Work of the Grade)

Understand the meaning of the equal sign (e.g., $6 = 6$; $5 + 2 = 4 + 3$; $7 = 8 - 1$). Determine if equations involving addition and subtraction are true or false.

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:
Generate an accurate equation where the operation is on the left side of the equal sign and the sum or difference is on the right side ($2 + 3 = 5$ or $10 - 7 = 3$).	Generate an accurate equation where the operation is on the right side of the equal sign and the sum or difference is on the left side ($5 = 2 + 3$ or $3 = 10 - 7$). Explain and model the word "equal" as "the same as" using concrete manipulatives.	Explain the meaning of the equal sign. Determine if equations involving addition are true or false. Determine if equations involving subtraction are true or false.	Determine equations involving addition and/or subtraction are true or false. If false, explain why the equation is false and propose a correct equation.

Instructional Focus Statements

Level 3:

Instruction in grade 1 should expose students to a wide variety of representations of equations, such as:

- an operation on the left side of the equal sign and the answer on the right side ($3 + 2 = 5$);
- an operation on the right side of the equal sign and the answer on the left side ($5 = 2 + 3$);
- numbers on both sides of the equal sign ($6 = 6$);
- operations on both sides of the equal sign ($5 + 2 = 4 + 3$); and
- repeated operations ($3+4+5=12$).

Students develop a conceptual understanding that an equation needs to “balance” with equal quantities on both sides of the equal sign. Once students understand the meaning of the equal sign, they are able to extend their understanding to determine if an equation is true or false.

Critical to this standard is the understanding that the equal sign represents a relationship and not an action. Reading “=” as “is the same as” rather than “is equal to” is one way to reinforce this important concept. One common misconception students often develop is that the equal sign indicates the answer comes next or calls for the action of carrying out the mathematics operation.

A balance scale is a helpful manipulative to visually reinforce that both quantities are equal. For example, have students model 3 on one side and 4 on the other to discover that the sides are not balanced/equal. Extend this exploration to have students model $3+4$ on one side and $2+5$ on the other noting that the sides are balanced/equal. It is important to note that the concrete representation of math should be connected back to the written equation. Students can further develop their understanding of equality by modeling equations involving both addition and subtraction with the balance (i.e. $10 - 6 = 3 + 1$). This has the added benefit of not only reinforcing the concept of equality, but also in helping solidify the meaning of the operations of addition and subtraction.

Level 4:

Students at this level should be able to determine if an equation is true or false and justify their claim using concrete manipulatives and words. For false equations, students should propose ways to modify the equation so that it becomes true. Further, students should then be able to explain mathematically how the adaptation they used made the equation true both verbally and mathematically (e.g., given $5 + 6 = 12 - 2$, the student recognizes that the equation is false, provides the explanation that 11 does not equal 10, proposes the modification $5 + 6 - 1 = 12 - 2$, states that $10=10$, and provides the explanation using a balance to say that one needed to be removed from the left hand side for the equation to balance which is the “- 1” part of their new equation). Students could then be challenged to find alternative ways to correct the same false equation.

Standard 1.OA.D.8 (Major Work of the Grade)

Determine the unknown whole number in an addition or subtraction equation, with the unknown in any position (e.g., $8 + ? = 11$, $5 = ? - 3$, $6 + 6 = ?$).

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:	Students with a level 5 understanding of this standard will most likely be able to:	Students with a level 6 understanding of this standard will most likely be able to:	Students with a level 7 understanding of this standard will most likely be able to:
Determine the whole number answer in addition and subtraction "total unknown" equations within 10.	Determine the whole number answer in addition and subtraction "total unknown" equations within 20. Determine the whole number answer in addition and subtraction "change unknown" equations within 10.	Determine the whole number answer in addition and subtraction "change unknown" equations within 10. Determine the whole number answer in addition and subtraction "start unknown" equations within 10.	Determine the whole number answer in addition and subtraction "start unknown" equations within 20.	Determine the unknown whole number in an addition and subtraction equation within 20 which includes two expressions that are equivalent (e.g., $7 + 4 = ? + 8$ or $10 - 6 = 9 - ?$).	Determine the unknown whole number in an equation with an addition expression on one side of the equal sign and a subtraction expression on the other side of the equal sign (e.g., $7 + 4 = 15 - ?$).	Generate a list of 5 possible values for the unknowns that would keep the value of both expressions within 20 (e.g., $? + 3 = ? - 5$ and the student generates 5 possible solutions) when given an equation with an addition expression on one side of the equal sign and a subtraction expression on the other side of the equal sign where both the addition and subtraction expressions have an unknown value,.

Instructional Focus Statements

Level 3:

In grade 1, students are developing a conceptual understanding of the operations of addition and subtraction by employing direct modeling and using student-invented strategies. They should integrate this standard when working with both simplifying expressions (1.OA.C.5) and making sense of and solving a wide variety of contextual problems (1.OA.A.1).

Standard 1.OA.D.8 is explicitly transitioning students so that they begin developing an understanding of the symbolic representations of addition and subtraction using equations. That said, this standard is not meant to be taught in isolation. As students reach a point where they are ready to express their thoughts in equation form when working with contextual problems or student invented strategies, they should be encouraged to do so. Students

should be provided equal opportunities to work both with equations that are not related to contextual problems and with equations that are generated from contextual problems. With both types, they should initially be modeling the solution with manipulatives or drawings. Part-part-whole maps are particularly helpful as students conceptualize equations.

Additionally, this standard pairs very nicely with standard 1.OA.D.7. Standard 1.OA.D.8 supports students as they solidify their understanding of the equal sign and solidify their understanding of what equality means. This concept should not be glossed over as this understanding is foundational to all future mathematics courses.

One other note, as students transition to writing equations as a way to represent and eventually solve contextual problems, symbolic representation may be challenging as it requires more abstract thinking patterns. It is important to ask students to explain their reasoning at every step of the way from writing the equation to solving it. Be sure that students are experiencing solving equations (both with and without a context) with the unknown in all positions.

Levels 4-7:

As students solidify their understanding of solving addition and subtraction equations with the unknown in all positions, they should be challenged to think through equations that require working with more than one operation. Students can be challenged to make sense of problems (MP 1) and reason quantitatively (MP 2) in order to solve more complex equations. For example, when solving the equation $10 + 2 = 8 + \underline{\quad}$ students may decompose 10 and look at the equation as $8 + 2 + 2 = 8 + \underline{\quad}$ then $8 + 4 = 8 + \underline{\quad}$ and determine that a 4 must be placed in the blank in order for the two sides to be equal. Students should be given the opportunity to justify their thinking and explain how they worked a particular problem. This type of flexible thinking will help build fluency and be invaluable to students in future mathematics work.

Numbers and Operations in Base Ten (NBT)

Standard 1.NBT.A.1 (Major Work of the Grade)

Count to 120, starting at any number. Read and write numerals to 120 and represent a number of objects with a written numeral. Count backward from 20.

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:	Students with a level 5 understanding of this standard will most likely be able to:	Students with a level 6 understanding of this standard will most likely be able to:	Students with a level 7 understanding of this standard will most likely be able to:
<p>Accurately complete at least <u>one</u> of the following tasks:</p> <p>count to 100, by 1's;</p> <p>read and write numerals to 20;</p> <p>represent a number of objects (within 20) with a written numeral; or</p> <p>count backward from 10 by 1's.</p>	<p>Accurately complete at least <u>two</u> of the following tasks:</p> <p>count to 100, starting at any number by 1's;</p> <p>read and write numerals to 100;</p> <p>represent a number of objects (within 100) with a written numeral; or</p> <p>count backward from 20 by 1's.</p>	<p>Count to 120, starting at any number by 1's.</p> <p>Read and write numerals to 120.</p> <p>Represent a number of objects (within 120) with a written numeral.</p> <p>Count backward from 20 by 1's.</p>	<p>Count to 120 by 1's, 2's, and 10's, starting at any number.</p> <p>Identify a missing number in a given counting sequence when counting by 1's.</p> <p>Count backward from 20 by 1's and 5's.</p>	<p>Count to 120 by 1's, 2's, 5's, and 10s starting at any number.</p> <p>Count to 120 by 10's and 20's, starting at any number.</p> <p>Identify a missing number in a given counting sequence when counting by 1's, 2's, 5's and 10's.</p> <p>Count backward from 20 by 1's, 2's and 5's.</p>	<p>Count to 120 by 1's, 2's, 3's, 4's, 5's, and 10's starting at any number.</p> <p>Count to 120 by both 10's and 20's starting at any number and mathematically explain the relationship between the two patterns.</p> <p>Identify a missing number in a given counting sequence when counting by 1's, 2's, 3's, 4's, 5's, 6's, and 10's and the student provides the rule for the pattern.</p>	<p>Count to 120 by any number increment between 1 and 10 starting with any number.</p> <p>Count to 120 by both 10's and 20's, 3's and 6's, and 4's and 8's starting at zero. Mathematically explain and generalize the relationship that exists between all three pairs.</p> <p>Identify a missing number in a given counting sequence when counting by any increment between 2 and 10 and the student provides the rule for the pattern.</p> <p>Count backward from any number between 10 and 20 by 1's, 2's, and 5's.</p>

Instructional Focus Statements

Level 3:

Not only are the other standards in the Numbers and Operations in Base Ten (NBT) domain heavily reliant on students first knowing number names and counting sequences, the Operations and Algebraic Thinking (OA) domain standards are also dependent upon students ability to count, recognize and read printed numerals. The instructional focus for this standard should be building upon the Counting and Cardinality standards from kindergarten in order to solidify oral numeric fluency, recognition of printed numerals, reading of printed numerals, and a student's ability to connect the three. Additionally, students should be able to represent the number of objects in a group with a printed numeral. This will require students to have a conceptual understanding of one-to-one correspondence, cardinality, and rote counting in order for them to determine what number to write.

Instruction should be designed so that students discover the patterns that exist in spoken words, in the written numerals, and also the relationship that exists between the two. It is important to note that the number words continue to require attention in grade 1. As in kindergarten, teen numbers, in general, may continue to be particularly difficult for 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. Further, from 20 to 100 the wording changes so that the tens are provided first. Also, these decade words (twenty, thirty, forty, etc.) sound similar to the teen numbers. For example, "fourteen" and "forty" sound a lot alike further providing possible road blocks for students as they work to understand the naming conventions alongside the meanings of our number system. It is also important to note that children frequently make counting errors such as "twenty-nine, twenty-ten, twenty-eleven, twenty-twelve." Additionally, watch carefully for students who struggle to differentiate between printed numerals like 12 and 21. While place value is not a focus for this standard, it is important to note when a student is struggling here. Students should be provided the opportunity to directly model each number with a manipulative such as linking cubes in order to reinforce that the placement of digits within a printed numeral matters.

When counting backwards, students may skip numbers. Additionally, they may struggle with the teen numbers for the same reasons they struggle with them when counting forwards.

The goal for this standard is for students to fluently count forwards, fluently count backwards, read numerals, and write numerals by the end of the grade. These skills should develop over time due to the readiness of the student. 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.

Levels 4-7:

Once students have mastered oral fluency for 1's, they should be encourage to skip-count using a variety of patterns. While skip-counting is not exclusively called out within the grade 1 standards (it is for kindergarten and grade 2), its conceptual understanding will be invaluable to students when

they employ repeated addition as a strategy for multiplication in subsequent grades. Additionally, students can be challenged to look for and make use of structure (MP 7) and look for and express regularity in repeated reasoning (MP 8) as they look at and discover patterns that exist within and between sequences generated by skip-counting. Students should also be challenged to identify missing numbers within a counting sequence. This gives them the opportunity to more flexibly think about the progression of numbers within the number system.

Standard 1.NBT.B.2 (Major Work of the Grade)

Know that the digits of a two-digit number represent groups of tens and ones (e.g., 39 can be represented as 39 ones, 2 tens and 19 ones, or 3 tens and 9 ones).

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:	Students with a level 5 understanding of this standard will most likely be able to:	Students with a level 6 understanding of this standard will most likely be able to:	Students with a level 7 understanding of this standard will most likely be able to:
<p>Represent a number less than 20 as a ten with some ones.</p> <p>Represent a number less than 20 as a collection of ones.</p>	<p>Represent a two-digit number in one of the following ways: a single ten with a collection of ones or multiple tens with a collection of ones. (e.g., 39 can be represented as 1 ten and 29 ones, 2 tens and 19 ones, or 3 tens and 9 ones).</p>	<p>Represent a two-digit number as groups of tens and ones in three different ways (e.g., 39 can be represented as 39 ones, 1 ten and 29 ones, 2 tens and 19 ones, or 3 tens and 9 ones).</p>	<p>Represent a two-digit number, larger than 50, as groups of tens and ones in all possible ways.</p>	<p>Represent a two-digit number, larger than 50, as groups of tens and ones in all possible ways and justify that all representations have been given.</p>	<p>Represent a two-digit number, larger than 50, as groups of tens and ones in all possible ways and justify that all representations have been given without the use of manipulatives.</p>	<p>Explain how to systematically list all of the different ways to break down a two-digit number into groups of tens and ones to guarantee that all possible ways have been generated and provide an explanation as to why the system works.</p>

Instructional Focus Statements

Level 3:

Students are building upon understanding developed in kindergarten standard K.NBT.A.1 where students composed and decomposed teen numbers into ten ones and some more ones. It is not inherently part of the kindergarten standard for students to name the ten ones a “ten”. Thus, grade1 instruction must explicitly focus in a way so that students make the connection that a “ten” is comprised of a bundle of ten ones. Also, attention should be given to the decade words “twenty”, “thirty”, “forty”, etc. so that students connect the words to their representation of 2 tens, 3 tens, 4 tens, etc. The connection between how numbers are verbally said and their printed form is crucial as students engage in developing an understanding of decomposing two-digit numbers into groups of tens and ones.

When students first interact with this standard, it is crucial that they build their conceptual understanding through direct modeling. Cubes or base ten blocks are both ideal manipulatives to provide students. Ten frames and Rekenreks may also be very helpful tools as students build conceptual

understanding. Students should be given the opportunity, through modeling (MP 4), to discover that in all instances where the two-digit number is greater than 20 there are multiple ways to decompose numbers utilizing tens and ones.

Through the course of instruction, students should be reasoning quantitatively (MP1), modeling with math (MP 4), and looking for and making use of structure (MP 7).

Ultimately, the understanding that accompanies this standard will provide a crucial foundation for students developing an understanding of place value. Additionally, the ability to see the decomposition in multiple ways will aid students when they begin using strategies with addition and subtraction.

Levels 4-7:

Instruction at these levels should focus on helping students, through repeated reasoning (MP 8), find ways to systematically produce all combinations of tens and ones for a two-digit number. This can be accomplished through direct modeling which will support students as they develop their iterative thinking process. Further, students should be able to verbalize in either spoken or written form their process and how they know that all combinations have been generated.

Standard 1.NBT.B.3 (Major Work of the Grade)

Compare two two-digit numbers based on the meanings of the digits in each place and use the symbols $>$, $=$, and $<$ to show the relationship.

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:	Students with a level 5 understanding of this standard will most likely be able to:	Students with a level 6 understanding of this standard will most likely be able to:	Students with a level 7 understanding of this standard will most likely be able to:
<p>Accurately compare two one-digit numbers by verbalizing the comparison with comparative language including greater than, more than, less than, fewer than, equal to, or same as (e.g., Seven is more than five).</p>	<p>Accurately compare two two-digit numbers based on the meanings of the digits in each place by verbalizing the comparison with comparative language including greater than, more than, less than, fewer than, equal to, or same as.</p>	<p>Accurately compare two two-digit numbers based on the meanings of the digits in each place and use the symbols $>$, $=$, and $<$ to show the relationship.</p>	<p>Accurately compare two two-digit numbers based on the meanings of the digits in each place and use the symbols $>$, $=$, and $<$ to show the relationship and Justifies the comparison (oral or written) by reasoning about meaning of the digits (e.g., 58 is more than 48 because 58 has 5 tens and 8 ones while 48 has 4 tens and 8 ones. Or, 56 is less than 59 because they both have 5 tens but 6 ones in 56 is less than 9 ones in 59).</p>	<p>Accurately order a set of five two-digit numbers from least to greatest or greatest to least based on the meanings of the digits in each place and use the symbols $>$ or $<$ to show the relationships. The student provides justification for the comparison (oral or written) by explaining the reasoning used.</p>	<p>Accurately compare two addition and/or subtraction expressions (values are less than 100) based on the meanings of the digits from the resulting sum or difference or the relationship that exists between the magnitude of the numbers and the operation; correctly use the symbols $>$, $=$, and $<$ to show the relationship; and provide justification for the comparison (oral or written) by explaining the reasoning used (e.g., $37 + 12 > 37 + 10$ because $49 > 47$ or $37 + 12$ is greater because 12 is a greater number than 10 and both are being added to the same quantity. $33 + 24 < 45 + 39$ because 57 < 84 or 33 is less than 45 and 24 is less than 39 so the sum of $33 + 24$ will be less than the sum of $45 + 39$).</p>	<p>Accurately order five addition and subtraction expressions (values are less than 100) based on their value from either least to greatest or greatest to least, correctly use the symbols $>$ and $<$ to show the relationship, and provide justification for the comparisons (oral or written) by explaining the reasoning used.</p>

Instructional Focus Statements

Level 3:

In kindergarten, students developed an understanding of the concepts of greater than, less than, and equal to (K.CC.C.6) and then compared two written numerals up to 10 using the mathematical terminology greater than, less than, and equal to (K.CC.C.7). Instruction in grade 1 should focus in such a way that after developing a conceptual understanding students are ultimately comparing numbers based on the place value meaning of the digits within the number. It is crucial that students develop a conceptual understanding around comparison as opposed to trying to memorize and employ a set of procedures.

Students need the opportunity to engage with concrete and pictorial representations prior to using printed numerals and prior to utilizing the place value of the numbers in order to compare them. As students are developing their understanding, they should interact with tools such as ten-frames, base ten blocks, and hundreds charts. Once students have grasped comparing numbers by using manipulatives, they can move to thinking about the value of each digit. Students should be able to generalize that the digit in the tens place is more important for determining which two-digit number has a greater value. It is important that understanding and vocabulary both be developed/reinforced prior to the use of symbolic language.

Correctly placing the $<$ or $>$ symbol is a challenge for early learners. Accuracy can improve if students think of putting the wide part of the symbol next to the larger number. Through questioning, it can be determined if students are making mistakes due to a lack of understanding of place value and comparing numbers or a lack of understanding around how to correctly use the inequality symbol. Students should be encouraged to explain and defend their thinking throughout instruction (MP 3).

Levels 4-7:

Once a student has a strong understanding of comparing two numbers using place value and can explain their reasoning in either verbal or written form, they should be challenged to order a set of more than two numbers providing justification for how and why they arranged the numbers within the set in a particular way. Further, students can be challenged with problems intentionally developed to illicit their ability to reason abstractly and quantitatively with numbers. One such example provided above is comparing $37 + 10$ and $37 + 12$. This pairing is very intentional as the student does not have to know how to add the numbers in order to answer the question. Instead they should be considering the relationships that exist between the numbers in the two provided expressions. Students should be challenged to make sense of the problem (MP 1), reason quantitatively (MP 2), and construct a viable argument (MP 3) to accompany their answer.

Standard 1.NBT.C.4 (Major Work of the Grade)

Add a two-digit number to a one-digit number and a two-digit number to a multiple of ten (within 100). Use concrete models, drawings, strategies based on place value, properties of operations, and/or the relationship between addition and subtraction to explain the reasoning used.

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:	Students with a level 5 understanding of this standard will most likely be able to:	Students with a level 6 understanding of this standard will most likely be able to:	Students with a level 7 understanding of this standard will most likely be able to:
<p>Accurately add two one-digit numbers using concrete models or drawings.</p> <p>Accurately add 10 to a single digit number using concrete models or drawings.</p>	<p>Accurately add a two-digit number to a one-digit number where composing a ten is not required (e.g., 12 + 6) using concrete models, drawings, strategies based on place value, properties of operations, or the relationship between addition and subtraction.</p> <p>Accurately add a multiple of 10 and 10 within 100 using concrete models, drawings, strategies based on place value, properties of operations, or the relationship between addition and subtraction.</p>	<p>Accurately add a two-digit number to a one-digit number (within 100) where composing a ten is required (e.g., 39 + 4) using concrete models, drawings, strategies based on place value, properties of operations, and/or the relationship between addition and subtraction to explain the reasoning used.</p> <p>Accurately add a two-digit number to a multiple of ten (within 100) using concrete models, drawings, strategies based on place value, properties of operations, and/or the relationship between addition and subtraction to explain the reasoning used.</p>	<p>Accurately add a two-digit number to a one-digit number (within 100) where composing a ten is required (e.g., 39 + 4) using concrete models, drawings, strategies based on place value, properties of operations, and/or the relationship between addition and subtraction and explain how the strategy was used and beneficial in solving the problem.</p> <p>Accurately add a two-digit number to a multiple of ten (within 100) using concrete models, drawings, strategies based on place value, properties of operations, and/or the relationship between addition and subtraction and explain how the strategy was used and beneficial in solving the problem.</p>	<p>Accurately add a two-digit number to a one-digit number (within 100) where composing a ten is required (e.g., 39 + 4) using two different strategies and explain the similarities and differences between the two strategies.</p> <p>Accurately add a two-digit number to a multiple of ten (within 100) using two different strategies and explain the similarities and differences between the two strategies.</p>	<p>Accurately add a two-digit number to a one-digit number (within 100) where composing a ten is required (e.g., 39 + 4) using two different strategies, explain the similarities and differences between the two strategies, and provides mathematical justification on how both strategies are correct as well as a description or example showing when each strategy is the most useful.</p> <p>Accurately add a two-digit number to a multiple of ten (within 100) using two different strategies, explain the similarities and differences between the two strategies, and provide mathematical justification on how both strategies are correct as well as a description or example</p>	<p>Analyze a given problem containing the sum of a two-digit number and a one-digit number (within 100) where composing a ten is required (e.g., 39 + 4) that has been worked out with all work shown and contains an error that is the result of a common misunderstanding to find the mistake, correct the mistake, and explain the mathematical misunderstanding that would have caused the mistake to occur.</p> <p>Analyze a given problem containing the sum of a two-digit number and a multiple of ten (within 100) that has been worked out with all work shown and contains an error that is the result of a common misunderstanding to find the mistake, correct the mistake, and explain</p>

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:	Students with a level 5 understanding of this standard will most likely be able to:	Students with a level 6 understanding of this standard will most likely be able to:	Students with a level 7 understanding of this standard will most likely be able to:
					showing when each strategy is the most useful.	the mathematical misunderstanding that would have caused the mistake to occur.

Instructional Focus Statements

Level 3:

Addition is a child’s first experience with a mathematical operation. It is building on the flexibility students have gained from composing and decomposing numbers in various ways as they developed an understanding of counting and cardinality. There is a progression that has been determined to help students as they develop a conceptual understanding of any operation. This progression is composed of three stages of learning: concrete, representational, and abstract. Instruction within grade 1 should exclusively focus on concrete and representational learning.

In the concrete learning stage, instruction should focus on direct modeling. Students should be physically manipulating objects or creating drawings to solve math problems. The initial focus for this standard should be on having students use direct modeling techniques to add a two-digit number and a one-digit number. At this stage, regrouping is not the focus. For example, if a student is adding 26 and 9 using direct modeling, they could count out or draw twenty-six objects, count out or draw nine objects, combine them into one group, and then count by ones to see that there are 35 objects. Ten frames and hundreds charts are also very helpful for students in the direct modeling stage as they give students a systematic way to look at combining the values of two numbers and may prompt students to begin thinking about more efficient ways to combine numbers. The focus of direct modeling is on solidifying the understanding of the operation of addition as combining the two sets not trying to introduce and develop the concept of regrouping and making a ten. Students will directly model the sum of a two-digit number and a multiple of ten the same way. Encourage students to look for patterns in their answers when they are adding multiples of ten as this will also cause them to think about more efficient ways of combining the numbers. It is important to note that direct modeling is a necessary developmental phase which allows children who are not ready for more efficient methods a way to explore the same problems as classmates who have progressed beyond this stage.

As students solidify their understanding of the operation of addition through direct modeling, as mentioned above, they will begin to look for more efficient ways to combine numbers. At this point, students are ready for working with representational modeling. Students will begin developing their own “invented strategies”. Invented strategies are when students begin eliciting their understanding of composing and decomposing numbers in flexible ways in order to more quickly figure out a computation. Some examples of invented strategies are compensation, counting on, counting back, or making a ten. It is important to note that for many students, these strategies are easier, more intuitive, and quicker than the standard algorithm that is not introduced until grade 3. Additionally, they play a crucial role in the development of a student’s fluency in addition. The vast majority of the invented

strategies are helping students develop an understanding of how and why making a ten is helpful. It is important that students are led to discover this relationship as opposed to being told the relationship. Additionally, the importance of “ten” can be reinforced when students are adding a two-digit number and a multiple of ten.

One important note about base ten blocks: Base ten blocks are very helpful in helping model tens and ones for students who have developed the conceptual understanding that the rod representing a ten is comprised of 10 ones. The drawback is that the ten rod cannot be separated into its ten individual pieces. For young learners who are just developing an understanding of the base ten number system, base ten blocks may inhibit their conceptual understanding of both addition and subtraction. Another alternative would be to use linking cubes or straw bundles that can be built into ten and then separated back into ones.

With this standard, students are not expected to interact with problems embedded in a context. Additionally, the orientation of the problem (horizontal or vertical) is not the focus. Students should see problems expressed both ways.

Levels 4-7:

Once students have developed fluency with invented strategies, it is important that they be challenged to make connections between the various strategies, explain those connections, and provide viable arguments (MP 3) for when certain strategies are the most efficient for solving problems. Ultimately a student with deep conceptual understanding of this standard has the capability of looking at someone else’s work, determining the strategy used, explaining the strategy used, determining if the problem is correct or incorrect, explaining why, and providing a critique of the reasoning used to solve the problem (MP 3).

Standard 1.NBT.C.5 (Major Work of the Grade)

Mentally find 10 more or 10 less than a given two-digit number without having to count by ones and explain the reasoning used.

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:
<p>Use concrete manipulatives and counting by ones to find the number that is ten more than a given two-digit number.</p> <p>Use concrete manipulatives and counting by ones to find the number that is ten less than a given two-digit number.</p>	<p>Locate a number on a number line or a hundreds chart that is 10 more than a given number. The student may have to count by ones.</p> <p>Locate a number on a number line or a hundreds chart that is 10 less than a given number. The student may have to count by ones.</p>	<p>Mentally find 10 more than a given two-digit number without having to count by ones and explain the reasoning used.</p> <p>Mentally find 10 less than a given two-digit number without having to count by ones and explain the reasoning used.</p>	<p>Mentally add a multiple of 10 that is less than 100 and explain the reasoning used (e.g., mentally add 30 to 23 and explain how the answer was obtained) when given a two-digit number.</p>

Instructional Focus Statements

Level 3:

This standard provides the bridge between standard K.OA.A.5 where students fluently added and subtracted within ten using mental strategies and standard 2.NBT.B.8 where students will mentally add and subtract 10 or 100 from a given number 100-900. As students deepen their understanding of place value, this standard requires them to understand and apply the concept of ten by mentally finding 10 more or 10 less.

Before students are able to use mental strategies, they must be given the opportunity to interact with direct modeling in order to have the mathematical foundation needed to move along the learning continuum. Students need to experience a wide variety of both concrete math materials and representational mathematical strategies when adding or subtracting 10 from a number in the range of 1 – 100. Students should be exposed to various strategies and then choose the one that is most efficient and makes the most sense to them. This process will allow students to grow so that they are eventually able to add and subtract using mental strategies. This process takes time. Additionally, students need opportunities to explain their reasoning using place value understanding and patterns on the number line or hundreds chart as the basis for their explanation. Instruction should not focus on tricks or procedures with no mathematical connections. Instead, instruction should focus on helping students conceptually understand our place value system, discovering patterns that exist, and mathematically discussing the implications of those patterns as they relate to addition and subtraction.

Students should be engaged in discussion about the patterns they notice when ten is added or subtracted from a given number. The use of a hundreds chart helps students visualize these patterns. Students also need to engage in skip counting by tens from a non-decade number both forward and backward. Through these experiences, students develop procedural fluency and can mentally calculate to find 10 more or 10 less than a given number.

Level 4:

Students at this level can extend their place value understanding to begin adding or subtracting multiples of 10 less than 100 from a given number. The students should be able to defend their answers and explain their strategies.

Standard 1.NBT.C.6 (Major Work of the Grade)

Subtract multiples of 10 from multiples of 10 in the range 10-90 using concrete models, drawings, strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

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:
<p>Accurately subtract 1 from a number less than 10 using concrete objects or drawings.</p>	<p>Inconsistently subtract 10 from multiples of 10 in the range of 10-90 using concrete objects or drawings.</p>	<p>Accurately subtract multiples of 10 from multiples of 10 in the range of 10-90 using concrete objects, drawings, strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.</p>	<p>Accurately mentally subtract multiples of 10 from multiples of 10 in the range of 10-90 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction and verbally explain the strategy used. Additionally, the student can describe patterns or generalizations and provide mathematical justifications for the pattern or generalization that can be used to solve these problems mentally.</p> <p>Identify all multiples of 10 that can be subtracted from a given multiple of 10 and mentally provide all of the resulting differences (e.g., when given 70 the student identifies that they can subtract 70, 60, 50, 40, 30, 20, and 10 and then the student can accurately, mentally, perform all of those calculations).</p>

Instructional Focus Statements

Level 3:

As with addition, the progression of learning for subtraction should move through the same three stages of learning: concrete, representational, and abstract. Instruction within grade 1 with subtraction should also exclusively focus on concrete and representational learning.

In the concrete learning stage, students should be directly modeling by physically manipulating objects or creating drawings to solve math problems. Direct modeling will look like students counting out a quantity of objects and then removing objects from the set one object at a time. Students may not intuitively remove whole groups of ten when they begin working with this standard. Tools that may be very helpful to students' thinking progress in a way where they see the benefit of removing groups of 10 at a time are linking cubes, hundreds charts, ten frames, or any system where students can build a ten from ones (i.e. filling cups with 10 beans). It is important to note that direct modeling is a necessary developmental phase which allows children who are not ready for more efficient methods a way to explore the same problems as classmates who have progressed beyond this stage.

One important note about base ten blocks: Base ten blocks are very helpful in helping model tens and ones for students who have developed the conceptual understanding that the rod representing a ten is comprised of 10 ones. The drawback is that the ten rod cannot be separated into its ten individual pieces. For young learners who are just developing an understanding of the base ten number system, base ten blocks may inhibit their conceptual understanding of both addition and subtraction. Another alternative would be to use linking cubes, straw bundles, or anything that can be built into tens and then separated back into ones.

As students solidify their understanding of the operation of subtraction through direct modeling, they will begin to look for more efficient ways to subtract numbers. At this point, students are ready for working with representational modeling. When subtracting ten, students will shift from removing one object from the group at a time to removing groups of ten and understanding why that is a more efficient way to calculate the difference. This understanding will be crucial for students in grade 2 when they begin working with subtraction problems requiring decomposition as many strategies for subtraction are based on creating more friendly numbers. Additionally, one mathematical learning goal for this standard is for students to connect that subtracting ten from a multiple of ten does not change the value in the ones place and for the student to be able to explain why. This very often gets lost as students are not working with any ones. This understanding still needs to be built for students.

It is also important that students realize the connection that exists between subtraction and addition. One way they should look at $80 - 70$ is as an unknown addend addition problem, $70 + \underline{\quad} = 80$, and reason that 1 ten must be added to 70 to make 80, so $80 - 70 = 10$. Grade 1 students are not expected to compute differences of two-digit numbers other than multiples of ten. Deferring such work until grade 2 allows two-digit subtraction with and without decomposing to occur in close succession.

With this standard, students are not expected to interact with problems embedded in a context. Additionally, the orientation of the problem (horizontal or vertical) is not the focus. Students should see problems expressed both ways.

Level 4:

Once students have developed the understanding of why they can subtract groups of 10 and explain why that is beneficial, they should be challenged to mentally subtract groups of ten from groups of ten and provide a mathematically correct explanation of their strategy and why their strategy works (MP 3). Additionally, students should be challenged to critically think about the patterns that exist when subtracting multiples of ten to determine all multiples that can be subtracted from a given multiple of ten. Students should be able to describe and explain any patterns or generalizations used.

Measurement and Data (MD)

Standard 1.MD.A.1 (Major Work of the Grade)

Order three objects by length. Compare the lengths of two objects indirectly by using a third object. *For example, to compare indirectly the heights of Bill and Susan: if Bill is taller than mother and mother is taller than Susan, then Bill is taller than Susan.*

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 which is longer/shorter, taller/smaller, etc., when given two objects and prompting from the teacher.	Order two objects by length (without measurement). Compare the lengths of two objects.	Order three objects by length. Compare the lengths of two objects indirectly by using a third object.	Compare and order more than three objects by length and verbalize the comparison using comparative vocabulary. Use an object as a benchmark and select more than one object that is "about the same as" the benchmark object.

Instructional Focus Statements

Level 3:

The instructional focus for this standard should extend students understanding from standard K.MD.A.2 where they directly compared two objects with a measurable attribute in common to now specifically ordering three objects focusing solely on the attribute of length. Students should order objects both from least to greatest and from greatest to least. This standard is not focusing students formally measuring objects using mathematical tools such as a ruler. The focus is on having students visually compare and reason about the length of objects. Once they can compare lengths of objects by direct comparison, they should be able to compare several items to a single item, such as finding all the objects in the classroom the same length as (or longer than, or shorter than) their pencil.

When visually the objects are too close to differentiate length, students begin using a third object to indirectly order the set. Students begin developing a foundational understanding of what will become the transitive property in high school geometry. They are developing an understanding that if the pencil is longer than the crayon, and the crayon is longer than the paper clip, then the pencil is also longer than the paper clip. Just as in kindergarten, it is important to stress the necessity of aligning endpoints when measuring. Students may incorrectly align objects to be measured which can result in an inaccurate comparison. Teachers may need to continually remind students to carefully check the alignment of the objects. Creating experiences where endpoints are misaligned and discussing the impact of that error can help solidify students' understanding.

Level 4:

Instruction at this level should focus on extending ordering of objects by length to sets with more than three members. Such sequencing requires multiple comparisons. Initially, students find it difficult to order a large set of objects that differ only slightly in length. They tend to order groups of two or three objects, but they cannot correctly combine these groups while putting the objects in order. Completing this task efficiently requires a systematic strategy, such as moving each new object "down the line" to see where it fits. Students need to understand that each object is larger than those that come before it, and shorter than those that come after. Reasoning that draws on transitivity is necessary. Additionally, students should be able to explain their comparisons using appropriate mathematical vocabulary.

Standard 1.MD.A.2 (Major Work of the Grade)

Measure the length of an object using non-standard units and express this length as a whole number of units.

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:
<p>Identify length as an attribute of an object.</p> <p>Students at this level are emergent in their understanding of measuring an object. In the process of finding the length of an object using a non-standard unit, they will often not begin measuring at one end of the object, will leave gaps when measuring, or may overlap the non-standard units causing them to get imprecise answers.</p>	<p>Line up non-standard unit of measure (e.g., paper clips) next to an object with the endpoints aligned and no gaps or overlaps. Students at this level may not connect this conceptually to the concept of length. They see 5 paper clips and 1 pencil as opposed to a pencil that is 5 paper clips long.</p>	<p>Measure the length of an object using non-standard units and express this length as a whole number of units.</p>	<p>Measure the length of an object using two different non-standard units and predict prior to measuring if the number of units will be more or less than the other units. Students should express the length as whole numbers using each unit.</p> <p>Explain common sources of error in measurement.</p> <p>Accurately estimate the length of an object using non-standard units before measuring the object using the non-standard unit of measure.</p>

Instructional Focus Statements

Level 3:

It is important to note that this is a student’s first experience with actually measuring objects. This standard is building on the understanding students gained in standard K.MD.A.2 where they compared objects by a common attribute such as length. When comparing by length, instruction focused in kindergarten on lining the objects up at one endpoint in order to visually see which was longer. Students have never formally or informally calculated length. Students must develop a conceptual understanding that length is the attribute of an object found by measuring how far it is between the two endpoints of the object. Measuring length consists of two aspects, choosing a unit of measure and subdividing (mentally and physically) the object by that

unit, placing that unit end to end alongside the object. The length of the object is the number of units required to iterate from one end of the object to the other, without gaps or overlaps. Length and unit iteration are critical in developing an understanding of and using the number line in subsequent grades.

Students in grade 1 use multiple copies of same-size objects to measure the length of a larger object. They learn to lay physical units (paper clips, cubes, toothpicks, etc.) end to end and count them to measure a length. Through numerous experiences and careful questioning by the teacher, students will recognize the importance of carefully measuring so that there are not any gaps or overlaps in order to get an accurate measurement.

Level 4:

When students use different sized units to measure the same object, they learn that the sizes of the units must be considered, rather than relying solely on the amount of objects counted. Students at this level measure the length of an object using two different non-standard units and predict if the number of units will be more or less than the other unit. Students understand that the smaller the unit, the more units will be needed to measure that object. Further, students also note that the larger the unit, the fewer number of units will be needed to measure that object.

Instruction should also focus on developing a student's estimation skills as related to length. Students should be challenged to estimate what the length of an object is in non-standard units, calculate the actual whole number measurement, and then explain any discrepancies. Students should also be able to explain sources of error in measurement.

Standard 1.MD.B.3 (Supporting Content)

Tell and write time in hours and half-hours using analog and digital clocks.

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:
Tell and write time in hours using digital clocks.	Tell and write time in hours using analog and digital clocks. Tell and write time in half-hours using digital clocks.	Tell and write time in hours and half-hours using analog and digital clocks.	Show the time on a clock when given a time in hours and half hours.

Instructional Focus Statements

Level 3:

Grade 1 is a student’s first formal introduction to telling and writing time. For analog clocks, instruction should first focus on helping students understand the differences between the two hands on the clock and the functions of these hands. Equally, while telling time with digital clocks is more intuitive for students, they need to understand the colon and the importance of the numbers prior to and following that colon. In order to gain a true conceptual understanding of telling time, students need to understand the similarities and differences between the two devices and be able to translate time between them.

Focusing on analog clocks, by carefully watching and talking about a clock with only the hour hand, students notice when the hour hand is directly pointing at a number, or when it is slightly ahead/behind a number. Using student understanding of halves (standard 1.G.A.3) can be an excellent connection to determining a "half" hour. Folding clocks in half to show where the minute hand would need to point in order to be a half hour can help solidify this understanding. In addition, using language, such as “about 6 o’clock” and “a little bit past 8 o’clock”, and “almost 9 o’clock” helps children begin to read hours on a clock with some accuracy. Through rich experiences, first grade students read both analog (numbers and hands) and digital clocks, orally tell the time, and write the time to the hour and half-hour. Students must write the time correctly using the colon notation, such as 2:30.

Level 4:

Students should be able to demonstrate conceptual understanding of time with digital and analog clocks by representing the same time written or spoken in words in both the analog and digital format. Students need to make sure they are using the correct placement of the hour hand when showing time to the hour and half hour. Students can duplicate the time on a clock model or draw the hands on a printed copy of a clock.

Standard 1.MD.B.4 (Supporting Content)

Count the value of a set of like coins less than one dollar using the ¢ symbol only.

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 a penny, nickel, dime, and quarter.	Identify and state the value of a penny, nickel, dime, and quarter.	Count the value of a set of like coins less than one dollar using the ¢ symbol only.	<p>Determine the value of a set of like coins less than one dollar in a contextual situation and record the answer using the ¢ symbol.</p> <p>Determine the value of a set of pennies and one other type of coin less than one dollar using the ¢ symbol only.</p>

Instructional Focus Statements

Level 3:

In kindergarten, students learned to identify coins and identify the value of pennies, nickels, dimes, and quarters. In grade 1, students will use their knowledge of skip counting by ones, fives and tens to assess the value of a set of like coins. It is important that the coins in a set be alike as this is what allows students to use skip-counting to assess the value of a set. It is equally important that students be able to use real coins as manipulatives as they skip count. This concrete representation of money will help them develop a conceptual understanding as well as help them start the trajectory of developing fluency with money.

Since money is a non-proportional model, the value of the coins is not physically related to the value of the other coins. For example, the dime is not physically 10 times larger than the penny. Students need to have an understanding of 1, 5, 10, and 25 when thinking about coin values as they need to be able to think of these quantities without seeing countable objects. Using a hundreds chart can help students connect skip counting to counting to identify the value of coins. Students can place nickels on the chart as they skip count by 5 or dimes as the skip count by 10s. Placing the coins on the value it represents can help connect the non-proportional coin to the value it represents to skip counting by those values.

Level 4:

After success with counting sets of like coins, students should be given the opportunity to solve contextual problems which involve counting sets of like coins. Teachers should ensure students have opportunities to talk and make sense of the problems they are solving. Students should communicate their thinking and justify their answers for the contextual problems. Additionally, students can begin working with sets that contain pennies and a single other type of coin. This allows students to first skip count to find the value of the larger valued coins and then count by ones to add the value of the pennies. These two skills will bridge this first grade standard to standard 2.MD.C.8 where students solve contextual problems involving dollar bills, quarters, dimes, nickels, and pennies with no restriction of working with sets of like coins.

Standard 1.MD.C.5 (Supporting Content)

Organize, represent, and interpret data with up to three categories. Ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.

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:
<p>Organize and represent data with up to two categories.</p> <p>Analyze given data pre-sorted into two categories to answer questions about how many are in each category and how many more or less are in one category than in another.</p>	<p>Organize and represent data with up to two categories. Ask and answer questions about how many are in each category.</p> <p>Analyze given data pre-sorted into three categories, answer questions about how many are in each category and how many more or less are in one category than in another.</p>	<p>Organize, represent, and interpret data with up to three categories. Ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.</p>	<p>Organize, represent, and interpret data with up to three categories in more than one way. Ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.</p>

Instructional Focus Statements

Level 3:

Students in grade 1 build on their understanding of sorting collections of objects (standard K.MD.C.4) to not only sort data but also to generate data from a posed question and then sorting, organizing, representing, and interpreting the categorical data collected. When initially working with this standard, students may benefit from working with pieces of the standard in chunks. For example, they may initially interpret data from a given graph or table to answer questions by counting the data points in each category, determining the category with the most or least members, or answering how many more and how many less questions based on the represented data. This gives students the opportunity to see different ways of organizing data before they are asked to organize their own. Additionally, they may benefit from organizing categorical data collected from a posed question and representing it in some way without answering subsequent questions about their data. That said, it is very important that students move beyond looking at the pieces of this standard in isolation so that they gain a complete understanding of the process of collecting data, representing data, and posing and answering questions about their findings.

It is important to note that teachers need to model the type of questions that can generate categorical data as this may not be initially intuitive for grade 1 students. For example, the teacher may begin by posing questions to have students discuss three possible categories of responses such as “what is your favorite ice cream flavor?” Students could then identify the three categories for which they want to collect data. Eventually, this should shift to where students are generating the question as well as the categories. Students can then collect data from their peers around the identified question. After data is collected, the data can be organized in a wide variety of ways. Some examples of how students can organize their collected data include in a table, with tally marks, and in pictographs. There is no single correct way to represent categorical data and the standard does not require students to use any specific format. After choosing a representation, students should be able to interpret the results and answer questions by counting the data points in each category, determining the category with the most or least members, and answering how many more and how many less questions based on the represented data. Students’ data work in grade 1 has important connections to the grade level addition and subtraction standards. This standard provides a real-world way for students to incorporate adding and subtracting within 20 (standard 1.OA.C.5).

Level 4:

Students at this level are building on their understanding of data to organize, represent, and interpret data with up to three categories in more than one way. Students should be able to ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another. In addition, students should be able to identify strengths and weaknesses of the different representations of the same data.

Geometry (G)

Standard 1.G.A.1 (Supporting Content)

Distinguish between attributes that define a shape (e.g., number of sides and vertices) versus attributes that do not define the shape (e.g., color, orientation, overall size); build and draw two-dimensional shapes to possess defining attributes.

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:
<p>Recognize multiple representations of a common two-dimensional shape but may not be able to define attributes.</p> <p>Build and draw common two-dimensional shapes when provided a picture of the shape.</p>	<p>Recognize multiple representations of a two-dimensional shape and state at least one attribute of that shape.</p> <p>Recognize multiple representations of a common three-dimensional shape and state at least one attribute of that shape.</p> <p>Build and draw common two-dimensional shapes.</p>	<p>Distinguish between attributes that define a two-dimensional shape versus attributes that do not define the shape.</p> <p>Distinguish between attributes that define a three-dimensional shape versus attributes that do not define the shape.</p> <p>Build and draw two-dimensional shapes that possess defining attributes.</p>	<p>Identify specific attributes that define that shape when given a two or three-dimensional shape.</p> <p>Build and draw two-dimensional shapes and compare two shapes using defining attributes and precise academic vocabulary.</p>

Instructional Focus Statements

Level 3:

In kindergarten, students focused on identifying and describing both two and three-dimensional shapes and analyzing, comparing, creating, and composing both two and three-dimensional shapes. In grade 1, students build on these experiences as they continue to reason about shapes and their attributes focusing on answering questions such as “What makes a square a square”. This will help develop their conceptual understanding and competence in determining which attributes actually define both two and three-dimensional shapes and which attributes do not define shapes.

One way to help students concretely develop and solidify this understanding is for them to sort shapes. In interacting with sorting, students need a wide variety of encounters with a wide variety of different shapes. Additionally the directions should fluctuate. Sometimes students should be provided what attribute to sort by and then after the shapes are sorted determine if the attribute was a defining or non-defining attribute. Sometimes students should be given the shapes and the student must decide on which attribute they are going to sort by and then identify if their chosen attribute is defining or non-defining. While their categories may not always be conventional, explaining why certain shapes are grouped together helps students develop vocabulary for naming and describing the defining attributes of shapes.

Students will build on their previous geometric vocabulary by adding the terms open and closed figures. Student exploration with a variety of shapes helps develop this understanding.

Additionally, students build on the building and drawing experiences from kindergarten in order to build and draw two-dimensional shapes with specific attributes.

Level 4:

Mathematically proficient students communicate precisely using appropriate mathematical language as they engage in discussions about their reasoning. When asked to build or draw given two-dimensional shapes, students should be encouraged to compare, contrast, and justify their thinking using defining attributes and precise geometric language.

For example, the teacher asks students to use a geoboard to make a triangle. One student makes an equilateral triangle and the other student makes an isosceles triangle. A student should be able to compare and contrast the two different types of triangles and will be able to defend that both are triangles. Students do not need to know the formal names for types of triangles but should be able to identify that any three sided closed figure with three vertices is a triangle. Student recognizes that all triangles do not look alike.

Standard 1.G.A.2 (Supporting Content)

Create a composite shape and use the composite shape to make new shapes by using two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, rectangular prisms, cones, and cylinders).

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:
<p>Compose larger shapes using simple shapes.</p> <p>Identify smaller shapes within a larger shape.</p>	<p>Create a composite shape using common two-dimensional shapes.</p> <p>Create a composite shape using common three-dimensional shapes.</p>	<p>Create a composite shape using two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) and use the composite shape to make new shapes.</p> <p>Create a composite shape using three dimensional shapes (cubes, rectangular prisms, cones, and cylinders) and use the composite shape to make new shapes.</p>	<p>Create a composite shape using two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) that tessellates a plane.</p> <p>Explain the relationship between the size and the number of shapes needed to fill a composite shape.</p>

Instructional Focus Statements

Level 3:

In kindergarten with standard K.G.B.6, students composed larger shapes using simple shapes and identified smaller shapes within a larger shape. In grade 1, student build on this understanding in order to create composite shapes, (a figure made up of two or more geometric shapes) deepening their understanding of how shapes fit together to create different shapes. They also continue noticing shapes within an already existing shape. They may use such tools as pattern blocks, tangrams, attribute blocks, or virtual shapes to compose different shapes. Discussion about these shapes and how they are created and composed is essential to solidifying understanding. The ability to compose and decompose shapes is crucial when students work with area of irregular shapes in subsequent grades.

Over time, students learn to perceive a combination of shapes as a single new shape (e.g., recognizing that two squares can be combined to make a rectangle, and simultaneously seeing the rectangle and the two squares). As a result they develop competencies that include: solving shape puzzles, constructing designs with shapes, and creating and maintaining a shape as a unit.

Students should also be interacting with three-dimensional figures. For example, students combine two right triangular prisms to create a right rectangular prism, and recognize that each triangular prism is half of the rectangular prism supporting the understanding of “halves” being developed in standard 1.G.A.3. It is important to note that students do not need to name the formal names of right rectangular prism but instead recognize they can create a new shape from existing shapes.

As students combine shapes, they continue to develop their precision in describing and identifying geometric attributes and properties and determining how shapes are alike and different, building important foundations for measurement and initial understandings of properties such as congruence and symmetry.

Level 4:

Students at this level should be able to combine both like and unlike shapes to make composite shapes. For example, when given an outline of a composite shape made from pattern block, students can fill in the outline with pattern blocks in more than one way. Additionally, students can identify the solution with the greatest amount of pieces and least amount of pieces. Students can explain the relationship between the size and the number of shapes needed to fill a composite shape. Students can be challenged to create a new shape that tessellates the plane.

Standard 1.G.A.3 (Supporting Content)

Partition circles and rectangles into two and four equal shares, describe the shares using the words *halves*, *fourths*, and *quarters*, and use the phrases *half of*, *fourth of*, and *quarter of*. Describe the whole as *two of*, or *four of* the shares. Understand for these examples that partitioning into more equal shares creates smaller shares.

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:
<p>Identify circles and rectangles.</p> <p>Compose a circle from half or quarter circles.</p> <p>Compose a rectangle from 2 smaller, congruent rectangles.</p>	<p>Explain that circles and rectangles can be partitioned into smaller pieces.</p> <p>Partition circles and rectangles in 2 equal pieces and identify them as halves.</p>	<p>Partition circles and rectangles into two equal shares, describe the shares using the words <i>halves</i>, and use the phrases <i>half of</i> to describe the relationship between a share and the whole.</p> <p>Partition circles and rectangles into four equal shares, describe the shares using the words <i>fourths</i> and <i>quarters</i>, and use the phrases <i>fourth of</i> or <i>quarter of</i> to describe the relationship between a share and the whole.</p> <p>Describe the whole as two of, or four of the shares.</p> <p>Explain that partitioning circles or rectangles into more equal shares creates smaller shares.</p>	<p>Explain why partitioning circles or rectangles into more equal shares creates smaller shares.</p> <p>Partition the same rectangle into halves in more than one way.</p> <p>Partition the same rectangle into fourths in more than one way.</p>

Instructional Focus Statements

Level 3:

This standard is a foundational building block for students' development of a conceptual understanding of fractions. Students should explore partitioning regions into equal shares of two or four pieces using concrete objects. Through numerous experiences with multiple representations, students are exposed to and begin using the words, halves, fourths, and quarters, and the phrases half of, fourth of, and quarter of to describe their thinking and solutions. Working with the "the whole", students understand that "the whole" is composed of two halves, or four fourths or four quarters.

Students need the opportunity to divide shapes in order to make the connection that as they create more parts, decomposing the shares from wholes to halves or halves to fourths, the parts get smaller. Instruction should center on the size of the halves and fourths as students often think fourths are larger since there are four of them in a whole. This understanding is intuitively difficult for many students. Experiences with many different concrete manipulatives and discourse around how the more times a shape is cut the smaller the pieces over time can help students conceptually grasp this important mathematical understanding.

Creating experiences where students explore shapes that are cut into two or four pieces that are not equal and facilitating discourse around why they are not halves or fourths can help students understand the need for the pieces to be equal.

Level 4:

Students need a wide variety of experiences with different sized circles and rectangles to recognize that when they cut a shape into two or four equal pieces, each piece will equal one half or one fourth of its original whole. They begin developing the mathematical understanding that with fractions the whole matters. Additionally they realize that halves of two different sized shapes are not the same size and thus not equal. Students can also be challenge to identify and cut rectangles into halves and quarters in different ways. This will lead towards the understanding developed in standard 2.G.A.3 that equal shares of identical wholes need not have the same shape.