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

1st Grade Mathematics ● Unpacked Contents
For the new Standard Course of Study that will be effective in all North Carolina schools in the 2017-18 School Year.

This document is designed to help North Carolina educators teach the 1st Grade Mathematics Standard Course of Study. NCDPI staff are continually updating and improving these tools to better serve teachers and districts.

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

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

How do I send Feedback?
Link for: Feedback for NC's Math Unpacking Documents We will use your input to refine our unpacking of the standards. Thank You!

Just want the standards alone?
Link for: NC Mathematics Standards

North Carolina Course of Study – 1st Grade Standards

Standards for Mathematical Practice

Operations and Algebraic Thinking	Number and Operations in Base Ten	Measurement and Data	Geometry
Represent and solve problems. NC.1.OA.1 NC.1.OA.2 *Understand and apply the properties of operations.* NC.1.OA.3 NC.1.OA.4 *Add and subtract within 20.* NC.1.OA.9 NC.1.OA.6 *Analyze addition and subtraction equations within 20.* NC.1.OA.7 NC.1.OA.8	*Extend and recognize patterns in the counting sequence.* NC.1.NBT.1 NC.1.NBT.7 *Understand place value.* NC.1.NBT.2 NC.1.NBT.3 *Use place value understanding and properties of operations.* NC.1.NBT.4 NC.1.NBT.5 NC.1.NBT.6	*Measure lengths.* NC.1.MD.1 NC.1.MD.2 *Build understanding of time and money.* NC.1.MD.3 NC.1.MD.5 *Represent and interpret data.* NC.1.MD.4	*Reason with shapes and their attributes.* NC.1.G.1 NC.1.G.2 NC.1.G.3

Standards for Mathematical Practice

Practice	Explanation and Example
1. Make sense of problems and persevere in solving them.	Mathematically proficient students in First Grade continue to develop the ability to focus attention, test hypotheses, take reasonable risks, remain flexible, try alternatives, exhibit self-regulation, and persevere (Copley, 2010). As the teacher uses thoughtful questioning and provides opportunities for students to share thinking, First Grade students become conscious of what they know and how they solve problems. They make sense of task-type problems, find an entry point or a way to begin the task, and are willing to try other approaches when solving the task. They ask themselves, "Does this make sense?" First Grade students' conceptual understanding builds from their experiences in Kindergarten as they continue to rely on concrete manipulatives and pictorial representations to solve a problem, eventually becoming fluent and flexible with mental math as a result of these experiences.
2. Reason abstractly and quantitatively.	Mathematically proficient students in First Grade recognize that a number represents a specific quantity. They use numbers and symbols to represent a problem, explain thinking, and justify a response. For example, when solving the problem: "*There are 60 children on the playground. Some children line up. There are 20 children still on the playground. How many children lined up?"* first grade students may write 20 + 40 = 60 to indicate a Think-Addition strategy. Other students may illustrate a counting-on by tens strategy by writing 20 + 10 + 10 + 10 + 10 = 60. The numbers and equations written illustrate the students' thinking and the strategies used, rather than how to simply compute, and how the story is decontextualized as it is represented abstractly with symbols.
3. Construct viable arguments and critique the reasoning of others.	Mathematically proficient students in First Grade continue to develop their ability to clearly express, explain, organize and consolidate their math thinking using both verbal and written representations. Their understanding of grade appropriate vocabulary helps them to construct viable arguments about mathematics. For example, when justifying why a particular shape isn't a square, a first grade student may hold up a picture of a rectangle, pointing to the various parts, and reason, "It can't be a square because, even though it has 4 sides and 4 angles, the sides aren't all the same size." In a classroom where risk-taking and varying perspectives are encouraged, mathematically proficient students are willing and eager to share their ideas with others, consider other ideas proposed by classmates, and question ideas that don't seem to make sense.
4. Model with mathematics.	Mathematically proficient students in First Grade model real-life mathematical situations with a number sentence or an equation, and check to make sure that their equation accurately matches the problem context. They also use tools, such as tables, to help collect information, analyze results, make conclusions, and review their conclusions to see if the results make sense and revising as needed.
5. Use appropriate tools strategically.	Mathematically proficient students in First Grade have access to a variety of concrete (e.g. 3-dimensional solids, ten frames, number balances, number lines) and technological tools (e.g., virtual manipulatives, calculators, interactive websites) and use them to investigate mathematical concepts. They select tools that help them solve and/or illustrate solutions to a problem. They recognize that multiple tools can be used for the same problem- depending on the strategy used. For example, a child who is in the counting stage may choose connecting cubes to solve a problem. While a student who understands parts of number, may solve the same problem using ten-frames to decompose numbers rather than using individual connecting cubes. As the teacher provides numerous opportunities for students to use educational materials, first grade students' conceptual understanding and higher-order thinking skills are developed.
6. Attend to precision.	Mathematically proficient students in First Grade attend to precision in their communication, calculations, and measurements. They are able to describe their actions and strategies clearly, using grade-level appropriate vocabulary accurately. Their explanations and reasoning regarding their process of finding a solution becomes more precise. In varying types of mathematical tasks, first grade students pay attention to details as they work. For example, as students' ability to attend to position and direction develops, they begin to notice reversals of numerals and self-correct when appropriate. When measuring an object, students check to make sure that there are not any gaps or overlaps as they carefully place each unit end to end to measure the object (iterating length units). Mathematically proficient first grade students understand the symbols they use (=, >,<) and use clear explanations in discussions with others. For example, for the sentence 4 > 3, a proficient student who is able to attend to precision states, "Four is more than 3" rather than "The alligator eats the four. It's bigger."

7. Look for and make use of structure.	Mathematically proficient students in First Grade carefully look for patterns and structures in the number system and other areas of mathematics. For example, while solving addition problems using a number balance, students recognize that regardless whether you put the 7 on a peg first and then the 4, or the 4 on first and then the 7, they both equal 11 (commutative property). When decomposing two-digit numbers, students realize that the number of tens they have constructed 'happens' to coincide with the digit in the tens place. When exploring geometric properties, first graders recognize that certain attributes are critical (number of sides, angles), while other properties are not (size, color, orientation).
8. Look for and express regularity in repeated reasoning.	Mathematically proficient students in First Grade begin to look for regularity in problem structures when solving mathematical tasks. For example, when adding three one-digit numbers and by making tens or using doubles, students engage in future tasks looking for opportunities to employ those same strategies. Thus, when solving 8+7+2, a student may say, "I know that 8 and 2 equal 10 and then I add 7 more. That makes 17. It helps to see if I can make a 10 out of 2 numbers when I start." Further, students use repeated reasoning while solving a task with multiple correct answers. For example, in the task "There are 12 crayons in the box. Some are red and some are blue. How many of each could there be?" First Grade students realize that the 12 crayons could include 6 of each color (6+6 = 12), 7 of one color and 5 of another (7+5 = 12), etc. In essence, students repeatedly find numbers that add up to 12.

Return to Standards

Represent and solve problems.

NC.1.OA.1 Represent and solve addition and subtraction word problems, within 20, with unknowns, by using objects, drawings, and equations with a symbol for the unknown number to represent the problem, when solving:

- Add to/Take from-Change Unknown
- Put together/Take Apart-Addend Unknown
- Compare-Difference Unknown

Clarification

In this standard, students extend their work from NC.K.OA.1 to represent and solve addition and subtraction problems within 20. Students should always create representations of word problems

In addition to continuing work with the problem types introduced in kindergarten, standard NC.1.OA.1 calls for first graders to work additional problem types, including:

- add to/take from – change unknown
- put together/take apart – addend unknown
- compare – difference unknown

		Result Unknown	Change Unknown
Action	**Add To**	Two birds sat in a tree. Three more birds fly to the tree. How many birds are in the tree now? 2 + 3 = ? K	Two birds sat in a tree. Some more birds flew there. Then there were five birds in the tree. How many birds flew over to the first two? 2 + ? = 5 1
	Take From	Five birds were in a tree. Two birds flew away. How many birds are in the tree now? 5 – 2 = ? K	Five birds were in a tree. Some flew away. Then there were three birds in the tree. How many birds flew away? 5 - ? = 3 1

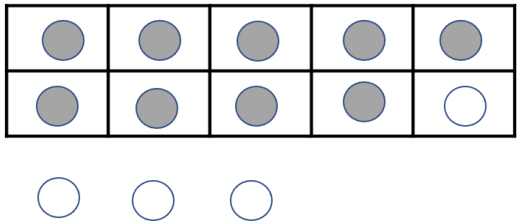
		Total Unknown	Addend Unknown	Both Addends Unknown
No Action	Put Together/ Take Apart	Three red birds and two blue birds are in a tree. How many birds are in the tree? 3 + 2 = ? K	Five birds are in a tree. Three are red and the rest are blue. How many birds are blue? 3 + ? 5 5 – 3 = ? 1	Five birds are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

Checking for Understanding

Nine bunnies were sitting on the grass. Some more bunnies hopped there. Now, there are 13 bunnies on the grass. How many bunnies hopped over there?

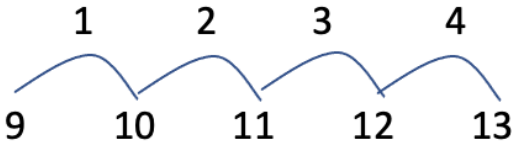
Possible responses: (Strategies can be found in NC.1.OA.6):

<u>Using objects (manipulatives):</u>
I put 9 counters out that were red. I then added more counters that were yellow until I had 13.



<u>Counting On with fingers:</u>
Nine. Student holds a finger for each additional number as they count from 9 to 13: 10, 11, 12, 13. Holding up her four fingers, 4! 4 bunnies hopped over there."

<u>Counting On using a Number Line:</u>
I drew a line and numbered it from 9 to 13.
I started at 9 and counted 4 jumps until I landed at 13.



Represent and solve problems.

NC.1.OA.1 Represent and solve addition and subtraction word problems, within 20, with unknowns, by using objects, drawings, and equations with a symbol for the unknown number to represent the problem, when solving:

- Add to/Take from-Change Unknown
- Put together/Take Apart-Addend Unknown
- Compare-Difference Unknown

Clarification

As students develop strategies for solving a variety of problem situations, they build meaning for the operations of addition and subtraction. The introduction of these new problem types should start with problems with small numbers (within 5 or 10) that can be easily represented with manipulatives and drawings. Keyword strategies should not be taught and students should be given opportunities to make sense of the action in word problems using approaches such as the Three Reads Strategy or the process of Retelling, Representing a problem with manipulatives or a picture.

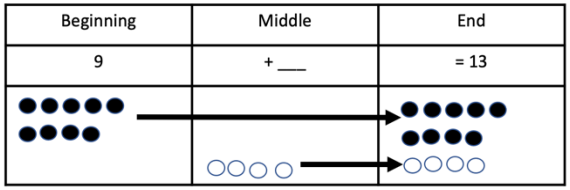
Change unknown and addend unknown problems provide a context for students to explore the relationship between subtraction and addition, where subtraction is the inverse (or opposite) operation. Developing the understanding of subtraction as an unknown addend addition problem is an essential goal for later mathematics. As students work with change unknown and addend unknown problems, they are expected to write equations that match the situation and the order of the numbers in the problem. Students may apply the relationship between addition and subtraction and use alternative equations and approaches to find the answer, but student in first grade are expected to record equations that match the given word problem.

When solving word problems that are compare situations, two amounts are compared to find “How many more” or “How many less/fewer”. One amount is compared to the other amount. Students build on their understanding of equal to, more than, and less than for two groups of objects or two numbers.

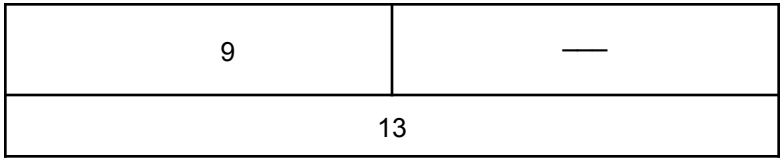
	Difference Unknown
Compare	***“How many more?” version:*** Lara has two stickers. Jade has five stickers. How many more stickers does Jade have than Lara? ***“How many less?” version:*** Lara has two stickers. Jade has five stickers. How many fewer stickers does Lara have than Jade? 2 + ? = 5 5 - 2 = ? 1

Checking for Understanding

Beginning-Middle-End Chart:
I made a beginning-middle-end chart. I put 9 in the beginning, and I knew that I needed to end with 13. I put 9 counters in the beginning column and then added counters to the middle column until we had a total of 13. That was 4 counters, so my answer is 4. I then moved all the counters to the end column and checked my work.



Part-part whole mat:
I know that 13 is my whole so 9 and my answer are parts. I then counted up from 9 to get to 13. The answer is 4.



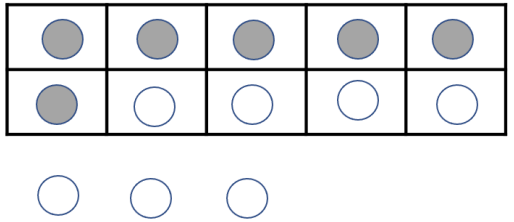
Making Ten:
I know that 9 and 1 make 10. Then I need 3 more to get to 13. 1 plus 3 is 4 so the answer is 4.

Decomposing a Number Leading to a Ten:
I know that I can count back from 13 to get to 9.
13 minus 3 is 10. 10 minus 1 is 9. So I need to take 4 away to get from 13 to 9.

Represent and solve problems.

NC.1.OA.1 Represent and solve addition and subtraction word problems, within 20, with unknowns, by using objects, drawings, and equations with a symbol for the unknown number to represent the problem, when solving:

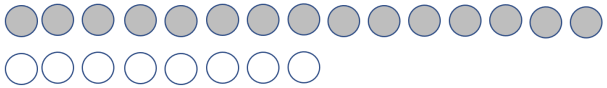
- Add to/Take from-Change Unknown
- Put together/Take Apart-Addend Unknown
- Compare-Difference Unknown

Clarification	**Checking for Understanding**
As students work with a variety of problem types, they extend the sophistication of addition and subtraction methods used in kindergarten (counting). Now, students use a variety of strategies (specified in NC.1.OA.6) which includes strategies such as counting on, making a group ten, and number combinations and basic facts such as doubles +/- 1 or +/- 2 to solve problems. Students also use a variety of representations including manipulatives and drawings with tools such as number lines, ten frames, and beginning-middle-end charts. Introduction of Symbols and Equations In order for students to read and use equations to represent their thinking, they need extensive experiences with addition and subtraction situations in order to connect the experiences with symbols (+, -, =) and equations (5=3+2). In Kindergarten, students demonstrated the understanding of how objects can be joined (addition) and separated (subtraction) by representing addition and subtraction situations using objects, pictures and words. In First Grade, students extend this understanding of addition and subtraction situations to use the addition symbol (+) to represent joining situations, the subtraction symbol (-) to represent separating and comparing situations, and the equal sign (=) to represent that one side of the equation "has the same value as" the other side of the equation. Avoid keyword strategies Students should be asked to explain how they know why they are adding or subtracting based on the action of the word problem. Keyword strategies should not be used at any time in elementary school since they cause a dependence on specific words that do not always line up to that operation in second grade and later grades. As a result, teachers should consistently ask, "What is the action in this problem?" and "What number are we trying to find out?" For a complete chart of problem types see page 42.	13 apples are on the table. 6 of them are red and the rest are green. How many apples are green? *Possible responses:* *Counting On:* *I started at 6 and counted up until I got to 13.* 6 7 8 9 10 11 12 13 *I counted up 7 numbers so the answer is 7.* *Counting On with Counters:* *I put 6 red counters in the ten frame. I then added counters until I had 13. I added 7 so that is the answer.*  *Making Ten:* *I am adding from 6 up until I get to 13.* *I know that 6 + 4 is 10. I need 3 more to get to 13.* *I added 4 and 3 so that is a total of 7.* *Decomposing a Number Leading to a Ten:* *I decided to subtract 6 from 13. I know that 13 take away 3 is 10. I need to take 3 more away and 10 take away 3 is 7. My answer is 7.* *Using Number Combinations (Fluency Facts):* Doubles +/- 1 or 2: *I know that 6 and 6 is 12. So, 6 and 7 is 13. There are 7 green apples.*

Represent and solve problems.

NC.1.OA.1 Represent and solve addition and subtraction word problems, within 20, with unknowns, by using objects, drawings, and equations with a symbol for the unknown number to represent the problem, when solving:

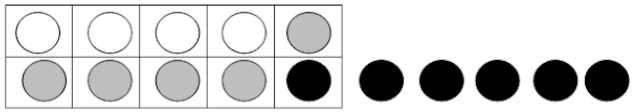
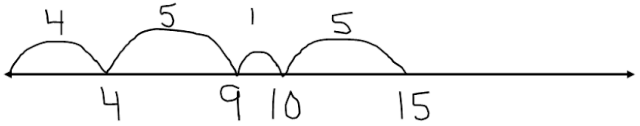
- Add to/Take from-Change Unknown
- Put together/Take Apart-Addend Unknown
- Compare-Difference Unknown

Clarification	Checking for Understanding
	Joe has 8 red balloons and 15 blue balloons. How many more blue balloons does Joe have compared to his number of red balloons? *Possible responses:* *<u>Comparing sets with manipulatives:</u>* *I made a set of 15 and a set of 8. When I lined them up I noticed that there are 7 more balloons than red balloons.*  *<u>Part-part whole mat with numbers:</u>* 15 8 | ? *<u>Decomposing a Number Leading to a Ten:</u>* *I noticed that I needed to subtract 8 from 15. I know that 15 take away 5 is 10. I then needed to take away 3 more which gets me to 7. The answer is 7.*

Return to Standards

Represent and solve problems.

NC.1.OA.2 Represent and solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, by using objects, drawings, and equations with a symbol for the unknown number.

Clarification	**Checking for Understanding**
Students are expected to solve multi-step word problems by adding (joining) three numbers whose sum is less than or equal to 20, using a variety of strategies and mathematical representations that are described in NC.1.OA.1 and NC.1.OA.6. Students may use concrete models or drawings to support their work on this standard before transitioning to using tools such as adding on a number line or number combinations (facts) to find the answers to these problems. This standard provides rich opportunities for students to develop specific addition strategies as well as the commutative property of addition. In Grade 1, one of the primary strategies is making a ten, so students should initially have ample opportunities to add three addends where two of the addends equal 10. Based on the commutative property of addition the addends can be arranged without changing the answer. When posing problems consider giving students problems where the first and third addend have a sum that is equal to 10. Examples include: 4 + 5 + 6, 2 + 3 + 8, and 3 + 4 + 7.	Mrs. Smith has 4 oatmeal raisin cookies, 5 chocolate chip cookies, and 6 gingerbread cookies. How many cookies does Mrs. Smith have? *Possible responses:* *Student A:* *I put 4 counters on the Ten Frame for the oatmeal raisin cookies. Then, I put 5 different color counters on the ten frame for the chocolate chip cookies. Then, I put another 6 color counters out for the gingerbread cookies. Only one of the gingerbread cookies fit, so I had 5 leftover. Ten and five more makes 15 cookies. Mrs. Smith has 15 cookies.*  $4 + 5 + 6 =$ *Student B:* *I used a number line. First, I jumped to 4, and then I jumped 5 more. That's 9. I broke up 6 into 1 and 5 so I could jump 1 to make 10. Then, I jumped 5 more and got 15. Mrs. Smith has 15 cookies.*  $4 + 5 + 6 =$ *Student C:* *I wrote: 4 + 5 + 6 = □. I changed the order and added 4 and 6 first since I know that 4 and 6 equals 10, so the oatmeal raisin and gingerbread equals 10 cookies. Then I added the 5 chocolate chip cookies. 10 and 5 is 15. So, Mrs. Smith has 15 cookies.* Marcello wanted to add 3 + 4 + 7. He decided to add 3 and 7 first and then added 4 to get to 14. Is Marcello's work correct? Explain why. If Marcello continues to use that strategy, how would he solve 6 + 8 + 4? *Possible Response:* *Marcello's work is correct. When you are adding three numbers you can change the order without changing the answer. Marcello added 2 numbers together to make a 10. Based on that strategy I think he would add 6 and 4 to get to 10 and then add 8 more to get to 18.*

Return to Standards

Understand and apply the properties of operations.
NC.1.OA.3 Apply the commutative and associative properties as strategies for solving addition problems.

Clarification

This standard calls for students to apply both the commutative and associative properties of operations as they solve addition problems

Commutative Property of Addition	Associative Property of Addition
This property is the primary focus of Grades 1-4. The order of the addends does not change the sum. *For example, if* *8 + 2 = 10 is known, then* *2 + 8 = 10 is also known.* This is also seen in NC.1.OA.2 when students add 3 addends. *For example,* *6 + 3 + 4 is the same as* *6 + 4 + 3.*	This property focuses on grouping addends when 3 addends are included. It is clearer when parentheses are introduced in Grade 5. In Grade 1 this property can be seen as an intersection with the commutative property when students add 3 addends together (NC.1.OA.2) and consider which 2 addends should be added together first. Specifically, the order of the addends does not change the answer. For example, when adding 2 + 6 + 4, the sum from adding the first two numbers first 2 + 6 and then the third number 4 equals 12. Student can get the same answer if they group 6 and 4 together first to get 10 and then add 2 to get 12.

Students use mathematical tools and representations (e.g., cubes, counters, number balance, number line, 100 chart) to demonstrate these ideas in the context of solving a problem.

Students in first grade do not use the formal terms “commutative” and “associative”.

Checking for Understanding

Commutative Property Example**:**
There are 8 birds in the tree. Some are red and some are yellow. There are 3 birds of one color. How many birds of each color could there be?

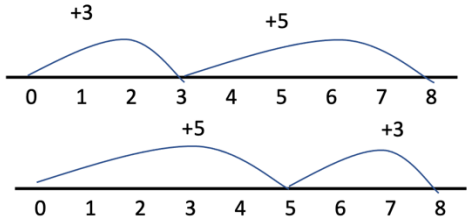
Possible Responses:

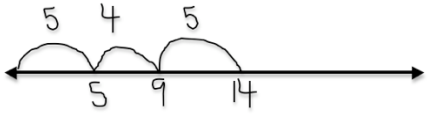
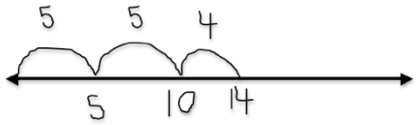
Cubes:
A student uses 2 colors of cubes to make as many different combinations of 8 as possible. When recording the combinations, the student records that 3 green cubes and 5 blue cubes equals 8 cubes in all. In addition, the student notices that 5 green cubes and 3 blue cubes also equals 8 cubes.

3 + 5 = 8

5 + 3 = 8

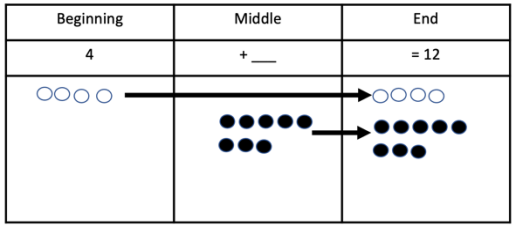
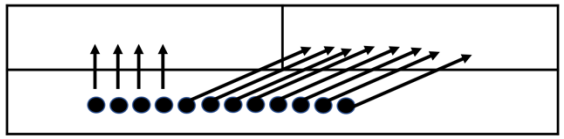
Number Line:
I draw a number line from 0 to 8. I decided to jump from 0 to 3 which is a jump of 3, and then jump from 3 to 8, which is a jump of 5. My equation is 3 + 5 = 8.
I then drew a different number line. I changed the order so I first jumped from 0 to 5 and then jumped from 5 to 8 which is a jump of 3. My equation is 5 + 3 = 8.



Understand and apply the properties of operations. **NC.1.OA.3** Apply the commutative and associative properties as strategies for solving addition problems.	
Clarification	**Checking for Understanding**
	Associative Property Example: Reena has 5 red jellybeans, 4 green jellybeans, and 5 black jellybeans. How many jellybeans are there in all? *Possible responses:* *Number Line:* Student A: *First I jumped to 5. Then, I jumped 4 more, so I landed on 9. Then, I jumped 5 more and landed on 14.*  Student B: *I got 14, too, but I did it a different way. First, I jumped to 5. Then, I jumped 5 again. That's 10. Then, I jumped 4 more. See, 14!*  *Number Combinations (Facts):* Student: *I started by adding 5 and 5 because I know that makes 10. Then, I added 49. That's 14.*

Return to Standards

Understand and apply the properties of operations.
NC.1.OA.4 Solve an unknown-addend problem, within 20, by using addition strategies and/or changing it to a subtraction problem.

Clarification	**Checking for Understanding**
In this standard, students are expected to solve unknown-addend word problems. This work intersects with the unknown-addend and change unknown problem types in NC.1.OA.1. The focus of this standard is for students to develop an understanding of the relationship between addition and subtraction by either solving the problem by adding up or by changing the unknown-addend problem into a subtraction problem. Standard NC.1.OA.6 describes strategies that students are expected to use while solving these problems. Initial work with this standard should include small numbers (within 5 or 10) as well as the use of concrete objects (manipulatives) to help students develop an understanding of these types of problems.	Francisco was making cards for his 12 friends. He already made 4 cards. How many cards does Francisco still need to make? *Possible Responses:* *Adding Up with Counters:* *I made a pile of 4 counters in a ten frame and added counters until I reached 12. I added 8 so that is my answer.* *Beginning-Middle-End Chart:* *I made a Beginning-Middle-End chart and put 4 in the beginning column. I then added counters into the middle column until I had a total of 12. I moved all of the counters to the end column to check my work. I added 8 so that was my answer.*  *Making a Ten Using Combinations (Facts):* *I had 4. I know that 4 and 6 make 10. Then I needed to add 2 more to get to 12. My answer is the 6 and the 2 that I added which is a total of 8.* *Changing the Problem to a Subtraction Problem:* *I worked backwards by building a group of 12 in the whole part of a part-part whole mat. I moved 4 of those 12 into one part and the rest of them went into the other part. The other part is my answer which is 8.*  *Decomposing a Number Leading to a Ten Using Combinations (Facts):* *I knew this was 12 take away 4. I took away 2 from 12 to get to 10. I then needed to take 2 more away which got me to 8 which is the answer.*

Return to Standards

Add and subtract within 20.
NC.1.OA.9 Demonstrate fluency with addition and subtraction within 10.

Clarification	**Checking for Understanding**
Students are expected to demonstrate fluency with all addition and subtraction combinations within 10 by the end of First Grade. Fluency includes accuracy, flexibility, and efficiency (Bay-Williams & SanGiovanni, 2021). In kindergarten students developed fluency for addition and subtraction within 5. Work with this standard should be integrated throughout the year with a focus on conceptual approaches to learning these combinations. For example, students in Grade 1 should develop an understanding that +1 facts mean that you are counting on from the other addend, and -1 facts mean that you are counting backwards one number from the other addend. The development of students' basic fact fluency should include ongoing work decomposing numbers 10 or less using concrete manipulatives and drawings with intentional work towards learning number combinations. Meaningful practice with intentional conversations will help students develop fluency (Carpenter et al., 2014). Meaningful practice will engage students in decomposing numbers flexibly and using relationships to add and subtract, and will push them to choose increasingly efficient strategies (van de Walle et al., 2022). Examples include solving word problems, problem strings crafted to highlight number relationships, conceptually subitizing with groups of objects, and games in which students break apart numbers to add and subtract. Please note that traditional flash cards without visuals and/or timed tests have not been proven as effective instructional strategies for developing fluency (Bay-Williams & San Giovanni, 2021). For students who demonstrate misconceptions related to basic fact fluency with combinations within 5 from Kindergarten (K.OA.5), there is a need for students to work on those combinations while also working on grade level standards. Students will benefit from ongoing experiences with activities that are aligned to K.OA.3, K.OA.4 that involve composing and decomposing numbers with numbers within 10.	Two frogs were sitting on a log. 6 more frogs hopped there. How many frogs are sitting on the log now? *Possible responses:* Counting- On *I started with 6 frogs and then counted up, Sixxxx…. 7, 8. So there are 8 frogs on the log.* *6 + 2 = 8* Number Combinations (Facts) *There are 8 frogs on the log. I know this because 6 plus 2 equals 8.* *6 + 2 = 8* Number String for a Number Talk: The teacher displays the first equation only and asks students to think independently at first about different ways to get the answer. 5 - 2 = __ 6 - 2 = __ 6 - 4 = __ Students share their ideas and strategies for the first equation in the number string. The teacher then displays the second equation and eventually the third equation using the same format. *Possible Responses:* *5-2: "I know that 5 minus 2 is 3."* *"I started at 5 and counted backwards 2 and landed on 3."* *"I started at 2 and added up until I reached 5. I counted 3 numbers."* *6-2: "I know that 6 minus 2 is 4."* *"I started at 6 and counted backwards 2 and landed on 4."* *"I started at 2 and added up until I reached 6. I counted 4 numbers."* *"I know that 5 minus 2 is 3 so 6 minus 2 is one more so that is 4."* *6-4: "I know that 6 minus 4 is 2."* *"I started at 6 and counted backwards 4 and landed on 2."* *"I started at 4 and added up until I reached 6. I counted 2 numbers."* *"I know that 6 minus 2 is 4 so that means that 6 minus 4 is 2."*

Return to Standards

Add and subtract within 20.

NC.1.OA.6 Add and subtract, within 20, using strategies such as:

- Counting on
- Making ten
- Decomposing a number leading to a ten
- Using the relationship between addition and subtraction
- Using a number line
- Creating equivalent but simpler or known sums.

Clarification

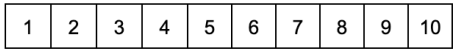
In this standard, students are expected to develop increasingly sophisticated strategies to become more efficient with addition and subtraction within 20. Students are expected to demonstrate fluency (accuracy, efficiency, and flexibility) with number combinations (facts) within 10. With number combinations within 20 students should demonstrate these strategies by the end of the year while solving addition and subtraction problems.

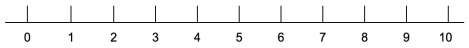
Most of the problems in first grade should be in the form of word problems, which provide rich opportunities for students to make sense of the action in mathematics problems and the various situations expected by the end of the year with NC.1.OA.1.

The table below describes examples of strategies. In addition to choosing strategies, students are expected to explain their thinking and how they used the strategy that they chose.

Representations: Number Lines and Number Paths

A number line (pictured below on the right) is included in 1.OA.6 as a tool that can be used to provide a visual to show how a student counts on, counts backwards, makes a group of ten, or decomposes a number leading to a ten. The number line can be utilized as a representation for the strategies listed below. Number paths (pictured below on the left) may be utilized in 1st grade as a scaffold for students' progression towards using number lines (Romani & Siegler, 2008).





Description of Strategies

Counting On

Counting on can be used to add (find a total) or subtract (find an unknown addend). Students see the first addend as part of the total and count on to find the answer. Students may put the first number in their head and count on using their fingers initially or show their work on a number line, number path, or by writing numbers on paper. Counting on is meant to be a thinking strategy, not a rote method. When students count on their fingers, their fingers are a tool or representation to show the strategy of counting on.

Checking for Understanding

Sam has 8 red marbles and 7 green marbles. How many marbles does Sam have in all?

Possible responses:

Making 10	Create an Easier Problem with Known Sums
I know that 8 plus 2 is 10, so I broke up (decomposed) the 7 up into a 2 and a 5. First, I added 8 and 2 to get 10, and then added the 5 to get 15.	*I broke up (decomposed) 8 into 7 and 1. I know that 7 and 7 is 14. I added 1 more to get 15.*
7 = 2 + 5 *8 + 2 = 10* *10 + 5 = 15*	*8 = 7 + 1* *7 + 7 = 14* *14 + 1 = 15*

There were 14 birds in the tree. 6 flew away. How many birds are in the tree now?

Possible responses:

Decomposing a Number Leading to Ten	Relationship between Addition & Subtraction
I know that 14 minus 4 is 10. So, I broke the 6 up into a 4 and a 2. 14 minus 4 is 10. Then I took away 2 more to get 8.	*I thought, '6 and what makes 14?'. I know that 6 plus 6 is 12 and two more is 14. That's 8 altogether. So, that means that 14 minus 6 is 8.*
6 = 4 + 2 *14 – 4 = 10* *10 – 2 = 8*	*6 + 8 = 14* *14 – 6 = 8*

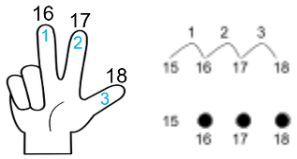
Add and subtract within 20.

NC.1.OA.6 Add and subtract, within 20, using strategies such as:

- Counting on
- Making ten
- Decomposing a number leading to a ten
- Using the relationship between addition and subtraction
- Using a number line
- Creating equivalent but simpler or known sums.

Clarification

Example: Juan read 15 pages. Rita read 18 pages. How many more did Rita read than Juan?
"I put 15 in my head and counted on until I got to 18. I said 3 numbers, so I know that Rita read 3 more pages than Juan."



Note: While counting backwards is not explicitly mentioned in this standard, teachers should provide opportunities for students to count backwards or count down from when solving subtraction or missing addend problems (van de Walle et al., 2019).

Making Ten

While adding two addends with a sum greater than 10, students may decompose one of the addends to make a group of 10.

Example:
Spider Man helped 9 people in the morning and 6 in the afternoon. How many people did he help?

I broke up 6 into 5 and 1 since 9 is 1 away from 10. I then added 9 + 1 + 5. My answer is 15.

9 + 6

9 + 1 + 5

10 + 5 = 15

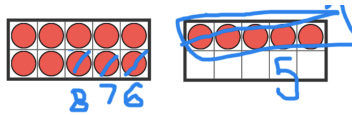
Decomposing a Number Leading to Ten

The number being subtracted is decomposed in order to land on 10 and then the remaining number is subtracted. In the example below, the ten frames and the number lines are tools or representations used to show the strategies.

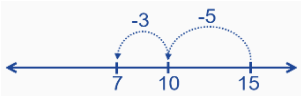
Example:
There were 15 dogs in the dog park then 8 went home. How many are still there?

Early work with counters or drawings

I put 15 in my ten frames. I took 5 away first and then took away 3 more. I took away 8 from 15 and had 7 left.



Further developed strategy represented on a number line.



"I know that 15 has 5 ones so I split the 8 into 5 and 3. I took away 5 first which got me to 10 and then took the 3 away to get 7 for my answer."

Checking for Understanding

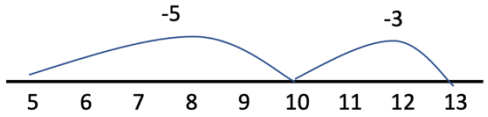
Isaac decides to draw a number line in order to solve 13 - 5 = __.
He says, "I want to break 5 up in order to land on 10 and then subtract some more to get my answer."

Part 1: Draw a number line that matches Isaac's strategy.

Part 2: How would Isaac use that strategy to solve 17 - 9 =__.
Draw a number line and write equations that match the number line.

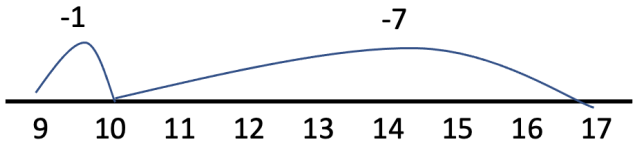
Possible Response:

Part 1:



13 - 8 = __
13 - 3 - 5 = __
13 - 3 = 10 and 10 - 5 = 5

Part 2:



Isaac would solve 17-9 by breaking 9 up into 7 and 2 and subtracting each of them from 17.
17 - 9 = __
17 - 7 - 2 = __
17 - 7 = 10 and 10 - 2 = 8

Add and subtract within 20.

NC.1.OA.6 Add and subtract, within 20, using strategies such as:

- Counting on
- Making ten
- Decomposing a number leading to a ten
- Using the relationship between addition and subtraction
- Using a number line
- Creating equivalent but simpler or known sums.

Clarification

Using the Relationship Between Addition and Subtraction

Students solve a subtraction problem by adding up from the number they are subtracting until they reach the start number.

There are 12 hamsters at the pet store. They sell some and now there are only 8. How many did they sell?

"Instead of thinking about this as 12 minus 8, I thought about this as 8 plus something equals 12. I knew that 8 and 4 makes 12 so the answer is 4. They sold 4 hamsters."

Creating an Equivalent Sum

When students know number combinations (basic facts from 1.OA.9) they may use those to help them solve related problems. This is evident in Grade 1 when students apply their knowledge of making 10 combinations to find combinations of 11, or use doubles combinations to solve doubles + 1 and doubles + 2 combinations.

Example:
There are 7 pens. How many more does Mrs. Bock need in order to have 11?
"I know that 7 and 3 is 10 so 7 and 4 is 11."

There are 5 blue pencils and 7 red pencils. How many pencils do I have?
"5 and 5 makes 10 that means 5 and 6 makes 11 and 5 and 7 makes 12. I have 12 pencils."

Checking for Understanding

Return to Standards

Analyze addition and subtraction equations within 20.

NC.1.OA.7 Apply understanding of the equal sign to determine if equations involving addition and subtraction are true.

Clarification

In this standard, students apply their understanding of the equal sign to determine whether an equation is true. While the equal sign may have been introduced in kindergarten, first grade students are expected to write equations and use informal language to explain the meaning of equations where the equal sign is a symbol that means "one side of the equation has the same value as the other side of the equation."

This standard should initially be explored using concrete materials (manipulatives) and drawings in the context of joining groups of objects (addition) and separating/taking away a group of objects (subtraction).

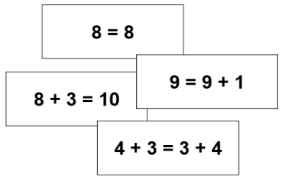
When students understand that an equation needs to "balance", with equal quantities on both sides of the equal sign, they understand various types of equations, such as:

- operation on left side of the equal sign, and answer on right side (5 + 8 = 13)
- operation on right side of the equal sign and answer on left side (13 = 5 + 8)
- only numbers on both sides of the equal sign (6 = 6)
- operations on both sides of the equal sign (5 + 1 = 9 - 3).

Once students understand the meaning of the equal sign, they are able to determine if an equation is true (9 = 9) or not true (9 = 8). Students in Grade 1 are not expected to change a not true equation into a true equation.

Checking for Understanding

Put these cards into two piles: True and Not True. Use objects, drawings, or words to explain your thinking.



Possible responses:

9 = 9 + 1

The equal sign means both sides have the same amount. The one side has nine, and the other side has ten. Nine and ten aren't equal.

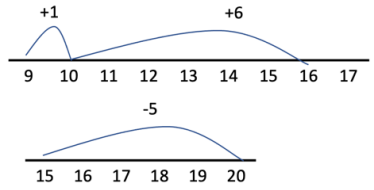
4 + 3 = 3 + 4

The numbers are flipped around, but both sides are equal to 7. The equal sign is true.

Mrs. Rickard wrote the following equation on the board. Is it true or false? Use manipulatives, drawings, or words to explain your answer.
9 + 7 = 20 - 5

Possible Responses:

Student A:
I used number lines. 16 is not equal to 15 so the equation is not true.



Student B:
The left side is 9 plus 7. I broke 7 into 1 and 6 to make a ten. 9 and 1 is 10 and 6 more is 16. The right side is 20 - 5. I counted backwards and got 15. 16 is not the same as 15 so the equation is not true.

Return to Standards

Analyze addition and subtraction equations within 20.
NC.1.OA.8 Determine the unknown whole number in an addition or subtraction equation involving three whole numbers.

Clarification

In this standard, students apply addition and subtraction strategies to solve equations with an unknown whole number. In first grade, the unknown symbols are boxes or pictures. Students are expected to explain orally and begin to informally explain in writing their process of finding the unknown in an equation.

Based on the specific problem types in NC.1.OA.1 the unknown whole number cannot be the starting number of an equation, and all problems are one-step problems. Teachers should revisit the problem types in NC.1.OA.1 to see the various forms of equations that are expected in Grade 1.

Similar to their work in NC.1.OA.1, students should apply the strategies in NC.1.OA.6 as they solve these equations. Students should begin exploring this standard by using concrete models (manipulatives) and drawings to support students' work before using more of the strategies specifically expected in first grade. The table below provides specifics about the relationship between NC.1.OA.1, NC.1.OA.6, and NC.1.OA.8. Teachers should consider how multiple opportunities for students to solve word problems addresses multiple standards at one time.

Standard	**Examples**
NC.1.OA.1	Students solve a word problem and represent it with concrete models, pictures, words, or equations.
NC.1.OA.6	Students use a variety of strategies to solve word problems and equations.
NC.1.OA.8	Students solve an equation that has an unknown. The equation could be one that they write when given a word problem OR an equation that the teacher provides.
All three equations at once	Students are given a word problem, represent it with an equation that includes an unknown, and they use an appropriate strategy to find the answer.

Checking for Understanding

There were 12 cookies on the table. I ate some cookies. Then there were 5 cookies. How many cookies did I eat?

1. Write down each of the numbers and explain what each of them means.
2. Complete a Beginning-Middle-End (BME) chart based on the problem.
3. Use your BME chart to write an equation that matches the problem. Include a box of the unknown.
4. Show your work and find the answer. Make sure you rewrite the equation with the answer in it.

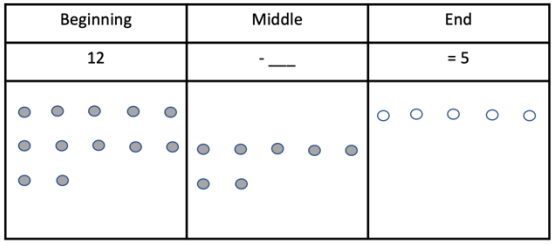
Possible Responses:

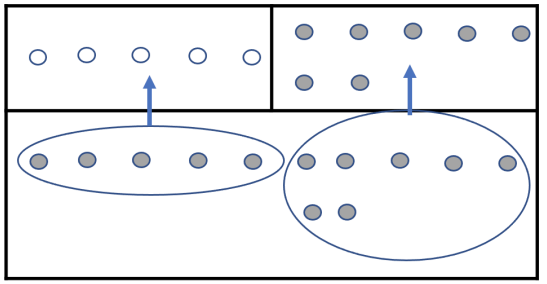
1. *12 is the number of cookies that is on the table.*
   12 is our beginning number of cookies.
2. *See the BME chart below.*

Beginning	Middle	End
12	- ___	= 5

3. *The equation that matches the problem is 12 - ☐ = 5*
4. *Possible strategies to solve the problem and find the answer which is 7.*

<u>Subtracting on the Beginning-Middle-End Chart with Counters</u>
I put 12 counters in the Beginning Column. Then I moved 5 to the end column. I moved the rest to the middle column. There were 7 in the middle so that is my answer.



Analyze addition and subtraction equations within 20. **NC.1.OA.8** Determine the unknown whole number in an addition or subtraction equation involving three whole numbers.	
Clarification	**Checking for Understanding**
	Subtracting on the Part-Part-Whole Math with Counters *I started with 12 red counters in the whole box. I moved 5 of them to a part box and flipped them all to yellow. I moved the rest of them to the other part box.*  *Subtracting by Decomposing a Number Leading to a Ten* *I subtracted 5 from 12. I broke 5 into 2 and 3 since I know 12 minus 2 is 10. I then took away the 3 and 10 minus 3 is 7. My answer is 7.* *Adding by Making a Ten* *I started at 5 and added up until I got to 12. I know 5 and 5 is 10. Then I added 2 more to get to 12. My answer is the sum of 5 and 2 which is 7.*

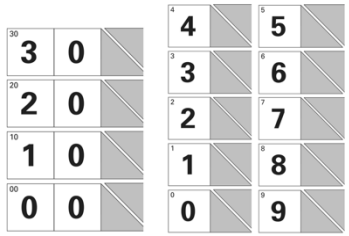
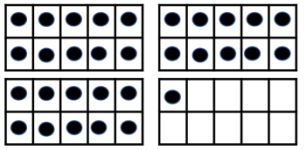
Return to Standards

Extend and recognize patterns in the counting sequence **NC.1.NBT.1** Count to 150, starting at any number less than 150.	
Clarification	**Checking for Understanding**
This standard asks for students to extend their work with NC.K.CC.2 when they independently rote counted forward from any number within 100. Students are expected to begin at any number and independently count on without having to go back and start counting at 1. The focus of this standard is rote counting only and does not require recognition of numerals or writing numerals. For numbers less than 100 in this standard work should be integrated into place value standards (NC.1.NBT.2, NC.1.NBT.7) when students write, read, and represent two-digit numbers. For numbers larger than 100 teachers should consider the use of a 150 chart which is like a hundreds chart but includes numbers up to 150. While the focus of this standard is rote counting, the use of the visual written number may help students (van de Walle et al., 2019). Students should have opportunities to look at numbers between 101 and 150 and discuss how the tens and ones digits are read as a two-digit number with the phrase "one hundred" in front of it. For example, 132 should be thought of as "one hundred' followed by "thirty-two." A common misconception is inserting the word "and" after 100. For example, 107 is read "one hundred seven" not "one hundred and seven." Provide multiple opportunities for students to work on reading numbers up to 150 and saying them without the word "and".	Possible Student Interview: Teacher: Begin at 107 and count up to 112 Student: *107, 108, 109, <pause> 110, 111, 112* Teacher: I noticed you paused to think at 99. How did you figure out the next number? Student: *had to think about counting and what I usually say after 9. After 9 comes 10 so after 109 is the number 110.* --- Look at this number (32). How do we say that number? Now look at this number (132). How do you think we say that number? Why? *Possible Response:* *We read 32 as "thirty-two."* *When I see 132, I know that "one zero zero" is "one hundred" so I think it is "one hundred thirty-two."*

Return to Standards

Extend and recognize patterns in the counting sequence

NC.1.NBT.7 Read and write numerals, and represent a number of objects with a written numeral, to 100.

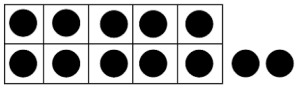
Clarification	**Checking for Understanding**
This standard calls for students to read and write numerals to represent a given amount up to and including 100. ● When determining the quantity of a set within 100, students will select the appropriate number card/tile (numeral recognition) or write the number. ● When given a numeral or number card/tile, students will create a set of items that represents the numeral presented. Earlier in the year before students are able to formally unitize, this work should be done with loose objects (counters, cubes, buttons, etc.) or ten frame cards where students can count each circle if needed. Base ten (place value) blocks should not be used until the middle of first grade after students have had ample opportunities to think about unitizing (grouping) 10 loose objects into groups of 10. As students explore larger two-digit numbers and develop a deeper understanding of tens and ones, they are expected to explain the relationship that the tens place represents groups of 10s while the ones place represents the number of leftover or loose objects or ones. **For example:** A student may write "17" and mean "71". Through teacher demonstration, opportunities to "find mistakes", and questioning by the teacher ("I am reading this and it says seventeen. Did you mean seventeen or seventy-one? How can you change the number so that it reads seventy-one?"), students become precise as they write numbers to 100.	<u>Counting a Group and Representing it with a Written Numeral</u> Activity with 31 buttons and arrow cards. The picture on the right shows all cards 0-9 and cards 10, 20, and 30). Teacher: How many buttons are in this bag? *Student: I counted 31.* Teacher: How many groups of 10 can you make? *Student: I made 3 groups of 10.* Teacher: Do you have any buttons that are not in a group of 10? *Student: I have 1 button not in a group.* Teacher: How many total buttons do you have? *Student: 10, 20, 30 and then 1 more so 31.* Teacher: Can you use these cards to show 31? *Student: I used the arrow cards to make 31.* Teacher: What does the 3 represent? *Student: 3 groups of 10.* Teacher: What does the 1 represent? *Student: The one button I have that is not in a group of 10.*  <u>Representing a Written Numeral with Materials (Loose Objects)</u> Teacher: Use the buttons to make a set to match this number. *Student: That's 27! Here are 27 buttons.* 2 7  <u>Representing a Written Numeral with Materials (Ten Frame cards)</u> Materials: Materials for the teacher to write a 2-digit number, Ten Frame Cards Teacher: Use the ten frame cards so that your picture matches this number. Teacher shows the number 31. *Student: I used 3 ten frame cards with 10 circles. Then I used another ten frame card with just 1 circle.* Teacher: Can you count by 10s and 1s to check your work? Student: 10, 20, 30 and then 31. 

Return to Standards

Understand place value.

NC.1.NBT.2 Understand that the two digits of a two-digit number represent amounts of tens and ones.

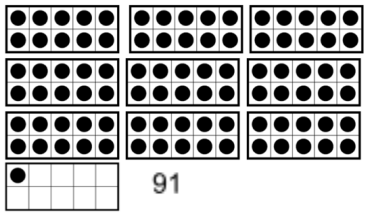
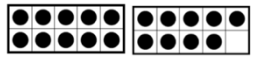
- Unitize by making a ten from a collection of ten ones.
- Model the numbers from 11 to 19 as composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
- Demonstrate that the numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens, with 0 ones.

Clarification	**Checking for Understanding**
The focus of this standard is for students to demonstrate understanding of place value concepts with all 2-digit numbers up to 99. <u>Unitize by making a ten from a collection of 10 ones:</u> Unitizing is a sophisticated concept where students are able to recognize, represent, and explain that 10 ones can be represented by a group of 10. Initial work with this concept should be done using concrete materials or drawings on a ten frame, which students began in kindergarten (NC.K.NBT.1). In kindergarten, everything was thought of as individual units, "ones". In first grade, students are asked to start to group those ten individual ones as a whole unit: "*one* ten". Students are introduced to the idea that a group of ten ones is called "a ten". This is known as unitizing. When students unitize a group of ten ones as a whole unit ("a ten"), they are able to count groups as though they were individual objects. For example, 4 trains of ten cubes each have a value of 10 and would be counted as 40 ones or as 4 tens. This can often be challenging for young children to consider a group of something as "one" when all previous experiences have been counting single objects. This is the foundation of the place value system and requires time and rich experiences with concrete manipulatives to develop. In addition, when learning about forming groups of 10, students learn that a numeral can stand for many different amounts, depending on its position or place in a number. This is an important realization as young children begin to work through reversals of digits, particularly in the teen numbers. A deep understanding of place value is developed over time as students have ample experiences with a variety of groupable materials (e.g., materials that can be grouped, snapped, or connected to make a ten). Pre-grouped materials (e.g., materials like place value base ten blocks and bean sticks, which must be traded to make a ten) should not be introduced until a student has a firm understanding of composing and decomposing ten. Additionally, students should only use proportional manipulatives for place value work. These materials, such as 10 snap cubes OR a place value (base ten) ten piece have a "ten" is ten times bigger than the material that has a value of 1.	<u>Unitize by making a ten from a collection of ten ones</u> Teacher makes a pile of 32 cubes but does not tell the student how many cubes there are. Teacher: Here is a pile of cubes. How many groups of 10 do you think we can make? *Student: I think that we can make 2 groups of 10.* Teacher: Let's find out. Can you put the cubes into groups of 10? *Student moves cubes into piles of 10.* Teacher: How many groups of 10 did you make? *Student: I made 3 groups with 10 cubes in each group and had 2 cubes leftover.* <u>Model the numbers 11 to 19 as a ten and some more ones</u> Here is a pile of 12 cubes. Do you have enough to make a ten? Would you have any leftover? If so, how many leftovers would you have?  Student A: *I filled a ten frame to make a ten and had two counters left over. The number 12 has 1 ten and 2 ones.* Student B: *I counted out 12 cubes. I had enough to make 10. I now have 1 ten and 2 cubes left over. The number 12 has 1 ten and 2 ones.*  <u>Demonstrate that multiples of 10 refer to a group of tens and 0 ones</u> Use place value (base ten) blocks to build the number 30. Now change the value of your pile to 40. Now change the value of your pile to 70.

Understand place value.

NC.1.NBT.2 Understand that the two digits of a two-digit number represent amounts of tens and ones.

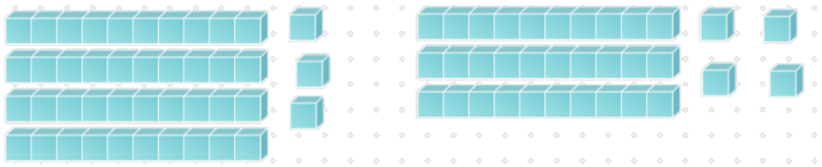
- Unitize by making a ten from a collection of ten ones.
- Model the numbers from 11 to 19 as composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
- Demonstrate that the numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens, with 0 ones.

Clarification	**Checking for Understanding**
When used in early grades, coins cause a misconception with regards to developing an understanding of place value. <u>Model the numbers 11 to 19:</u> This aspect of the standard should be integrated throughout the year, building on the work from kindergarten (NC.K.NBT.1) where students represented a teen number (11-19) as a group of 10 objects on a ten frame and some remaining ones either on another partially filled ten frame or outside of the ten frame. <u>Demonstrate that multiples of ten refer to a group of tens with 0 ones</u> This aspect of the standard expects students to create a representation of a multiple of 10 (between 10 and 90) and explain the idea that these numbers contain groups of 10 and no additional ones. While students rote counted by 10s in Kindergarten (NC.K.CC.1), this standard goes beyond rote counting and focuses on expecting students to explain and show with concrete objects or pictures that multiples of 10 include only groups of ten and no additional ones. In Grade 1, this last bullet is extended into work with all 2-digit numbers in this standard. In Grade 1 students are expected to state that a 2-digit number is composed of both tens and ones. For example, 70 is 7 tens and 0 ones and 75 is 7 tens and 5 ones. Students should also have ample experiences building 2-digit numbers with concrete models and drawings AND represent the number in expanded form, which is an addition equation that shows the tens and ones (e.g. 75 = 70 + 5). Expanded form is a foundational application of place value and in Grade 1 should always be joined with a representation with concrete models such as place value (base ten) blocks or drawings of place value blocks.	*Possible Response:* *Based on the standard, students have met NC.1.NBT.2 if they are able to correctly build the number with place value (base ten) blocks that include only tens pieces. If students have to start at 0 and count by 10s that is acceptable with this standard but it is not acceptable for NC.1.NBT.4, which asks students to add a two-digit number and a multiple of 10.* <u>Model the numbers from 11 to 19 as composed of a ten and some ones</u> AND <u>Demonstrate that multiples of 10 refer to a group of tens and 0 ones</u> Are the number 19 and 91 the same or different? **(19 91)** Teacher: Are these numbers the same or different? Students: *Different!* Teacher: Why do you think so? *Student A: Even though they both have a one and a nine, I know the 1 in 19 represents one group of ten. The 1 in 91 represents 1 one.* *Student B: I know the 9 in 91 represents nine groups of tens. The 9 in 19 represents 9 ones.*  91  19

Return to Standards

Understand place value.

NC.1.NBT.3 Compare two two-digit numbers based on the value of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.

Clarification	**Checking for Understanding**
In this standard, students apply their understanding of place value and the magnitude of digits in the tens and ones place to compare two two-digit numbers. Students should have multiple opportunities to build numbers with concrete models or drawings of two-digit numbers or place value (base ten) blocks and discuss how many groups of ten and ones are in each number. This work intersects NC.1.NBT.2. Students are then expected to compare two two-digit numbers based on the number of the tens and ones in the numbers. After verbally discussing the number of tens and ones in each number, first grade students may record the results of the comparisons with the symbols for greater than (>), less than (<), and equal (=). The equal sign should be thought of as "is the same as" where the number or expression on the left side has the value as the number or expression on the right side of the equal sign. One of the most common errors that students should have ample opportunities to explore and make sense of occurs when the two numbers that are compared are reversals, such as 34 and 43. By building these numbers with concrete models or drawings students are able to see the number of tens and ones that are in each of the numbers.	Compare these two numbers. 42 __ 45 Possible responses: *42 has 4 tens and 2 ones. 45 has 4 tens and 5 ones. They have the same number of tens, but 45 has more ones than 42. So, 42 is less than 45.* 42 < 45 --- Mrs. Olympia's class has 43 pencils. Mrs. Gregory's class has 34 pencils. Use base ten blocks or a picture of base ten blocks to represent the number of pencils that each teacher has. Which teacher has more pencils? Use your pictures or words to explain how you know. *Possible Response:* *Mrs. Olympia has 43 which is more than the 34 that Mrs. Gregory had.* *I know that 43 has 4 tens and 34 only has 3 tens so 43 is larger than 34.* 

Return to Standards

Use place value understanding and properties of operations.

NC.1.NBT.4 Using concrete models or drawings, strategies based on place value, properties of operations, and explaining the reasoning used, add, within 100, in the following situations:

- A two-digit number and a one-digit number
- A two-digit number and a multiple of 10

Clarification

In this standard, students use models, drawings, and place value strategies to add within 100. This work is limited to adding only a two-digit number to either a one-digit number or a multiple of 10.

In this standard, students should apply their understanding of place value from NC.1.NBT.2 to consider how many tens and ones are in a 2-digit number and write the number in expanded form.

Students move beyond basic facts and draw on their understanding of the base-ten system (i.e., composing groups of ten from ten ones, and recognizing that a digit's value is determined by its place) to begin developing strategies for adding one- and two-digit numbers. The table below describes the strategies that are described in this standard.

Strategy	Examples
Strategies based on place value	• Students add or subtract in parts where they add the tens and ones separately. • Students may add or subtract in parts where they decompose the one-digit number OR the ones in the two-digit number in order to make a ten. They then add the tens separately. • These strategies are also used in Grade 2, before moving to expanded form in Grade 3 before introducing the US standard algorithm in Grade 4. • These strategies could be represented on a number line, a hundreds board (hundreds chart), or as equations. Students may also use concrete models or drawings such as base ten blocks or draw pictures of base ten blocks to represent the strategy.

Checking for Understanding

A two-digit number and a one-digit number

24 red apples and 8 green apples are on the table. How many apples are on the table?

Possible responses:

Student A:

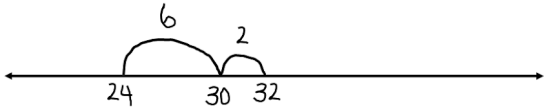
I used ten frames. I put 24 chips on 3 ten frames. Then, I counted out 8 more chips. 6 of them filled up the third ten frame. That meant I had 2 left over. 3 tens and 2 left over. That's 32. So, there are 32 apples on the table.

24 + 6 = 30
30 + 2 = 32

Student B:

I used an open number line. I started at 24. I knew that I needed 6 more jumps to get to 30. So, I broke apart 8 into 6 and 2. I took 6 jumps to land on 30 and then 2 more. I landed on 32. So, there are 32 apples on the table.

24 + 6 = 30
30 + 2 = 32



Student C:

I wrote 24 as 20 + 4. I then decomposed 8 into 6 + 2.
I had 20 + 4 + 6 + 2
I know that 4 and 6 makes 10 so my equation is 20 + 10 + 2 which is 32.

Use place value understanding and properties of operations.

NC.1.NBT.4 Using concrete models or drawings, strategies based on place value, properties of operations, and explaining the reasoning used, add, within 100, in the following situations:

- A two-digit number and a one-digit number
- A two-digit number and a multiple of 10

Clarification

Properties of operations	● In first grade the commutative property of addition is the primary focus. When students have decomposed a two-digit number into tens and ones they can change the order of the addends to get the same answer. 35 + 7 = ___ 30 + 5 + 7 = Students may use strategies based on place value and decompose 7 into 5 and 2 to make 30 + 5 + 5 + 2 to make it easier to make a group of 10. 30 + 5 + 5 + 2 = 42

The focus of this standard is to develop an understanding and lay a foundation for multi-digit addition using Counting On or Making Ten strategies (NC.1.OA.6) when adding a one-digit number and adding tens using place value strategies when adding a multiple of 10. The US standard algorithm of carrying or borrowing is neither an expectation nor a focus in First Grade. Students develop strategies for addition and subtraction in Grades K-3.

Checking for Understanding

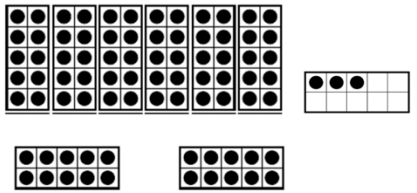
A two-digit number and a multiple of 10

63 apples are in the basket. Mary put 20 more apples in the basket. How many apples are in the basket?

Possible responses:

Student A:

I used ten frames. I picked out 6 filled ten frames. That's 60. I got the ten frame with 3 on it. That's 63. Then, I picked one more filled ten frame for part of the 20 that Mary put in. That made 73. Then, I got one more filled ten frame to make the rest of the 20 apples from Mary. That's 83. So, there are 83 apples in the basket.



73 + 10 = 83

Student B:

I used a hundreds chart. I started at 63 and jumped down one row to 73. That means I moved 10 spaces. Then, I jumped down one more row (that's another 10 spaces) and landed on 83. So, there are 83 apples in the basket.

63 + 10 = 73
73 + 10 = 83

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

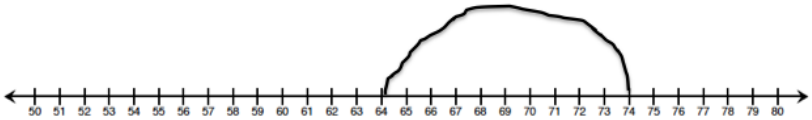
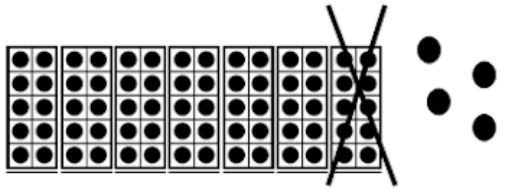
Student C:

I knew that 10 more than 63 is 73. And 10 more than 73 is 83. So, there are 83 apples in the basket.

Return to Standards

Use place value understanding and properties of operations.

NC.1.NBT.5 Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.

Clarification	**Checking for Understanding**
In this standard, students apply their understanding of place value developed in standard NC.1.NBT.2 to mentally find 10 more or 10 less than a 2-digit number without counting forward or backwards by 1s. First grade students are also expected to orally explain their reasoning used to find the answer. In kindergarten, students rote counted by 10s. While this work is related, this standard focuses on first grade students decomposing a two-digit number into tens and ones and then adjusting the number of 10s by either adding or subtracting one from the tens digit. For example, when asked to find 10 less than the number 52 students should get the number 42 in one of two ways. 1. Students may decompose 52 into 50 + 2 and change the 50 to 40 by subtracting 10 which would get the answer 42, or 2. Students may realize that 52 is 5 tens and 2 ones and realize that 10 less means that the 5 becomes a 4 resulting in 4 tens and 2 ones which is 42. While this standard calls for students to mentally find 10 more or 10 less than a two-digit number, this work should begin with NC.1.NBT.2 by providing ample opportunities for students to build two-digit numbers and then find 10 more and 10 less than a given number when they have access to ten frame cards, place value (base ten) blocks, or a hundreds board. These visuals will let students move beyond counting on or back by 1s and support their progress towards being able to find 10 more or 10 less mentally. After providing the answer students should be asked to explain how they got their answer. In first grade students may orally explain their thinking, or show their thinking with concrete models, pictures, or equations.	There are 74 birds in the park. 10 birds fly away. How many birds are in the park now? *Possible responses:* *Student A:* *Student: 64* Teacher: Explain how you got the answer. *Student: I thought about a number line. I started at 74. Then, because 10 birds flew away, I took a leap of 10. I landed on 64. So, there are 64 birds left in the park.*  *Student B:* *Student: 64* Teacher: Explain how you got the answer. *Student: I pictured 7 ten frames and 4 left over in my head. Since 10 birds flew away, I took one of the ten frames away. That left 6 ten frames and 4 left over. So, there are 64 birds left in the park.*  *Student C:* *Student: 64* Teacher: Explain how you got the answer. Student: *I know that 10 less than 74 is 64. So, there are 64 birds in the park.*

Use place value understanding and properties of operations. **NC.1.NBT.5** Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.	
Clarification	**Checking for Understanding**
	What is 10 more than 23? *Possible Responses* *Student A:* *Student: 33* Teacher: Explain how you got the answer. *Student: I know that 23 is 2 tens and 3 ones. I changed the 2 to 3 since I added a ten so I had 3 tens and 3 ones which is 33.* *Student B:* *Student: 33* Teacher: Explain how you got the answer. *Student: I thought about 23 being 2 rods and 3 ones and that I should add another rod. It looks like this.* 

Return to Standards

Use place value understanding and properties of operations.

NC.1.NBT.6 Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90, explaining the reasoning, using:

- Concrete models and drawings
- Number lines
- Strategies based on place value
- Properties of operations
- The relationship between addition and subtraction

Clarification

This standard calls for students to move beyond determining "10 less" (NC.1.NBT.5) to subtract a multiple of 10 from another multiple of 10. The standard provides specific strategies which are described in the table below.

Strategy	Examples
Strategy based on place value using concrete models and drawings as a representation	Students build the first number with place value (base ten) blocks or drawings of place value (base ten) blocks. Students show the process of subtraction with the concrete models or drawings.
Finding a difference or counting back using a number line as a representation	Students can use number lines in one of two ways: 1. Students can plot both numbers as points on the number line and find the difference. e.g., 60 - 40 = __. Students would plot 60 and 40 and find the difference between the 2 numbers which is 20, OR 2. Students would plot the first number and move backwards on the number line the amount that they are subtraction. e.g., 60 - 40 = __. Students would plot 60 on the number line and jump back 40 to land on 20 which is the answer.
Strategies based on place value	Students' strategies based on place value could include the strategies described for concrete models and drawings or number lines. Students could also solve the problem by writing an equation and providing the answer.
Properties of operations	In Grade 1 the commutative property of addition is the focus. When subtracting multiples of 10 students should make sense of the idea that the order of the numbers does matter when subtracting, and the numbers cannot be reversed like they can when adding.

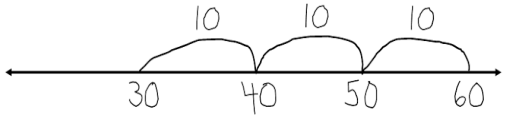
Checking for Understanding

There are 60 students in the gym. 30 students leave. How many students are still in the gym?

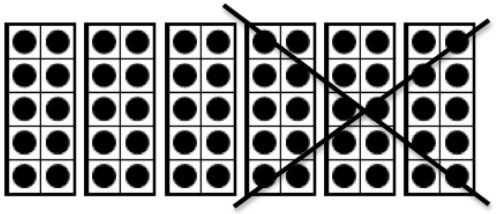
Possible responses:

Student A:
I used a number line. I started at 60 and moved back 3 jumps of 10 and landed on 30. There are 30 students left.

60 – 10 = 50
50 – 10 = 40
40 – 10 = 30



Student B:
I used ten frames. I had 6 ten frames- that's 60. I removed three ten frames because 30 students left the gym. There are 30 students left in the gym.



60 – 30 = 30

Student C:
I started with 30 and kept adding ten sticks until I got to 60. I added 3 sticks so the answer is 30.

Student D:
I thought, "30 and what makes 60?". I know 3 and 3 is 6. So, I thought that 30 and 30 makes 60. There are 30 students still in the gym.

30 + 30 = 60

Use place value understanding and properties of operations.

NC.1.NBT.6 Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90, explaining the reasoning, using:

- Concrete models and drawings
- Number lines
- Strategies based on place value
- Properties of operations
- The relationship between addition and subtraction

Clarification	**Checking for Understanding**

The relationship between addition and subtraction	In Grade 1 students explore the idea that subtraction is the inverse (opposite) of addition. Students may apply that by starting with the number that they are subtracting and add up until they reach the number that they are subtracting from. e.g., 60 - 40 = __. Students will start at 40 and add up by multiples of 10 until they reach 60.

First graders are not expected to compute differences of two-digit numbers other than multiples of ten. Students are expected to explain their reasoning using pictures, numbers, or words.

Return to Standards

Measure lengths.
NC.1.MD.1 Order three objects by length; compare the lengths of two objects indirectly by using a third object.

Clarification	**Checking for Understanding**
In this standard, students build on their work from kindergarten when they directly compared the length of the two objects to determine whether objects were shorter, longer, or the same length as one other object. In first grade students will order and sequence three objects by length. One of the measurement skills that is a focus in first grade is the precision of measuring length by measuring from one end of an object to the other end. Students are expected to demonstrate appropriate measurement processes and explain that their measurement is accurate based on where they started and ended measuring the length of an object. The concept of transitivity is also a focus in first grade. It is central to this standard in two ways. First, students can look at the direct relationship of objects to compare the relationship between 3 objects. For example, the blue crayon is longer than the red crayon, and the red crayon is longer than the yellow crayon. Based on the relationships the student also can conclude that the blue crayon is longer than the yellow crayon. Second, students are expected to apply transitivity to order two objects that may not be able to be moved. For example, to compare the length of a bookshelf to the length of a desk, you could cut a string that is the same length as the bookshelf. You can then compare the piece of string with the desk. If the string is longer than the desk, then you know that the bookshelf is longer than the desk.	The yellow, red, and green pencils are on the desk. List them in order from the shortest to the longest pencil.  *Possible answer:* *The shortest pencil is the red pencil. Then the green pencil was the second longest. Finally, the yellow pencil is the longest.* --- Juanita needs to decide whether Mrs. Lopez can put a new desk in a space on the wall before moving the desk. How can Juanita use a piece of string to help Mrs. Lopez? *Possible response:* *Juanita can cut the string so that it is the same length as the desk. Then she can take the string to the space on the wall to see if the string will fit. If she stretches out the string out straight across and fits, then the desk will fit. If the string doesn't fit, then the desk won't fit.*

Return to Standards

Measure lengths.

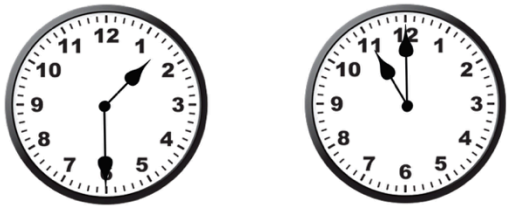
NC.1.MD.2 Measure lengths with non-standard units.

- Express the length of an object as a whole number of non-standard length units.
- Measure by laying multiple copies of a shorter object (the length unit) end to end (iterating) with no gaps or overlaps

Clarification	Checking for Understanding
This standard focuses on the process of measuring the length of an object. In first grade the focus is on the process of iterating a unit, which is a short object (e.g., cube or paper clip) that is used to measure the lengths of longer objects without gaps or overlaps. Developmentally, this standard follows after students have had ample opportunities to directly compare the lengths of two or three objects (NC.1.MD.1). The process of iterating a non-standard length unit without gaps or overlaps may be challenging for students who are still developing their fine motor skills. Snap cubes may be the easiest manipulative for those students since the cubes will connect and form a straight line of multiple non-standard length units.	Measure this pencil using non-standard units  *Possible Response: I carefully placed paper clips end to end. The pencil is 5 paper clips long. I thought it would take about 6 paperclips.* Which row is longer? Explain how you know.  Student Incorrect Response: *The row with 6 sticks is longer. Row B is longer.* Student Correct Response: *They are both the same length. See, they match up end to end and there are no gaps or overlaps*

Build understanding of time and money.

NC.1.MD.3 Tell and write time in hours and half-hours using analog and digital clocks.

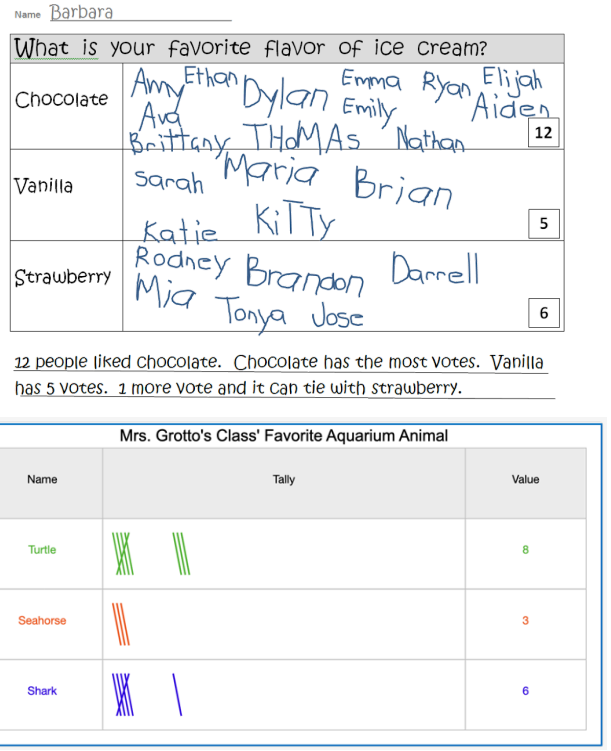
Clarification	Checking for Understanding
In this standard, students tell and then write the time to the hour and half-hour when given on both analog and digital clocks. Students are expected to distinguish between the hour hand and the minute hand and explain that when the hour hand is between two numbers the hour still is the preceding hour, e.g., at 12:30 the hour hand will be halfway between 12 and 1 and the hour is still 12 since it is not yet completely at the 1. In first grade students are expected to tell the times using the vocabulary terms: hour, minute, thirty, and half past. Students may be asked to draw hands on a clock. Teachers are asked to use discretion while evaluating students' work since the focus of the standard is being able to tell and write the time when given on both analog and digital clocks.	Write the times shown on each of the clocks below: 

Return to Standards

Represent and interpret data

NC.1.MD.4 Organize, represent, and interpret data with up to three categories.

- Ask and answer questions about the total number of data points.
- Ask and answer questions about how many in each category.
- Ask and answer questions about how many more or less are in one category than in another.

Clarification	**Checking for Understanding**
In this standard, students are expected to pose questions, collect data, analyze data (including representing data in a chart), and interpreting data. Students should be posing questions that yield categorical data with up to three categories (e.g., eye color, favorite dinner food, age, number of pets at home, etc.). The three aspects of this standard specify the types of questions that students should be answering. This standard provides ample opportunities for students to work on NC.1.OA.1, NC.1.OA.2, and comparing numbers with data as a context. ● The first bullet expects students to add the total number of data points, which intersects with their work when students solve problems that involve adding 3 numbers (NC.1.OA.2). ● The second bullet point focuses on interpreting tallies or numbers in a chart to state how many students preferred, voted for, or were included in a specific category. The second bullet also expects students to be able to compare and state which category has the most or least amount of values. ● The third bullet aligns with the Compare-Difference Unknown problem type that is new in First Grade (NC.1.OA.1). The limit in number size for this standard is 20 data points.	The question, "What is your favorite flavor of ice cream?" is posed. *The categories chocolate, vanilla and strawberry are determined as anticipated responses and written down on the recording sheet. When asking each classmate about their favorite flavor, the student's name is written in the appropriate category.* *Once the data are collected, the student counts up the amounts for each category and records the amount. The student then analyzes the data by carefully looking at the data and writes 3 sentences about what they notice about the data.* *Possible response:* 

Represent and interpret data **NC.1.MD.4** Organize, represent, and interpret data with up to three categories. ● Ask and answer questions about the total number of data points. ● Ask and answer questions about how many in each category. ● Ask and answer questions about how many more or less are in one category than in another.	
Clarification	**Checking for Understanding**
	Based on the data in the table above answer the following questions: 1. How many children voted? 2. How many more children liked the turtle than the seahorse? 3. How many fewer children liked the seahorse than the shark? 4. Mrs. Arugula's class had 14 children vote. How many fewer children voted in Mrs. Arugula's class than Mrs. Grotto's class? *Possible Responses:* *1. 8 + 3 + 6 = 17* *2. 8 - 3 = 5* *3. 6 - 3 = 6* *4. 17 - 14 = 3*

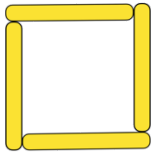
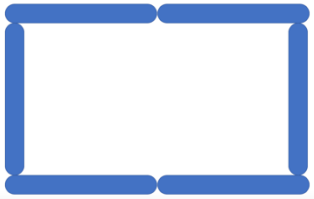
Build understanding of time and money. **NC.1.MD.5** Identify quarters, dimes, and nickels and relate their values to pennies.	
Clarification	**Checking for Understanding**
In this standard, students are expected to identify quarters, dimes, and nickels and then state the value of a coin in terms of pennies. Students are expected to give the value of a coin in terms of both cents and the number of pennies. For example, a student should be able to say that a quarter is 25 cents and is equal to 25 pennies. In first grade, students are not expected to calculate the values of a group of coins. While students do add a two-digit number to a one-digit number, add a two-digit number to a multiple of 10 (NC.1.NBT.4), and subtract multiples of 10 (NC.1.NBT.6), money should not be used as a context for this work since coins are non-proportional manipulatives. The use of coins as a context for adding and subtracting may lead to misconceptions related to place value, adding, and subtracting with two-digit numbers (van de Walle et al., 2019).	Give the students a handful of pennies, nickels, dimes, and quarters. Possible questions to ask: ● Can you hand me the nickel? ● Can you hand me the coin that has a value of 5 cents? ● Can you hand me the coin that has the same value as 10 pennies?

Return to Standards

Reason with shapes and their attributes

NC.1.G.1 Distinguish between defining and non-defining attributes and create shapes with defining attributes by:

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

Clarification	Checking for Understanding
In this standard, students distinguish between defining and non-defining attributes of both two-dimensional and three-dimensional shapes to identify and create shapes. Additionally in first grade when students are given the name of a shape they can build or draw the two-dimensional shapes listed: triangles, rectangles, squares, trapezoids, hexagons, and circles. Students also use materials to build the three-dimensional shapes that are listed: cubes, rectangular prisms, cones, spheres, and cylinders. Students understand that defining attributes are always present features that classify a particular object such as number of sides, lengths of sides, and number of angles. They also understand that non-defining attributes are features that may be present, but do not identify what the shape is called (e.g., color, size, orientation, etc.). <u>Two-Dimensional Shapes</u> Students should be able to describe the two-dimensional shapes they build by telling the number of sides and vertices it has. Students should be able to identify the vertex (corner) as the location where two sides meet; however, it is not necessary for Grade 1 students to use the term vertex. Through analysis, students should recognize that the length of sides is an important attribute when naming shapes. Specifically, a rectangle has four square corners, and the opposite sides are the same length, while a square is a special type of rectangle where it has four square corners, and all four sides are the same length. *Students should not develop the misconception that a rectangle has 2 long sides and 2 short sides.* Note: North Carolina has adopted the exclusive definition for a trapezoid. A trapezoid is a quadrilateral with *exactly* one pair of parallel sides. The following table describes the defining attributes for two-dimensional shapes.	Build a shape from these popsicle sticks. What shape did you make? How do you know?  *I used popsicle sticks to build a square. I know it's a square because all 4 sides are the same length and it has 4 right corners.*  *I built a rectangle. I know this is a rectangle because it has 4 sides and 4 square corners.* Which of the following characteristics are defining attributes of a rectangle. Closed shape 4 straight sides Blue lines Larger than a square 4 square corners *Correct Answers:* *The following are defining attributes of a rectangle: closed shape, 4 straight sides, and 4 square corners. Relative size and color are not defining attributes.* I have 4 sides and exactly one pair of sides move exactly in the same direction and will never cross. Who am I? *Response: A trapezoid*

Reason with shapes and their attributes

NC.1.G.1 Distinguish between defining and non-defining attributes and create shapes with defining attributes by:

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

Clarification

Please note that the words in parentheses are vocabulary for teachers and are not expected to be discussed in first grade classrooms.

Two-Dimensional Shape	Defining Attributes
Triangle	Closed shape with three straight sides Three corners (vertices)
Rectangle	Closed shape with four straight sides 4 square corners (right angles)
Square	Closed shape with four straight sides 4 square corners (right angles) All sides are the same length (congruent) A square is a special type of rectangle since it has 4 square corners and also has sides that are the same length.
Trapezoid	Closed shape with four straight sides 4 corners (vertices) Exactly one pair of sides move in the same direction and will never cross (intersect)
Hexagon	Closed shape with six straight sides
Circle	Closed shape with no straight sides No vertices All parts on the curve are the same distance from the center of the circle. Note: An oval is also a closed shape with straight sides and no vertices, but all of the points on the curve are not the same distance from the circle.

Checking for Understanding

I am a three-dimensional shape that has 2 circular faces and a curved surface. What am I?

Response: A cylinder.

Use these toothpicks and marshmallows to make two shapes. Make a cube and a rectangular prism that is not a cube. How are the two shapes similar? How are they different?

Possible response:

The two shapes both have 6 faces. Each shape has some faces that are squares.

The cube has 6 faces that are all squares. The rectangular prism has 2 faces that are squares and 4 faces that are rectangles but not squares.

Reason with shapes and their attributes

NC.1.G.1 Distinguish between defining and non-defining attributes and create shapes with defining attributes by:

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

Clarification

Three-Dimensional Shapes

In first grade the focus of three-dimensional shapes is for students to examine what two-dimensional shapes are the faces of three-dimensional shapes. The shapes are limited to only those included in the standard.

First grade students are only expected to know the number of faces in three-dimensional shapes and are not expected to know the number of edges and corners (vertices) in three-dimensional shapes.

This table describes the defining attributes for three-dimensional shapes that students are expected to apply during activities.

Three-Dimensional Shape	Defining Attributes
Cube	Six faces that are all squares. Every corner of every face is a square corner.
Rectangular Prism	Six faces that are all either rectangles or squares. Opposite faces are always the same shape (e.g., rectangles are opposite rectangles and squares are opposite squares) Every corner of every face is a square corner.
Cone	One circle face and one curved surface that meet (intersect) at the circle face and a point.
Sphere	A sphere has no straight lines, sides, or edges. All parts of the sphere are the same distance from the center of the sphere.
Cylinder	Two circle faces and one curved surface. The two circle faces are opposite each other.

Checking for Understanding

Return to Standards

Reason with shapes and their attributes

NC.1.G.2 Create composite shapes by:

- Making a two-dimensional composite shape using rectangles, squares, trapezoids, triangles, and half-circles naming the components of the new shape.
- Making a three-dimensional composite shape using cubes, rectangular prisms, cones, and cylinders, naming the components of the new shape.

Clarification

In this standard, students create composite two- and three-dimensional shapes. In first grade students are expected to name the composite shape, if it is a shape that is common to first grade students, as well as the component shapes that they used to make the new shape. The goal of this standard is for students to explore how shapes fit together to create new shapes, as well as notice which shapes are components of an existing shape.

<u>Two-dimensional shapes</u>

The table below provides *some ideas* on some composite two-dimensional shapes and how they can be formed by component shapes.

Two-dimensional Composite shape	**Components of composite shape**
Rectangle	• 2 squares • 2 rectangles • 2 triangles with square corners
Square	• 2 rectangles • 2 triangles with square corners
Trapezoid	• 1 rectangle and 1 triangle with a square corner • 1 rectangle and 2 triangles with square corners
Hexagon	• 2 trapezoids

In addition to building composite shapes, this standard provides opportunities for students to also solve shape puzzles and construct designs with two-dimensional shapes.

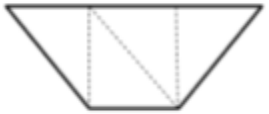
Checking for Understanding

What shapes can you create with triangles?

Possible responses:

Student A: *I made a square. I used 2 triangles.*

Student B: *I made a trapezoid. I used 4 triangles.*



Student C: *I made a tall skinny rectangle. I used 6 triangles.*

I want to make a wall that looks like a rectangular prism, but I do not have any rectangular prisms. Make a wall and describe the shapes that you used to make the rectangular prism.

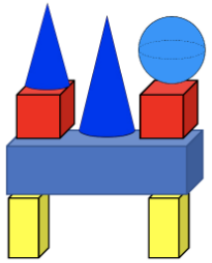
Possible Response:

I used 4 cubes and 2 triangular prisms to make a rectangular prism.

Build a tower out of three-dimensional shapes. Describe what shapes you used in your tower.

Possible Response:

I used 2 cubes, 3 rectangular prisms, 2 cones, and 1 sphere.



Reason with shapes and their attributes

NC.1.G.2 Create composite shapes by:

- Making a two-dimensional composite shape using rectangles, squares, trapezoids, triangles, and half-circles naming the components of the new shape.
- Making a three-dimensional composite shape using cubes, rectangular prisms, cones, and cylinders, naming the components of the new shape.

Clarification

Three-dimensional shapes

Three-dimensional composite shape	**Component shapes**
Cube	● 4 cubes
Rectangular prism	● Cubes or rectangular prisms ● Triangular prisms with square corners

In regard to three-dimensional shapes, nearly all three-dimensional composite shapes that are common to first grade students can be made from other three-dimensional component shapes. Therefore, nearly all composite shapes will be composite shapes or designs that will include three-dimensional component shapes.

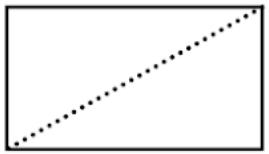
Checking for Understanding

Return to Standards

Reason with shapes and their attributes

NC.1.G.3 Partition circles and rectangles into two and four equal shares.

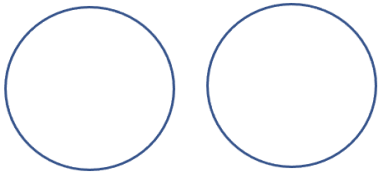
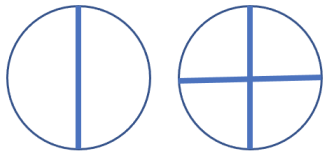
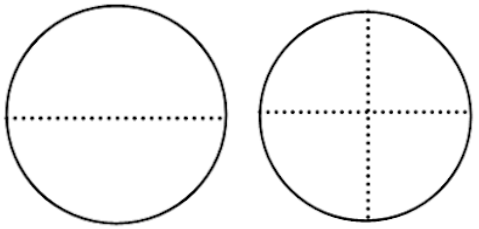
- Describe the shares as halves and fourths, as half of and fourth of.
- Describe the whole as two of, or four of the shares.
- Explain that decomposing into more equal shares creates smaller shares.

Clarification	**Checking for Understanding**
In this standard, students partition circles and rectangles (including squares) into two and four equal shares. The focus of this standard is the third bullet, which states that students are expected to explain that decomposing a whole into more shares will make the shares or pieces smaller. Specifically, students should examine a whole partitioned into halves and the same sized whole partitioned into fourths and explain why fourths are smaller than halves. The first 2 bullets of the standard call for students to describe both the shares and wholes based on the number of shares that the whole was partitioned into. As stated in the first bullet of the standard students use the phrases "halves" "half of", "fourths," and "fourth of" to describe the shares that were created. Students should not be introduced to the idea of writing a fraction with a numerator or denominator until third grade. Working with "the whole", students understand that "the whole" is composed of two halves or four fourths. This standard provides multiple opportunities for students to explore contexts and word problems that involve partitioning circles and rectangles (including squares). Contexts could include, but should not be limited to, paper plates at a picnic, art projects, or food contexts such as pizza or cakes.	How can you and a friend share equally (partition) this piece of paper so that you both have the same amount of paper to paint a picture?  *Possible responses:* Student A *I would split the paper right down the middle. That gives us 2 halves. I have half of the paper and my friend has the other half of the paper.*  Student B *I would split it from corner to corner (diagonally). She gets half of the paper and I get half of the paper. See, if we cut on the line, the parts are the same size.* 

Reason with shapes and their attributes

NC.1.G.3 Partition circles and rectangles into two and four equal shares.

- Describe the shares as halves and fourths, as half of and fourth of.
- Describe the whole as two of, or four of the shares.
- Explain that decomposing into more equal shares creates smaller shares.

Clarification	**Checking for Understanding**
	<u>Describe the whole as two of, or four of the shares</u> The class is painting clay circles in art class. Catey partitions her circle so that each section is half of the circle. Grayson cuts her circle so that each section is a fourth of the circle.  Draw each design in the circles. For each design explain how many sections are needed to make one whole. *Possible Response:* *In Catey's design we need 2 sections to make a whole since each section is one half. In Grayson's design we need 4 sections to make a whole since each section is one fourth.*  <u>Explain that decomposing into more equal shares creates smaller shares</u> You can have only one slice of pizza. Which pizza should you pick your slice from if you want the biggest piece of pizza? The pizzas are the same size and are each divided into equal pieces. Explain how you know.  *Possible response:* *I would get more pizza if I took a slice from the pizza that is cut into two equal parts. The more equal slices there are, the smaller the pieces get. I wouldn't get as much pizza if I only got a fourth of the pizza instead of half of the pizza.*

Return to Standards

Addition/Subtraction Problem Types

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

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

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

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