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

2nd 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 2nd 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 – 2nd Grade Standards

Standards for Mathematical Practice

Operations & Algebraic Thinking	Number & Operations in Base Ten	Measurement and Data	Geometry
Represent and solve problems **NC.2.OA.1** *Add and subtract within 20.* **NC.2.OA.2** *Work with equal groups.* **NC.2.OA.3** **NC.2.OA.4**	*Understand place value.* **NC.2.NBT.1** **NC.2.NBT.2** **NC.2.NBT.3** **NC.2.NBT.4** *Use place value understanding and properties of operations.* **NC.2.NBT.5** **NC.2.NBT.6** **NC.2.NBT.7** **NC.2.NBT.8**	*Measure and estimate lengths.* **NC.2.MD.1** **NC.2.MD.2** **NC.2.MD.3** **NC.2.MD.4** *Relate addition and subtraction to length.* **NC.2.MD.5** **NC.2.MD.6** *Build understanding of time and money.* **NC.2.MD.7** **NC.2.MD.8** *Represent and interpret data.* **NC.2.MD.10**	*Reason with shapes and their attributes.* **NC.2.G.1** **NC.2.G.3**

Standards for Mathematical Practice

Practice	Explanation and Example
1. Make sense of problems and persevere in solving them.	Mathematically proficient students in Second Grade examine problems and tasks, can make sense of the meaning of the task and find an entry point or a way to start the task. Second Grade students also develop a foundation for problem solving strategies and become independently proficient on using those strategies to solve new tasks. In Second Grade, students' work continues to use concrete manipulatives and pictorial representations as well as mental mathematics. Second Grade students also are expected to persevere while solving tasks; that is, if students reach a point in which they are stuck, they can reexamine the task in a different way and continue to solve the task. Lastly, mathematically proficient students complete a task by asking themselves the question, "Does my answer make sense?"
2. Reason abstractly and quantitatively.	Mathematically proficient students in Second Grade make sense of quantities and relationships while solving tasks. This involves two processes- decontextualizing and contextualizing. In Second Grade, students represent situations by decontextualizing tasks into numbers and symbols. For example, in the task, "There are 25 children in the cafeteria, and they are joined by 17 more children. How many students are in the cafeteria?" Second Grade students translate that situation into an equation, such as: 25 + 17 = __ and then solve the problem. Students also contextualize situations during the problem-solving process. For example, while solving the task above, students can refer to the context of the task to determine that they need to subtract 19 since 19 children leave. The processes of reasoning also other areas of mathematics such as determining the length of quantities when measuring with standard units.
3. Construct viable arguments and critique the reasoning of others.	Mathematically proficient students in Second Grade accurately use definitions and previously established solutions to construct viable arguments about mathematics. During discussions about problem solving strategies, students constructively critique the strategies and reasoning of their classmates. For example, while solving 74 - 18, students may use a variety of strategies, and after working on the task, can discuss and critique each other's reasoning and strategies, citing similarities and differences between strategies.
4. Model with mathematics.	Mathematically proficient students in Second 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. Second Grade students use concrete manipulatives and pictorial representations to provide further explanation of the equation. Likewise, Second Grade students are able to create an appropriate problem situation from an equation. For example, students are expected to create a story problem for the equation 43 + 17 = ___ such as "There were 43 gumballs in the machine. Tom poured in 17 more gumballs. How many gumballs are now in the machine?"
5. Use appropriate tools strategically.	Mathematically proficient students in Second Grade have access to and use tools appropriately. These tools may include snap cubes, place value (base ten) blocks, hundreds number boards, number lines, rulers, and concrete geometric shapes (e.g., pattern blocks, 3-d solids). Students also have experiences with educational technologies, such as calculators and virtual manipulatives, which support conceptual understanding and higher-order thinking skills. During classroom instruction, students have access to various mathematical tools as well as paper, and determine which tools are the most appropriate to use. For example, while measuring the length of the hallway, students can explain why a yardstick is more appropriate to use than a ruler.
6. Attend to precision.	Mathematically proficient students in Second Grade are precise in their communication, calculations, and measurements. In all mathematical tasks, students in Second Grade communicate clearly, using grade-level appropriate vocabulary accurately as well as giving precise explanations and reasoning regarding their process of finding solutions. For example, while measuring an object, care is taken to line up the tool correctly in order to get an accurate measurement. During tasks involving number sense, students consider if their answer is reasonable and check their work to ensure the accuracy of solutions.
7. Look for and make use of structure.	Mathematically proficient students in Second Grade carefully look for patterns and structures in the number system and other areas of mathematics. For example, students notice number patterns within the tens place as they connect skip count by 10s off the decade to the corresponding numbers on a 100s chart. While working in the Numbers in Base Ten domain, students work with the idea that 10 ones equals a ten, and 10 tens equals 1 hundred. In addition, Second Grade students also make use of structure when they work with subtraction as missing addend problems, such as 50- 33 = __ can be written as 33+ __ = 50 and can be thought of as," How much more do I need to add to 33 to get to 50?"

8. Look for and express regularity in repeated reasoning.	Mathematically proficient students in Second Grade begin to look for regularity in problem structures when solving mathematical tasks. For example, after solving two-digit addition problems by decomposing numbers (33+ 25 = 30 + 20 + 3 +5), students may begin to generalize and frequently apply that strategy independently on future tasks. Further, students begin to look for strategies to be more efficient in computations, including doubles strategies and making a ten. Lastly, while solving all tasks, Second Grade students accurately check for the reasonableness of their solutions during and after completing the task.

Return to Standards

Represent and solve problems.
NC.2.OA.1 Represent and solve addition and subtraction word problems, within 100, with unknowns in all positions, by using representations and equations with a symbol for the unknown number to represent the problem, when solving:

- One-Step problems:
  - Add to/Take from-Start Unknown
  - Compare-Bigger Unknown
  - Compare-Smaller Unknown
- Two-Step problems involving single digits:
  - Add to/Take from- Change Unknown
  - Add to/Take From- Result Unknown

Clarification

In this standard, students extend their previous work with addition and subtraction word problems in two ways. First, they represent and solve one-step word problems within 100, building upon their previous work to 20 (NC.1.OA.1). They also represent and solve one and two-step word problems.

<u>One-step Word Problems with New Problem Types</u>
In Grade 2, student continue to work with problem types from previous grade levels (Result Unknown and Change Unknown) with numbers less than 100. Second graders are expected to independently read, represent with manipulatives or pictures, write equations, and solve <u>all</u> addition and subtraction problem types, with unknowns in <u>all</u> positions. As students work with various problem types, they will record situation equations (equations in which the operation and order of numbers matches the situation of the problem). Eventually, students notice that a problem may be solved with other solution equations (equations that lead to the answer, but do not match the situation of the story).

Students continue working with problem types introduced in Kindergarten and First Grade, and begin exploring, representing, and solving word problems aligned to the four remaining problem types:

- *Add To/Start Unknown*
- *Take From/Start Unknown*
- *Compare/Bigger Unknown*
- *Compare/Smaller Unknown*

The introduction of new problem types should begin by providing students with opportunities to explore word problems with numbers less than 10 initially so that they can represent them with manipulatives and/or pictures.

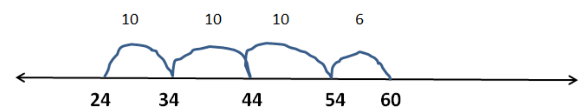
Checking for Understanding

<u>One-Step Word Problem (Start Unknown):</u>
Some students are in the cafeteria. 24 more students came in. Now there are 60 students in the cafeteria. How many were in the cafeteria to start with? Use drawings and equations to show your thinking.

Possible responses:

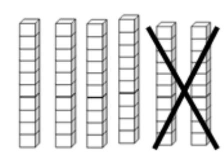
Student A:
I read the equation and thought about how to write it with numbers. I asked, "What and 24 makes 60?" So, my equation is ☐ + 24 =60. I used a number line to solve it.

I started with 24. Then I took jumps of 10 until I got close to 60. I landed on 54. Then, I took a jump of 6 to get to 60. So, 10 + 10 + 10 + 6 = 36. So, there were 36 students in the cafeteria to start with.



Student B:
I read the equation and thought about how to write it with numbers. First, I wrote an equation that showed me what the question is asking. I wrote ☐ + 24 = 60. Then, I thought, "There are 60 total. If I take away the part that I know (24), I'm left with the other part. So, what is 60 – 24?" My equation for the solution is 60 – 24 = ☐. I used place value blocks to solve it.

I started with 60 and took 2 tens away.



Represent and solve problems.

NC.2.OA.1 Represent and solve addition and subtraction word problems, within 100, with unknowns in all positions, by using representations and equations with a symbol for the unknown number to represent the problem, when solving:

- One-Step problems:
  - Add to/Take from-Start Unknown
  - Compare-Bigger Unknown
  - Compare-Smaller Unknown
- Two-Step problems involving single digits:
  - Add to/Take from- Change Unknown
  - Add to/Take From- Result Unknown

Clarification

Compare problems provide opportunities to reason about which quantity is smaller and larger, which influences whether students should add or subtract. The use of keywords to determine operations should **not** be used since it will lead students to do the wrong operation in Second Grade and future years. Alternatively, students should use part-part-whole diagrams, bar models, and/or reasoning about the size of quantities while solving compare problems.

Examples of Compare Problems

Compare Bigger Unknown	Compare Smaller Unknown
Problem with "more" Juan has 3 pencils. Brielle has 2 more than Juan. How many pencils does Brielle have? B = 3 + 2	Problem with "more" Vikas has 3 pencils. He has 2 more pencils than Olivia. How many pencils does Olivia have? O = 3 - 2
Problem with "fewer/less" Nina has 3 pencils. Nina has 2 fewer pencils than Jamison. How many pencils does Jamison have? J = 3 + 2	Problem with "fewer/less" Ricardo has 3 pencils. Marcie has 2 less pencils than Ricardo. How many fewer pencils does Marcie have? M = 3 - 2

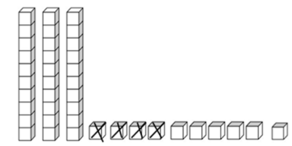
Since second graders are just beginning their work with these four new problem types, they should **not** be included in two-step word problems. Additionally, two-step problems should involve single-digit addends so the primary focus is on understanding the problem situation and finding strategies to solve the problem.

One-step word problems use one operation. Two-step word problems use two operations which may include the same operation or opposite operations.

Checking for Understanding

I needed to take 4 more away. So, I broke up a ten into ten ones. Then, I took 4 away.

That left me with 36. So, 36 students were in the cafeteria at the beginning. 60 – 24 = 36



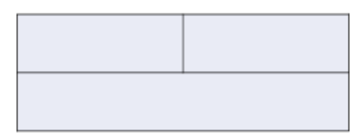
Student C
I first used a Beginning Middle End or BME chart.
Based on my equation __ + 24 = 60 I decided to add up from 24 to get to 60.
24 + 6 = 30
30 + 10 = 40
40 + 10 = 50
50 + 10 = 60
My answer is the sum of what I added: 10 + 10 + 10 + 6 = 36

Begin	Middle	End
___	+24	= 60

One-Step Addition and Subtraction Word Problems (Compare):

There are 37 students with black shoes in the cafeteria. The number of students with black shoes is 28 fewer than the number of students with brown shoes in the cafeteria.

Complete the diagram with the words: Black, Brown, and Difference.



Write an equation to find the number of students with brown shoes in the cafeteria.

Show your work and find the number of students with brown shoes on.

Represent and solve problems.

NC.2.OA.1 Represent and solve addition and subtraction word problems, within 100, with unknowns in all positions, by using representations and equations with a symbol for the unknown number to represent the problem, when solving:

- One-Step problems:
  - Add to/Take from-Start Unknown
  - Compare-Bigger Unknown
  - Compare-Smaller Unknown
- Two-Step problems involving single digits:
  - Add to/Take from- Change Unknown
  - Add to/Take From- Result Unknown

Clarification

One Step Word Problem *One Operation*	**Two-Step Word Problem** *Two Operations, Same*	**Two-Step Word Problem** *Two Operations, Opposite*
There are 15 stickers on the page. Cindy put some more stickers on the page. There are now 22 stickers on the page. How many stickers did Cindy put on the page? 15 + □ = 22 22 – 15 = □	There are 9 blue marbles and 6 red marbles in the bag. Maria put in 8 more marbles. How many marbles are in the bag now? 9 + 6 + 8 = □	There are 9 peas on the plate. Carlos ate 5 peas. Mother put 7 more peas on the plate. How many peas are on the plate now? 9 – 5 + 7 = □

As second grade students solve one- and two-step problems they use manipulatives such as snap cubes, place value materials, ten frames, etc.; create drawings of manipulatives to show their thinking; or use number lines to solve and describe their strategies. They then relate their drawings and materials to equations. Students solve a variety of addition and subtraction word problems, determining the unknown in all positions (*Result* unknown, *Change* unknown, and *Start* unknown). Rather than a letter ("*n*"), boxes or pictures are used to represent the unknown number.

Add To		
Result Unknown:	*Change* Unknown:	*Start* Unknown:
There are 29 students on the playground. Then 18 more students showed up. *How many students are there now?* 29 + 18 = □ K	There are 29 students on the playground. *Some more students show up*. There are now 47 students. How many students came? 29 + ☼ = 47 1	*There are some students on the playground.* Then 18 more students came. There are now 47students. How many students were on the playground at the beginning? □ + 18 = 47 2

Checking for Understanding

Possible response:

37 + 28 = ___

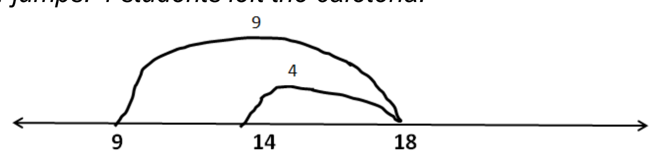
I added by tens first then added the ones.
30 + 20 = 50
7 + 8 = 15
Then I added 50 and 15 to get 65 which is the answer.

Black	Difference
Brown	

<u>Two-Step Addition and Subtraction Word Problems</u>:
There are 9 students in the cafeteria. 9 more students come in. After a few minutes, some students leave. There are now 14 students in the cafeteria. How many students left the cafeteria? Use drawings and equations to show your thinking.

Possible responses:

Student A
I read the equation and thought about how to write it with numbers:
9 + 9 - □ = 14. I used a number line to solve it. I started at 9 and took a jump of 9. I landed on 18. Then, I jumped back 4 to get to 14. So, overall, I took 4 jumps. 4 students left the cafeteria.



Student B
I read the equation and thought about how to write it with numbers:
9 + 9 - □ = 14. I used doubles to solve it. I thought about double 9s. 9 + 9 is 18. I knew that I only needed 14. So, I took 4 away, since 4 and 4 is eight. So, 4 students left the cafeteria.

Represent and solve problems.

NC.2.OA.1 Represent and solve addition and subtraction word problems, within 100, with unknowns in all positions, by using representations and equations with a symbol for the unknown number to represent the problem, when solving:

- One-Step problems:
  - Add to/Take from-Start Unknown
  - Compare-Bigger Unknown
  - Compare-Smaller Unknown
- Two-Step problems involving single digits:
  - Add to/Take from- Change Unknown
  - Add to/Take From- Result Unknown

Clarification

Second graders use a variety of strategies, such as making tens and using fluency strategies such as doubles and near doubles, to help solve problems involving addition and subtraction within 20. With larger numbers, students are expected to apply their understanding of place value to solve problems using strategies such as adding or subtracting by place value, representing addition and subtraction on a number line, or by using base ten blocks or drawings of base ten blocks.

While using a number line as a tool to add and subtract students will use many of the strategies described here and in NC.2.NBT.5. Standard NC.2.MD.6 is intended to be foundational for number line work since NC.2.MD.6 specifies that the number line is pre-marked and given to them. Students should then transition to an open number line which they create and draw independently. This open number line is a tool that students can use to provide a visual and show strategies such as place value strategies like breaking apart tens and ones, adding or subtracting in parts to land on landmark (friendly) numbers, or the relationship between addition and subtraction. Strategies are the processes that students use to solve problems, while tools such as number lines, open number lines, hundreds boards, and manipulatives help students use and demonstrate the various strategies in Second Grade.

Checking for Understanding

Student C

I used two bar diagrams to determine what was unknown. I saw that 9 + 9 made 18 students in the cafeteria. Then, I had to figure out how many students left the cafeteria. I knew there were eighteen to start, and there were 14 left. The part that I need to make 18 is 4.

?	
9	9

18	
14	?

Represent and solve problems.
NC.2.OA.1 Represent and solve addition and subtraction word problems, within 100, with unknowns in all positions, by using representations and equations with a symbol for the unknown number to represent the problem, when solving:

- One-Step problems:
  - Add to/Take from-Start Unknown
  - Compare-Bigger Unknown
  - Compare-Smaller Unknown
- Two-Step problems involving single digits:
  - Add to/Take from- Change Unknown
- Add to/Take From- Result Unknown

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
Action	**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? ***"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 "more":*** Jade has three more stickers than Lara. Lara has two stickers. How many stickers does Jade have? ***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 "more":*** Jade has three more stickers than Lara. Jade has five stickers. How many stickers does Lara have? ***Version with "fewer":*** Lara has three fewer stickers than Jade. Jade has five stickers. How many stickers does Lara have? 5 - 3 = ? 2

Return to Standards

Add and subtract within 20 **NC.2.OA.2** Demonstrate fluency with addition and subtraction, within 20, using mental strategies.	
Clarification	**Checking for Understanding**
In this standard, students use various addition and subtraction strategies in order to fluently add and subtract within 20: This standard calls for students to learn about and use a variety of strategies to solve addition and subtraction problems. As these strategies are repeatedly used in ways that make sense to the students, they begin to understand and internalize the relationships that exist between and among numbers. This leads to fluency. Students are fluent when they display *accuracy*, *efficiency*, and *flexibility*. Traditional flash cards or timed tests have not been proven as effective instructional strategies for developing fluency (Kling & Bay-Williams, 2014). Rather, students should have multiple experiences solving tasks with manipulatives and drawings, playing fluency games, and discussing the relationships between numbers to help develop fluency with addition and subtraction strategies. Building from first grade (NC.1.OA.6), students should apply their understanding of making ten strategies and decomposing a number leading to a ten to support fluency. Both of these strategies rely on knowing number combinations that add together to make 10 (NC.K.OA.4, NC.1.OA.9).	9 + 5 = __ **Counting On:** *I started at 9 and counted 5 more. I landed on 14.* **Making Ten:** *I know that 9 and 1 is 10, so I broke 5 into 1 and 4. 9 plus 1 is 10. Then I have to add 4 more, which is 14.* *I know that 5 and 5 is 10 so I broke 9 into 5 and 4 and added 5 + 5 + 4. That is the same as 10 + 4 which is 14.* 13 - 9 = __ **Using the Relationship between Addition and Subtraction:** *I know that 9 plus 4 equals 13. So, 13 minus 9 is 4.* **Decomposing a Number Leading to a Ten:** *I know that 13 - 3 is 10 so I decomposed 9 into 3 and 6.* *13 - 3 - 6 is the same as 10 - 6 which is 4.*

Return to Standards

Work with equal groups

NC.2.OA.3 Determine whether a group of objects, within 20, has an odd or even number of members by:

- Pairing objects, then counting them by 2s.
- Determining whether objects can be placed into two equal groups.
- Writing an equation to express an even number as a sum of two equal addends.

Clarification

The focus of this standard is placed on the conceptual understanding of determining whether numbers within 20 are even and odd numbers and proving the evenness or oddness of numbers with objects, drawings, and equations with 2 equal addends. An even number is an amount that can be made of two equal parts with no leftovers. An odd number is one that is not even and cannot be made of two equal parts.

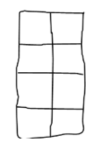
When pairing objects, students should represent even numbers with equations to represent the pairs. For example, if given 6 objects, a students may write 2 + 2 + 2 = 6 or 3 + 3 = 6 to represent their picture. While both equations are mathematically correct, the expectation for second graders is to apply the concept of doubles to the concept of odd and even numbers. Students should understand that if a number can be decomposed (broken apart) into two equal addends or doubles addition facts (e.g., 10 = 5 +5), then that number is an even number. Students should explore this concept with concrete objects (e.g., counters, cubes, etc.) before moving towards pictorial representations such as circles or arrays.

While noticing that even numbers end in 0, 2, 4, 6, and 8 is an interesting and useful observation, it should not be used as the definition of an even number.

Checking for Understanding

Is 8 an even number? Justify your thinking with an equation of two equal addends.

Possible responses:

Student A	Student B
I grabbed 8 counters. I paired counters up into groups of 2. Since I didn't have any counters left over, I know that 8 is an even number. The equation is 8 = 4 + 4.	*I grabbed 8 counters. I put them into 2 equal groups. There were 4 counters in each group, so 8 is an even number. The equation is 8 = 4 + 4.*
Student C	**Student D**
I drew 8 boxes in a rectangle that had two columns. Since every box on the left matches a box on the right, I know that 8 is even. The equation is 8 = 4 + 4. 	*I know 4 plus 4 equals 8. So, 8 is an even number. The equation is 8 = 4 + 4.*

Return to Standards

Work with equal groups
NC.2.OA.4 Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.

Clarification

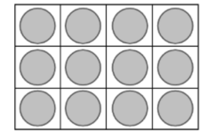
In this standard, students build rectangular arrays and write repeated addition equations to find the total number of objects in the arrays as a building block for multiplication in Grade 3. Students are expected to create arrays with concrete objects (e.g., counters, bears, square tiles, etc.) as well as pictorial representations on grid paper or other drawings. Due to the commutative property of addition, students can add either the rows or the columns and still arrive at the same solution.

Students explore this concept with concrete objects (e.g., counters, bears, square tiles, etc.) as well as pictorial representations on grid paper or other drawings. Due to the commutative property of addition, students can add either the rows or the columns and still arrive at the same solution.

While students are not expected in second grade to partition a rectangle into rows and columns, this standard is related to that concept of dividing a rectangle into rows and columns. With this standard, students should explore how to determine the total number of small squares in a pre-marked array. Exploring a rectangle already partitioned into rows and columns is a precursor to learning about the area of a rectangle and using arrays and repeated addition as representations and strategies to support multiplicative thinking.

Checking for Understanding

What is the total number of circles below?

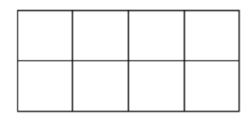


Possible responses:

Student A	Student B
I see 3 counters in each column and there are 4 columns. So, I added 3 + 3 + 3 + 3. That equals 12.	*I see 4 counters in each row and there are 3 rows. So, I added 4 + 4 + 4. That equals 12.*
3 + 3 + 3 + 3 = 12	4 + 4 + 4 = 12

Joe used grid paper to make a rectangle with 2 rows and 4 columns. How many small squares did he make? Write an equation to show how you found the total amount of squares.

Possible response:
There are 8 squares in this rectangle. See- 2, 4, 6, 8.
My equation is 2 + 2 + 2 + 2 = 8



Return to Standards

Understand place value.

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

- Unitize by making a hundred from a collection of ten tens.
- Demonstrate that the numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds, with 0 tens and 0 ones.
- Compose and decompose numbers using various groupings of hundreds, tens, and ones.

Clarification

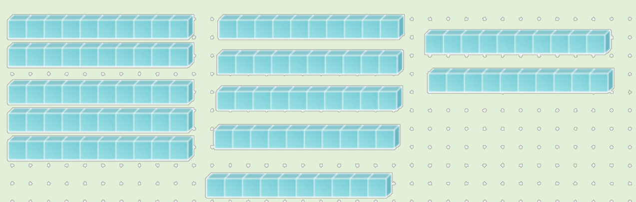
In this standard, students extend their place value understanding to the hundreds place as they are introduced to the idea that a bundle of 10 tens is a unit called a "hundred".

Unitize by making a hundred from a collection of ten tens

In Grade 1 students worked on unitizing (grouping) 10 ones into a ten. In Grade 2 students extend this idea to unitize (group) 10 tens into a hundred. When students unitize tens as a whole unit (called "a hundred"), they are able to count groups as though they were individual objects. In Grade 2 this work extends beyond simple rote counting where they say 100, 200, 300. Rather, students are expected to examine a group of more than 10 base ten ten rods and group 10 of them together to make a hundred. After unitizing ten tens into a hundred when students are asked to determine the value of a pile of base ten blocks (or a picture of blocks) students should be able to count the group of 10 tens as hundreds.

Demonstrate that numbers 100, 200, … refer to a number of hundreds with 0 tens and 0 ones

Students are expected to recognize and group the blocks in the left and middle as 10 tens or 100 and talk about the blocks as 12 tens as well as a group of 100 and 2 tens.



Students continue to apply their place value understanding from first grade as they are expected to build three-digit numbers that have only a non-zero number in the hundreds place. For example, 100 can be made of 10 groups of ten as well as 100 ones and 400 could be made of 4 hundreds or 40 tens or 400 ones.

Compose and decompose numbers using various groupings of hundreds, tens, and ones

This part of the standard lays the groundwork for the use of place value concepts later in the year and in future grades in the context of adding and subtracting multi-digit numbers.

Checking for Understanding

Unitize by making a hundred from a collection of ten tens

The following list shows the number of pencils that each teacher has. Each box holds 10 pencils.

- Mrs. Abernathy- 10 boxes and a bag of 1 pencil
- Mrs. Bulgogi- 12 boxes and a bag of 5 pencils
- Mrs. Oh- 11 boxes and a bag of 9 pencils.

How many pencils does each teacher have?

Possible response:

Student A

Mrs. Abernathy has 10 tens and 1 pencil. Since 10 tens is 100 she has 101 pencils.

Mrs. Bulgogi has 12 tens and 5 pencils. Since 10 tens is 100 she has 100 and 2 tens and 5 pencils. That is 125 pencils.

	Hundreds	Tens	Ones
Abernathy	1	~~10~~ 10 + 0 0	1
Bulgogi	1	~~12~~ 10 + 2 2	5
Oh	1	~~11~~ 10 + 1 1	9

Mrs. Oh has 11 tens and 9 pencils. Since 10 tens is 100 she has 100 and 1 ten and 9 pencils. That is 119 pencils.

Student B

I used a place value chart. Since there were 10 pencils in a box I put the number of boxes in the tens place to start. For each teacher I broke the number of boxes up into tens and ones and made a group of 100.

Understand place value.

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

- Unitize by making a hundred from a collection of ten tens.
- Demonstrate that the numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds, with 0 tens and 0 ones.
- Compose and decompose numbers using various groupings of hundreds, tens, and ones.

Clarification

For example, 125 can be made of 1 hundred, 2 tens, and 5 ones OR the hundred block can be traded for 10 tens making the pile 12 tens and 5 ones. This work should begin with exchanging (trading) 1 block for 10 of a smaller block before moving to extremely large groups of blocks that need to be exchanged. In all cases students in second grade are only expected to exchange (trade) between one place value.

Examples Exchanging Between 1 Group and a Group of Either 10 Ones or 10 Tens	**Examples Exchanging Between Extremely Large Groups**
Bridget wants to write the value of 1 hundred, 6 tens, and 8 ones as only tens and ones. How can she write it? *16 tens and 8 ones*	What is the value of 32 tens and 6 ones? *326*
What is the value of 1 hundred, 12 tens and 8 ones? *228*	Xola wants to write the value of 274 using only tens and ones. How can she write it? *27 tens and 4 ones*

Students group objects as they count using both groupable manipulatives (i.e., materials that can be grouped, snapped, or connected to make a ten or hundred) and pre-grouped manipulatives (i.e., materials like base ten blocks, ten frame cards, and bean sticks, which must be traded to make a ten or hundred). The use of coins and money in place value is not developmentally appropriate since coins are not proportional (e.g., a dime is not 10 times bigger than a penny).

Through use of manipulatives and pictorial representations, students make a connection between the written three-digit numbers and hundreds, tens, and ones. Understanding the value of the digits goes beyond simply telling the number of hundreds or tens. Second graders who truly understand the position and place value of the digits are also able to confidently model the number with some type of visual representation. Others who seem like they know, because they can state which number is in the tens place, may not truly know what each digit represents.

Checking for Understanding

<u>Demonstrate numbers 100, 200… refer to one and two hundreds with 0 tens and 0 ones.</u>

Give a student access to a pile of base ten blocks. Ask students the following:

- Can you make a pile that equals 200? *(2 hundreds blocks)*
- Can you make a pile that equals 400? *(4 hundreds blocks)*
- Can you make a pile that equals 700? *(7 hundreds blocks)*

<u>Compose and decompose numbers using various groupings of hundreds, tens, and ones</u>

Ms. Smith asked her students to use base ten blocks to represent the number 212.

- Molly used two hundreds, one ten, and two ones.
- Zack used 212 ones.
- Salvador showed 212 a different way using 2 hundreds and other base ten blocks. What could Salvador have done?

Possible Response:

2 hundreds and 12 ones.

Return to Standards

Understand place value. **NC.2.NBT.2** Count within 1,000; skip-count by 5s, 10s, and 100s.	
Clarification	**Checking for Understanding**
In this standard, students count within 1,000, including counting on from a given number without having to go back and start at one. In Kindergarten, students skip counted by 10 up to 100. In second grade, students build on this work as they skip count by 5s, 10s, and 100s. In second grade students are expected to skip count proficiently applying patterns within the counting sequence. For example, when skip counting by 5s starting at 0 using a 100s board or number line, students learn that the ones digit alternates between 5 and 0. When students skip count by 100s, they discover that the hundreds digit is the only digit that changes and that it increases by one number each time.	Destiny was skip-counting the fruit roll ups by 5s. She already counted 490 fruit roll ups. As she continues to <u>skip-count by 5s</u>, what are the next six numbers she will count? What do you notice? 480, 485, 490, _____, _____, _____, _____, _____, _____ *Possible Response:* *495, 500, 505, 510* *I noticed that the ones place alternates between a 5 and a 0.* *I also noticed that the tens digit increases by 1 when the ones digit becomes a 0.* Cassandra was skip-counting the fruit roll ups by 10s. She already counted 178 fruit roll ups. As she <u>skip-counts by 10s</u>, what are the next six numbers she will count? What do you notice? 158, 168, 178, _____, _____, _____, _____, _____, _____ *Possible Response:* *188, 198, 208, 218* *I noticed that the ones digit is always 8 and the tens digit increases by 1 each time. From 198 to 208 I noticed that since we had 9 tens the next number 208 had 0 tens but had 1 more hundred since 9 tens and 1 more ten make a hundred.*

Return to Standards

<table>
<tr><td colspan="2">Understand place value.
NC.2.NBT.3 Read and write numbers, within 1,000, using base-ten numerals, number names, and expanded form.</td></tr>
<tr><td>Clarification</td><td>Checking for Understanding</td></tr>
<tr><td>This standard calls for students to read and write the numbers 1-999 in a variety of ways, including:
• Base ten numerals (e.g., 123)
• Number names (e.g., one hundred twenty-three)
• Expanded form (e.g., 100 + 20 + 3)

Expanded form is a foundational skill for when students use place value strategies to add and subtract large numbers (NC.2.NBT.7).

Students also explore the idea that numbers can be composed of different variations of ones, tens, and hundreds. For example, the representations for 100 include:
• 1 hundred
• 10 tens
• 9 tens + 10 ones
• 8 tens + 20 ones

When reading and writing whole numbers, the word “and” should not be used (e.g., 235 is stated and written as “two hundred thirty-five).

Expanded form is a critical aspect of this standard as it is foundational for adding and subtracting multi-digit numbers in Grades 2, 3, and 4 with whole numbers. Students need ample experience representing numbers with base ten blocks or pictures of base ten blocks (NC.2.NBT.1) and writing the numbers using base-ten numerals and expanded form (NC.2.NBT.3).</td><td>Mrs. Marquez’ class has two hundred seventy-six pieces of paper.
Write the number of pieces of paper that the class has as a number.
Write the number of pieces of paper that the class has in expanded form.

Possible response:
Mrs. Marquez’ class has 276 pieces of paper. That number is 200 + 70 + 6 in expanded form.
<hr>Ume is thinking of a number that his classmates are trying to guess. Ume gives the following clues. After each clue state some of the possible numbers that Ume’s number could be.

1. My number has a 3 in the hundreds place. What is a possible number?
2. My number also has a number less than 3 in the ones place. What is a possible number?
3. My number also has a number greater than 7 in tens place. What is a possible number?
4. Write down what you think Ume’s number is in word form and in expanded form.

Possible answers:
1. 300 to 399,
2. 300, 301, 302, 310, 311, 312, 320, 321, 322, 330, 331, 332, 340, 341, 342, 350, 351, 352, 360, 361, 362, 370, 371, 372, 380, 381, 382, 390, 391, 392
3. 380, 381, 382, 390, 391, 392
4. One of the numbers for number 3 is written in word form and expanded form.</td></tr>
</table>

Return to Standards

Understand place value.

NC.2.NBT.4 Compare two three-digit numbers based on the value of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.

Clarification

This standard calls for students to apply their knowledge of NC.1.NBT.1 and NC.1.NBT.3 by comparing two three-digit numbers. Students are expected to be able to compare three-digit numbers presented in various forms, including number or base-ten form, word form, and expanded form.

Students should have ample experiences communicating their comparisons in words before using symbols. Students were introduced to the symbols greater than (>), less than (<) and equal to (=) in Grade 1 and continue to use them in Second Grade with numbers within 1,000.

In Grade 2 students are only expected to compare two numbers at a time using reasoning about place value to support the use of the greater than, less than, and equals sign.

Checking for Understanding

Compare these two numbers. 452 __ 455

Student A *Place Value Strategy*	Student B *Counting Up (or Back) Strategy*
452 has 4 hundreds 5 tens and 2 ones. 455 has 4 hundreds 5 tens and 5 ones. They have the same number of hundreds and the same number of tens, but 455 has 5 ones and 452 only has 2 ones. 452 is less than 455. 452 < 455	*452 is less than 455. I know this because when I count up I say 452 before I say 455. 452 is less than 455.* 452 < 455

Use > or < to make each statement true. Draw pictures if needed.

a) 700 + 5 + 60 ☐ 60 + 3 + 700	b) 32 tens ☐ 254
c) 40 + 600 + 8 ☐ 60+ 800 + 4	d) 3 tens + 5 ones + 100 ☐ 147

Return to Standards

Use place value understanding and properties of operations.

NC.2.NBT.5 Demonstrate fluency with addition and subtraction, within 100, by:

- Flexibly using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
- Comparing addition and subtraction strategies and explaining why they work.
- Selecting an appropriate strategy in order to efficiently compute sums and differences.

Clarification

Students are expected to fluently add and subtract within 100. This work should be integrated with 2.OA.1 where they solve addition and subtraction word problems embedded in word problems. Solving word problems provides students with a context to help them determine whether they should add or subtract (van de Walle et al., 2019).

This is the first standard that mentions fluency with multi-digit computation in the elementary grades. Fluency means that students can accurately find the answer and progress towards more efficient ways in addition to thinking flexibly about how to compose and decompose numbers.

The U.S. Standard algorithm is **not** expected until Grade 4 and should not be introduced in second grade. Students who have independently demonstrated proficiency with the strategies mentioned here should spend time working on adding and subtracting with expanded form which is the expectation in third grade

Flexibly using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction

Students develop procedural fluency with multi-digit addition and subtraction through ample experiences developing conceptual understanding of various strategies. These experiences should include adding and subtracting with place value tools, such as base ten blocks or pictures of base ten blocks, the hundreds board (hundreds chart), an open number line, and the process of adding or subtracting tens and ones separately. The table below shows the strategies described in the standard. Often second grade students will apply multiple strategies while solving a problem.

Strategy	Possible Examples
Strategies based on place value	• Students use base ten blocks or draw pictures of base ten blocks to solve problems. • Students add or subtract in parts where they add tens and ones separately. This could be shown on a number line, a hundreds board (hundreds chart), or as equations.

Checking for Understanding

Flexibly use strategies

There are 67 pens and 25 pencils in the store. How many pens and pencils are in the store?

Possible responses:

Place Value Strategy:	Decomposing into Tens:	Commutative Property:
I broke both 67 and 25 into tens and ones. 6 tens plus 2 tens equals 8 tens. Then I added the ones. 7 ones plus 5 ones equal 12 ones. I then combined my tens and ones. 8 tens plus 12 ones equals 92.	*I decided to start with 67 and break 25 apart. I knew I needed 3 more to get to 70, so I broke off a 3 from the 25. I then added my 20 from the 22 left and got to 90. I had 2 left. 90 plus 2 is 92. So, 67 + 25 = 92*	*I broke 67 and 25 into tens and ones so I had to add 60+7+20+5. I added 60 and 20 first to get 80. Then I added 7 to get 87. Then I added 5 more. My answer is 92.*

63 – 32 = __

Possible responses:

Decomposing into Tens:	Think Addition:
I broke apart both 63 and 32 into tens and ones. I know that 3 minus 2 is 1, so I have 1 left in the ones place. I know that 6 tens minus 3 tens is 3 tens, so I have a 3 in my tens place. My answer has a 1 in the ones place and 3 in the tens place, so my answer is 31. 63 – 32 = 31	*I thought, '32 and what makes 63?'. I know that I needed 30, since 30 and 30 is 60. So, that got me to 62. I needed one more to get to 63. So, 30 and 1 is 31. 32 + 31 = 63*

Use place value understanding and properties of operations.

NC.2.NBT.5 Demonstrate fluency with addition and subtraction, within 100, by:

- Flexibly using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
- Comparing addition and subtraction strategies and explaining why they work.
- Selecting an appropriate strategy in order to efficiently compute sums and differences.

Clarification

	• Students add or subtract in parts where they add or subtract to land on a friendly or landmark number such as a multiple of ten. They then add or subtract the tens and ones separately.
Properties of operations	• In second grade the commutative property of addition is the primary focus. Students change the order of the addends when adding multiple addends together OR when they have decomposed addends into tens and ones or decomposed addends into smaller numbers they change the order of the addends. For example: 47 + 36 = __ a student may do: 47 = 40 + 7 and 36 = 30 + 6 Students may decompose 6 into 3 + 3 so they can make a group of 10. The equation would be: 40 + 7 + 30 + 3 + 3. The commutative property of addition lets students change the order: 40 + 30 + 7 + 3 + 3 70 + 10 + 3 = 83
Relationship between addition and subtraction	• Students rewrite a subtraction problem as an addition problem. For example, 62 - 28 = __ would be rewritten as 28 + __ = 62 OR solved by starting at 28 and adding in parts until they reach 62. When students add or subtract in second grade if they apply the relationship between addition and subtraction, they are expected to use strategies

Checking for Understanding

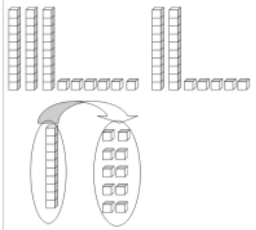
There are 36 birds in the park. 25 more birds arrive. How many birds are there? Solve the problem and explain your thinking.

Student A

I broke 36 and 25 into tens and ones 30 + 6 + 20 + 5. I can change the order of my numbers, since it doesn't change any amounts, so I added 30+ 20 and got 50. Then I added 5 and 5 to make10 and added it to the 50. So, 50 and 10 more is 60. I added the one that was left over and got on 6 to get 61. So, there are 61 birds in the park.

Student B

I used place value blocks and made a pile of 36 and a pile of 25. Altogether, I had 5 tens and 11 ones. 11 ones is the same as one ten and one left over. So, I really had 6 tens and 1 one. That makes 61.



<u>Comparing addition and subtraction strategies and explaining why they work</u>

One of your classmates solved the problem 56 - 34 = __ by writing "I know that I need to add 2 to the number 4 to get 6. I also know that I need to add 20 to 30 to get to 50. So, the answer is 22." Is their strategy correct? Explain why or why not?

Possible response:

I see what they did. Yes. I think the strategy is correct. They thought, '34 and what makes 56?' So, they thought about adding 2 to the 4 to get 6. Then, they had 36 and needed 56. So, they added 20 more. That means that they added 2 and 20 which is 22. I think that it's right.

Use place value understanding and properties of operations.

NC.2.NBT.5 Demonstrate fluency with addition and subtraction, within 100, by:

- Flexibly using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
- Comparing addition and subtraction strategies and explaining why they work.
- Selecting an appropriate strategy in order to efficiently compute sums and differences.

Clarification

	based on place value and/or properties of operations to find the answer.

Students are expected to apply the commutative property of addition when using place value strategies to add. For example, when adding 32 + 59 students may decompose both addends into tens and ones making the equation 30 + 2 + 50 + 9. Using the commutative property students can rearrange the addends into 30 + 50 + 9 + 2 in order to add the tens first before adding the ones or they can rearrange them into 9+2+30+50 to add the ones first.

In second grade students are also expected to reason about the relationship between addition and subtraction. This relationship can be applied when they turn a subtraction equation (e.g., 62 - 17 = __) into an addition equation (e.g., 17 + _ = 62) or other related problems. In second grade this idea is integrated into the various problem types (Result Unknown, Change Unknown, and Start Unknown) described in NC.2.OA.1.

Students may use a number line as a tool while working with this standard as well as NC.2.OA.1. Standard NC.2.MD.6 is intended to be foundational for number line work since NC.2.MD.6 specifies that the number line is pre-marked and given to them. Students should then transition to an open number line which they create and draw independently. This open number line is a tool that students can use to provide a visual and show strategies such as place value strategies like breaking apart tens and ones, adding or subtracting in parts to land on landmark (friendly) numbers, or the relationship between addition and subtraction. Strategies are the processes that students use to solve problems, while tools such as number lines, open number lines, hundreds boards, and manipulatives help students use and demonstrate the various strategies in second grade.

Comparing addition and subtraction strategies, and explaining why they work
With this part of the standard students are expected to examine two different strategies for the same problem, explain similarities and differences between them, and then explain why those strategies work. In Grade 2 students may use manipulatives (base ten blocks), drawings or equations to support their explanations.

Checking for Understanding

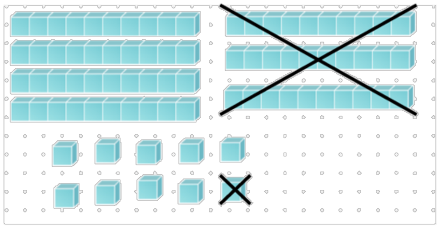
One of your classmates solved the problem 25 + 35 by adding 20 + 30 + 5 + 5. Is their strategy correct? Explain why or why not?

Possible response:

Well, 20 + 30 is 50. And 5 + 5 is 10. So, 50 + 10 is 60. I got 60 too, but I did it a different way. I added 25 and 25 to make 50. Then I added 5 more and got 55. Then, I added 5 more and got 60. We both have 60. I think that it doesn't matter if you add the 20 first or last. You still get the same amount.

Tomika and Tomas both solved 80-31 = __.

Tomika
I used base ten blocks. I traded a ten stick in for 10 ones and then removed 1 of the ones. Then I removed 3 ten sticks. I had 4 tens and 9 ones which is 49.



Tomas

80 – 10 = 70
70 – 10 = 60
60- 10 = 50
50 – 1 = 49

How are there strategies similar? How are they different?

Possible Responses:

Both Tomika and Tomas subtracted 3 tens and 1 one from 80.
Both of them got 49 as an answer.
Tomika subtracted 1 first and Tomas subtracted 3 tens first.
Tomika subtracted 30 or 3 tens at one time while Tomas subtracted 10 3 times.

Use place value understanding and properties of operations.

NC.2.NBT.5 Demonstrate fluency with addition and subtraction, within 100, by:

- Flexibly using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
- Comparing addition and subtraction strategies and explaining why they work.
- Selecting an appropriate strategy in order to efficiently compute sums and differences.

Clarification

Selecting an appropriate strategy in order to efficiently compute sums and differences

When given a two-digit addition or subtraction problem students in second grade are expected to select an appropriate strategy to find the answer. In second grade the concept of "efficient strategies" can be discussed when comparing different approaches. For example, students should be able to describe that when adding in parts on a number line it is more efficient to add groups of 10 rather than adding by one repeatedly.

Checking for Understanding

Selecting an appropriate strategy to efficiently compute sums and differences

Brianna is trying to find the answer to this problem.

There are some paintings hanging in the art room. Then a class paints 24 paintings. If there are now 81 paintings, how many were first in the art room?

Brianna thought about using the following strategies. For each strategy is it correct? Explain why or why not? For each strategy is it efficient? Explain why or why not.

A. Start at 24 and add by ones until 81.
B. Start at 81 and count backwards to 74. Then count backwards by 10s until she reaches 24.
C. Start at 81 and count backwards by 4. Then subtracted 20.
D. Start at 24 and add by ones until 31. Then add 50 to get to 81.

Possible Response:

A. Correct. Not efficient since they counted by 1s 57 times.
B. Correct. Somewhat efficient since they counted backwards by 1 7 times and then counted backwards by 10s 5 times.
C. Correct. Efficient since they counted backwards by 1 4 times and then subtracted 20.
D. Correct. Efficient since they added by 1 7 times and then added 50.

Nikki was using the hundreds board to solve this problem.

There were 95 pieces of paper in the art room. After the project there are only 58 pieces left. How many pieces of paper were used for the project?

Nikki decided to start at 95 and counted backwards until she reached 65. She then counted back by ones until she reached 58.

95 - 10 = 85
85 - 10 = 75
75 - 10 = 65
65 - 7 = 58
My answer is 10 + 10 + 10 + 7 = 37

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

Was she correct? How do you know?

Use place value understanding and properties of operations.

NC.2.NBT.5 Demonstrate fluency with addition and subtraction, within 100, by:

- Flexibly using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
- Comparing addition and subtraction strategies and explaining why they work.
- Selecting an appropriate strategy in order to efficiently compute sums and differences.

Clarification	Checking for Understanding
	Describe a more efficient way that Nikki could find the answer using the hundreds board. Possible Response: *The answer to 95 - O = 58 can be found the way Nikki found it. The answer is 37 since 58 + 37 = 95.* *A more efficient way would have been to move on the hundreds chart from 95 to 90 by subtracting 5 then subtracting 30 all at once and then subtracting 2 again.* *Those equations would be* *95 - 5 = 90* *90 - 30 = 60* *60 - 2 = 58*

Return to Standards

Use place value understanding and properties of operations. **NC.2.NBT.6** Add up to three two-digit numbers using strategies based on place value and properties of operations.	
Clarification	**Checking for Understanding**
This standard provides an opportunity for students to apply the commutative property and place value strategies (see table in 2.NBT.5) to find the sum of 3 2-digit numbers. The commutative property of addition states that when the order of the addends is changed, the sum stays the same. Students are expected to explain why strategies work as they apply place value strategies by decomposing a two-digit number into tens and ones and then add the decomposed numbers. Students may use drawings or objects to support their explanation. The US standard algorithm should **<u>not</u>** be taught until Grade 4. Students who have independently demonstrated proficiency with the strategies mentioned here should spend time working on adding and subtracting with expanded form which is the expectation in third grade.	43 + 34 + 47 = __ Student A *Commutative Property* *I saw the 43 and 47 and added them first since I know 3 plus 7 equals 10. Then I added and 90 was my answer. Then I added 34 and got 124.* *So, 43 + 47 + 34 = 124* Student B *Place Value Strategies* *I broke up all of the numbers into tens and ones. First, I added the tens. 40 + 30 + 40 = 110. Then I added the ones. 3 + 4 + 7 = 14. That meant I had 1 ten and 4 ones. So, 110 + 10 is 120. 120 and 4 more is 124.* *So, 43 + 34 + 57 = 124* Student C *Place Value Strategies and Associative Property* *I broke up all the numbers into tens and ones. First, I added up the tens. 40 + 30 + 40. I changed the order of the numbers to make adding easier. I know that 40 + 40 equals 80. I took 10 from the 30, so that 80 + 10 equals 90. I added the 20 that was left to get 110.* *Then I added up the ones. 3 + 4 + 7. I changed the order of the numbers to make adding easier. I know that 3 plus 7 equals 10. 10 plus 4 equals 14.* *I then combined my tens and my ones. 110 plus 14 (1 ten and 4 ones) equals 124.*

Return to Standards

Use place value understanding and properties of operations.

NC.2.NBT.7 Add and subtract, within 1,000, relating the strategy to a written method, using:

- Concrete models or drawings
- Strategies based on place value
- Properties of operations
- Relationship between addition and subtraction

Clarification

This standard calls for students to extend their understanding of addition and subtraction to add and subtract two 3-digit numbers with concrete materials (manipulatives), models, drawings, place value strategies, and properties of operations to add within 1,000. Students should be introduced to these larger numbers with problems in the context of word problems since that helps students make sense of the problem (van de Walle et al., 2019). Since students have been working with Result Unknown problem types since kindergarten this is the problem type that should be the initial problem type used with this standard. Students are expected to explore all problem types with 3-digit addition and subtraction problems but should have access to concrete models or drawings during this work. The table below describes the various strategies in the standard. This table is similar to the one found in NC.2.NBT.5.

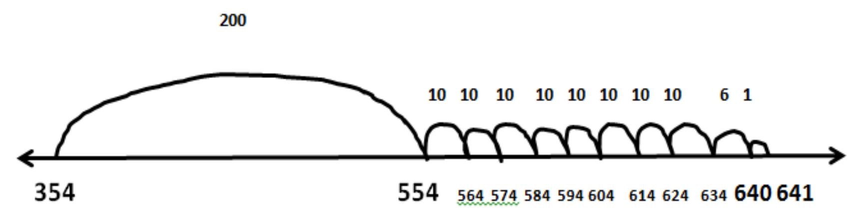
Strategy	Examples
Concrete models or drawings	• Students use base ten blocks or draw pictures of base ten blocks to solve problems. This is also a strategy based on place value. • Students add or subtract in parts where they add tens and ones separately on a number line. This is also a strategy based on place value.
Strategies based on place value	• Students use base ten blocks or draw pictures of base ten blocks to solve problems. • Students add or subtract in parts where they add the hundreds, tens, and ones separately. This could be shown on a number line, a hundreds board (hundreds chart), or as equations. This is shown as expanded form in Grade 3 before introducing the U.S. Standard algorithm in Grade 4. • Students add or subtract in parts where they add or subtract to land on a friendly or landmark number such as a multiple of 10 or 100. They can then add or subtract the hundreds, tens, and ones separately.

Checking for Understanding

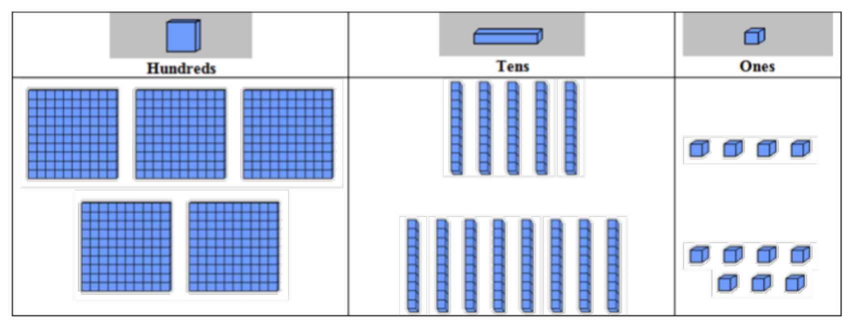
354 + 287 = __

Possible responses:

Student A: Strategies based on place value
I started at 354 and jumped 200. I landed on 554. I then made 8 jumps of 10 and landed on 634. I then jumped 6 to land on 640. Then I jumped 1 more and landed on 641. 354 + 287 = 641



Student B: Concrete models or drawings
I used place value blocks and a place value mat.
I broke up both of the numbers and placed them on the place value mat.
First, I added the ones.4 + 7 = 11.
Then I added the tens. 50 + 80 = 130.
Then I added the hundreds. 300 + 200 = 500.
Then I combined my answers. 500 + 130 = 630. 630 + 11= 641.



Use place value understanding and properties of operations.
NC.2.NBT.7 Add and subtract, within 1,000, relating the strategy to a written method, using:
- Concrete models or drawings
- Strategies based on place value
- Properties of operations
- Relationship between addition and subtraction

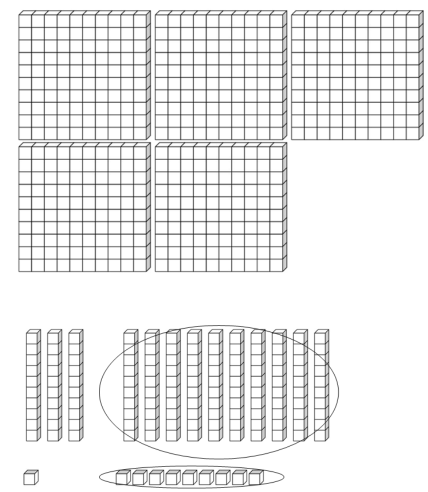
Clarification

Properties of operations	In Second Grade the commutative property of addition is the primary focus. Students change the order of the addends when adding multiple addends together OR when they have decomposed addends into tens and ones or decomposed addends into smaller numbers they change the order of the addends. For example: 374 + 438 = __ 300 + 70 + 4 + 400 + 30 + 8. The student would decompose 8 into 6 and 2 so they can make a 10. 300 + 70 + 4 + 400 + 30 + 6 + 2 The commutative order of addition lets students rearrange the order of the addends. $\underbrace{300 + 400}_{700} + \underbrace{70 + 30}_{100} + \underbrace{4 + 6}_{10} + 2$ 700 + 100 + 10 + 2 = 812
Relationship between addition and subtraction	• Students rewrite a subtraction problem as an addition problem. For example, 612 - 328 = __ would be rewritten as 328 + __ = 612 OR solved by starting at 328 and adding in parts until they reach 612. When students add or subtract in Second Grade if they apply the relationship between addition and subtraction, they are expected to use strategies based on place value and/or properties of operations to find the answer.

Based on the standard, students should relate every strategy to a written method, which means students who use base ten blocks to solve the problem are expected to represent their work with the blocks by drawing pictures of

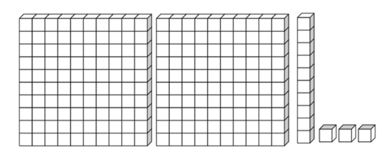
Checking for Understanding

Student C: Concrete models or drawings
I used place value blocks. I made a pile of 354. I then added 287. That gave me 5 hundreds, 13 tens and 11 ones. I noticed that I could trade some pieces. I had 11 ones and traded 10 ones for a ten. I then had 14 tens, so I traded 10 tens for a hundred. I ended up with 6 hundreds, 4 tens and 1 one.
So, 354 + 287 = 641

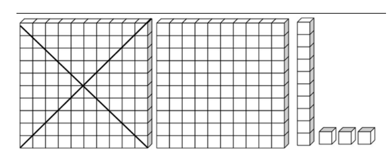


There are 213 children in the cafeteria. Then 124 leave. How many children are left?

Possible responses:
Student: A: Concrete models or drawings
I used place value blocks. I made a pile of 213.



I then started taking away blocks. First, I took away a hundred which left me with 1 hundred and thirteen.



Use place value understanding and properties of operations.
NC.2.NBT.7 Add and subtract, within 1,000, relating the strategy to a written method, using:
- Concrete models or drawings
- Strategies based on place value
- Properties of operations
- Relationship between addition and subtraction

Clarification

blocks or writing equations that match what they did with the blocks. Students are expected to explain their reasoning using pictures, numbers, or words.

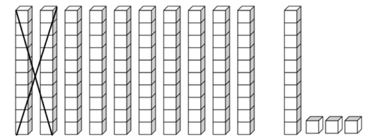
The US standard algorithm should not be taught until Grade 4. Students who are proficient with the strategies mentioned here should spend time working on adding and subtracting with expanded form which is the expectation in third grade.

Students' experiences with this standard can be sequenced developmentally based on the amount of reorganization (regrouping) that is needed. The size of numbers and relationship between the numbers used in the ones, tens, and hundreds place should be carefully considered when students are working on this standard. See the table below for examples.

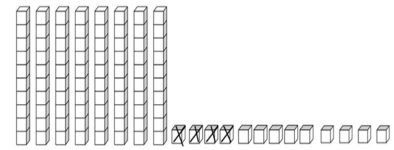
	No Reorganizing	**Reorganizing only Ones and Tens**	**Reorganizing in Ones, Tens, and Hundreds**
Addition	432 + 157 = __	432 + 159 = __	432 + 189 = __
Subtraction	752 - 321 = __	752 - 325 = __	752 - 375 = __

Checking for Understanding

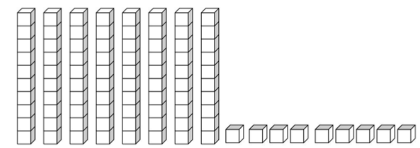
Now, I only need to take away 24. I need to take away 2 tens but I only had 1 ten so I traded in my last hundred for 10 tens. Then I took two tens away leaving me with no hundreds and 9 tens and 3 ones.



I then had to take 4 ones away but I only have 3 ones. I traded in a ten for 10 ones. I then took away 4 ones.

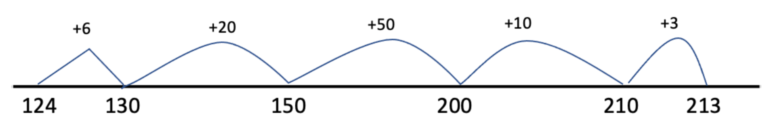


This left me with no hundreds, 8 tens and 9 ones. My answer is 89. 213 - 124 = 89



Student B: Strategies based on Place Value
213 - 124 = ___
I decomposed 124 into 100 + 20 + 4 and subtracted each of those numbers one at a time.
213 - 100 = 113
113 - 20 = 93
93 - 4 = 89

Student C: Relationship between addition and subtraction
213 - 124 = __ this is the same as adding onto 124 until I reach 213.
I added in parts and showed it on a number line. I landed on the next ten which was 130 then jumped to 150 then jumped to 200. I kept going until I got to 213.



Return to Standards

Use place value understanding and properties of operations.
NC.2.NBT.8 Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900.

Clarification

In this standard, students extend the work from Grade 1 (NC.1.NBT.5) where they mentally found 10 more and 10 less than any two-digit number. This standard calls for students to mentally add and subtract 10 or 100 from a given number between 100 and 900.

As students engage in various experiences with concrete objects and representations, they realize that adding or subtracting 10 or 100 that only the tens place or the digit in the hundreds place changes by 1. Students should have ample opportunities to explore a 200s chart when starting this standard to help them discover the patterns and relationships that existed in first grade when you add or subtract 10 still hold true for larger numbers.

Opportunities to solve problems in which students cross hundreds (10 more than 392) should be included after students have become comfortable adding and subtracting within the same hundred.

Checking for Understanding

Adding/Subtracting 10 within the same hundred:
What is 10 more than 218?
What is 241 – 10?

Adding/subtracting 10 across hundreds:
293 + 10 = ☐
What is 10 less than 206?

Discovering Patterns with adding and subtracting 10 on the 200s chart:
Find 175 on the 200s chart.
What is 10 more than 175?
What is 10 less than 175?
Explain how you found your answers.

Find 191 on the 200s chart.
What is 10 less than 191?
What do you think 10 more than 191 is?
How do you know?

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
101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170
171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190
191	192	193	194	195	196	197	198	199	200

Possible Response:
175: 10 less is 165, 10 more is 185.
I moved up a row to find 10 less and down a row to find 10 more OR I added/subtracted 1 to/from the 6 in the tens place.

191: 10 less is 181. 10 more is 201.
I moved up a row to find 10 less and to find 10 more I knew that 201 comes after 200 OR I added/subtracted 1 to/from the 9 in the tens place.

Mentally adding/subtracting 100
Julio wants to subtract 100 from 706. He tells Trinity, “I just take 1 away from the number in the hundreds place which makes it 606.” Is Julio correct?

Based on Julio’s reasoning, what is the answer to 100 less than 812? Explain how you found the answer.

Possible Response:
Julio is correct since 706-100 = 606.
Based on his reasoning 812-100 = 712. I subtracted 8-1 in the hundreds place.

Return to Standards

Measure and estimate lengths

NC.2.MD.1 Measure the length of an object in standard units by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.

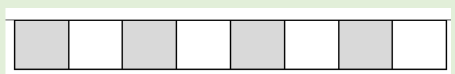
Clarification

In this standard, students build upon their non-standard measurement experiences in first grade by measuring in standard units (inches, feet, centimeters, and meters). Students are expected to demonstrate the concept of iteration (repeatedly using a tool) to determine the length of an object using standard units.

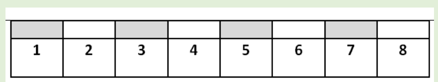
Using both customary (inches and feet) and metric (centimeters and meters) units, students select an attribute to be measured (e.g., length of classroom), choose an appropriate unit of measurement (e.g., yardstick), and determine the number of units (e.g., yards). Students will understand that larger units (e.g., yard) can be partitioned into equivalent units (e.g., feet or inches).

Students should connect their understanding of non-standard units from first grade to standard units in second grade as they measure the length, width, or height of an object and determine how many of a specific unit it takes to measure the specific dimension of the object.

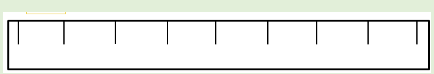
By helping students progress from a "ruler" that is blocked off into colored units (no numbers)…

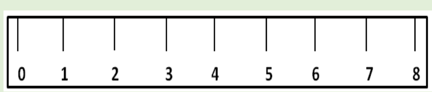


…to a "ruler" that has numbers along with the colored units…



…to a "ruler" that has inches (centimeters) with and without numbers, students develop the understanding that the numbers on a ruler do not count the individual marks but indicate the spaces (distance) between the marks. This is a critical understanding students need when using such tools as rulers, yardsticks, meter sticks, and measuring tapes.





Checking for Understanding

Use a ruler to measure the width of the doorway in inches. Explain how you found how wide the doorway was.

Possible Response:

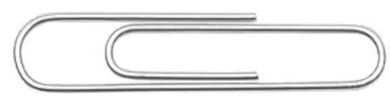
> *The doorway was 48 inches wide. I used a ruler that was 12 inches long 4 times in order to measure the entire doorway. Each time that I reached the end of the ruler I marked the end with a pencil so I would know where to begin measuring when I moved the ruler.*

Would it more appropriate to use a ruler or a yard stick to measure the length of a book? Explain why.

Possible Response:

> *A book is about the same length of a ruler so it makes more sense to use a ruler to measure the length of a book.*

What is the length of each item below in inches?



Possible Response:
Crayon: 4 inches, Paper clip: 2 inches

Return to Standards

Measure and estimate lengths **NC.2.MD.2** Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.	
Clarification	**Checking for Understanding**
In this standard, students measure one object using two units of different lengths. Students are expected to explain that one object can have different measurements based on the size of the unit. Students are also expected to explain that measuring the dimension of an object with a smaller unit will have a larger number associated with the measurement compared to measuring the same object with a larger unit. This relationship between the size of a unit and the number of units is called the compensatory principal. Students do not need to know that formal term, but they should be able to demonstrate and explain that the smaller the unit, the more units it will take to measure the selected attribute.	Measure the height of the table with a yard stick. How tall is the table in feet? How tall is the table in inches? Explain how the measurements can both be used to describe the height of the table. *Possible response:* *The table is a little bit more than 2 feet tall. When I measured it in inches, it was 26 inches. Both 2 feet and 26 inches can be used to describe the height since the units feet and inches are different. The measurement has more inches than feet since inches are a smaller unit than feet.* Trinity measured the length of a piece of paper. She noticed it was 11 inches and about 28 centimeters. Can both measurements be correct? Explain why or why not. *Possible response:* *It is possible for both of those measurements to be correct. Since centimeters are smaller than inches it would take more centimeters than inches to describe the length of a piece of paper.*

Return to Standards

Measure and estimate lengths **NC.2.MD.3** Estimate lengths in using standard units of inches, feet, yards, centimeters, and meters.	
Clarification	**Checking for Understanding**
In this standard, students estimate the lengths of objects using inches, feet, centimeters, and meters prior to measuring. The process of estimation helps the students focus on the attribute being measured and the measuring process. As students estimate, they consider the size of the unit, which helps them to become more familiar with the unit size. Once a student has made an estimate, they should measure the object and reflect on the accuracy of the estimate made and apply their understanding for future estimates and measurements.	How many inches do you think this string is if you measured it with a ruler? *Possible response:* *An inch is pretty small. I'm thinking it will be somewhere between 8 and 9 inches. If I measure it with a ruler, it is 9 inches. I thought that it would be somewhere around there.*

Return to Standards

Measure and estimate lengths **NC.2.MD.4** Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.	
Clarification	**Checking for Understanding**
In this standard, students choose two objects to measure, identify an appropriate tool and unit, measure both objects, and then determine the differences between the two lengths. Students should make comparative statements to describe differences between two objects such as "This object is shorter by 2 inches" or "It is longer by 4 centimeters." This standard intersects NC.2.OA.1 with the word problem type Compare-Difference Unknown which was introduced in First Grade with numbers 20 or less. In this standard, numbers should be limited to 99 or less.	Choose two pieces of string to measure. About how many inches long do you think each string is? Measure to see how long each string is. What did you notice? How many more inches does your short string need to be so that it is the same length as your long string? *Possible Response:* *Estimate- I think String A is about 30 inches long. I think string B is only about 10 inches long. It's really short.* *Measuring- String A is definitely the longest one. It is 31 inches long. String B was only 9 inches long. I was close!* *Comparing lengths- String A is 31 inches and String B is 9 inches. String B needs to be 22 inches longer to be as long as String A.*

Return to Standards

Relate addition and subtraction to length.
NC.2.MD.5 Use addition and subtraction, within 100, to solve word problems involving lengths that are given in the same units, using equations with a symbol for the unknown number to represent the problem.

Clarification

In this standard, students apply their understanding of length (NC.2.MD.1) to solve addition and subtraction word problems (NC.2.OA.1) with numbers within 100. Within a problem, the same unit of measurement should be used. Equations may vary depending on students' interpretation of the task.

Students are expected to solve word problems related to all of the problem types for addition and subtraction that are described in NC.2.OA.1. In line with NC.2.OA.1 numbers should be limited to 100 or less.

Students are expected to use symbols to represent unknowns in all positions in equations in this standard. This work directly aligns to the equations provided with the various addition and subtraction problem types in NC.2.OA.1. In Grade 3 students begin using letters to represent unknowns.

The US standard algorithm is not expected until Grade 4. Students should use the multiple place value strategies and representations described in NC.2.NBT.5. Students who have independently demonstrated proficiency with these strategies should solve problems using expanded form which is the expectation in Grade 3.

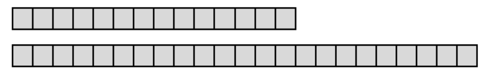
Checking for Understanding

In P.E. class Kate jumped 14 inches. Mary jumped 23 inches. How much farther did Mary jump than Kate? Write an equation and then solve the problem.

Possible responses:

Student A

My equation is 14 + __ = 23 since I thought, "14 and what makes 23?". I used cubes. I made a train of 14. Then I made a train of 23. When I put them side by side, I saw that Kate would need 9 more cubes to be the same as Mary. So, Mary jumped 9 more inches than Kate. 14 + 9 = 23.



Student B

My equation is 23 - 14 = __ since I thought about what the difference was between Kate and Mary. I broke up 14 into 10 and 4. I know that 23 minus 10 is 13. Then, I broke up the 4 into 3 and 1. 13 minus 3 is 10. Then, I took one more away. That left me with 9. So, Mary jumped 9 more inches than Kate. That seems to make sense since 23 is almost 10 more than 14. 23 – 14 = 9.

23 – 10 = 13
13 – 3 = 10
10 – 1 = 9

Poppy decided to make a braided necklace. After Saturday her necklace was 18 cm long. She braided some more on Sunday. After Sunday her necklace was 41 cm long.

- Fill in the Beginning-Middle-End chart so that it matches the problem.
- Write an equation that matches the problem using a symbol to represent the unknown.
- Show your work and find the length that Poppy braided on Sunday.

Begin	Middle	End

Possible response:

$18 + \boxed{} = 41$

I started at 18 and added up until I got to 41.
I added 2 to get to 20 since it is a multiple of 10.
I then added 20 more to get to 40.
I then added 1 more.
My answer is 2 + 20 + 1 which is 20 + 2 + 1 which is 23.

Begin	Middle	End
18	+ $\boxed{}$	= 41

Return to Standards

Relate addition and subtraction to length.

NC.2.MD.6 Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points and represent whole-number sums and differences, within 100, on a number line.

Clarification

In this standard, students build upon their experiences with open number lines from Grade 1 and their work with other standards in second grade (e.g., NC.2.OA.1, NC.2.NBT.5, NC.2.NBT.7). This standard expects students to represent numbers on a pre-marked number line.

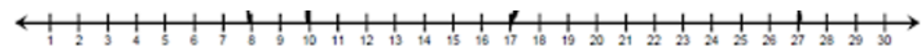
This standard also includes the expectation that students use a number line as a tool to help students find the sums and differences of numbers within 100. These tasks should be embedded in the context of word problems since word problems help students to make sense of the mathematics in the problems (van de Walle et al., 2019).

When adding and subtracting using a number line as a tool students will use many of the strategies detailed earlier in NC.2.OA.1 and NC.2.NBT.5. This standard is intended to be foundational since the number line is pre-marked and given to them. Students should eventually transition to an open number line which they create and draw independently. This open number line is a tool that students can use to provide a visual and show strategies such as place value strategies like breaking apart tens and ones, adding or subtracting in parts to land on landmark (friendly) numbers, or the relationship between addition and subtraction. Strategies are the processes that students use to solve problems, while tools such as number lines, open number lines, hundreds boards, and manipulatives help students use and demonstrate the various strategies in second grade.

Checking for Understanding

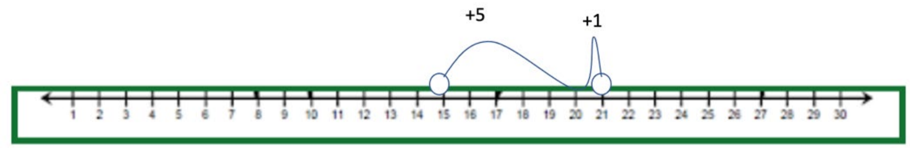
<u>Represent whole numbers as lengths from 0 on a number line diagram</u>
Aleigha has 15 gel pens. Aleigha has 6 fewer than Celeste. How many does Celeste have?

Use the diagram below and plot Aleigha's number of gel pens.
Use the number line to find the number of gel pens that Celeste has.
Explain how you found your answer.



Possible Response:

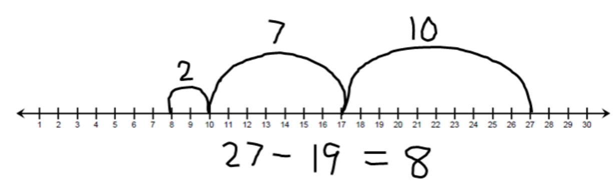
I know that Celeste has more than Aleigha so I need to add the difference to Aleigha's 15 to find the answer. I added 5 to move from 15 to 20. Then I added 1 to get to 21. I moved a total of 6 to get to 21 which is my answer.

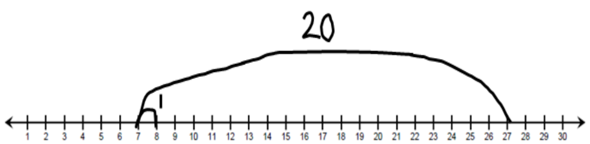


<u>Represent whole number sums and differences</u>
There were 27 students on the bus. 19 got off the bus. How many students are on the bus?

Possible responses:

Student A: I used a number line. I started at 27. I broke up 19 into 10 and 9. That way, I could take a jump of 10. I landed on 17. Then I broke the 9 up into 7 and 2. I took a jump of 7. That got me to 10. Then I took a jump of 2. That's 8. So, there are 8 students now on the bus.



Relate addition and subtraction to length. **NC.2.MD.6** Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points and represent whole-number sums and differences, within 100, on a number line.	
Clarification	**Checking for Understanding**
	Student B: I used a number line. I saw that 19 is really close to 20. Since 20 is a lot easier to work with, I took a jump of 20. But that was one too many. So, I took a jump of 1 to make up for the extra. I landed on 8. So, there are 8 students on the bus. *27 - 20 = 7* *7 + 1 = 8*  Hector scored 19 goals during the soccer season. He scored 8 fewer than the rest of the team. How many goals did the rest of the team score?

Return to Standards

Build understanding of time and money.

NC.2.MD.7 Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.

Clarification

In this standard, students extend their work from Grade 1 where they told time to the hour and half-hour by now telling time to the nearest 5-minute intervals on both analog and digital clocks. Students are expected to make connections between skip counting by 5s (NC.2.NBT.2) and telling time to the nearest five minutes on an analog clock.

Students should be familiar with terminology related to this standard, such as: *a.m.* for times from the beginning of the day until noon, *p.m.* for times between noon and the end of the day, *o'clock* to represent the number of hours when there are no minutes (e.g. 2 o'clock). Students are also expected to be able to write the time in digital form while reading an analog clock using a colon between the minutes and the hour.

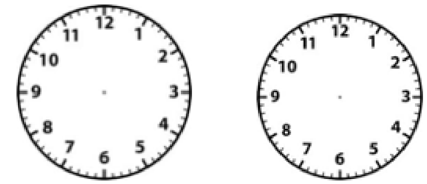
Students are expected to understand that the hour hand is a large unit of measurement while the minute hand is a smaller, more precise unit to measure time. This is evident on the clock when the hour hand gradually moves between the 2 and the 3 as the time changes from 2:00 to 2:59.

While students may draw the hands on an analog clock as part of this standard the focus should be on telling and writing time from analog and digital clocks to the nearest five minutes. If students have opportunities to draw the hands on a clock, teacher discretion should be used when evaluating students' accuracy of the length of the hour and minute hands and the placement of the hour hand within an hour (e.g., where the 2 should be when drawing the hands on the clock for 2:30.

Checking for Understanding

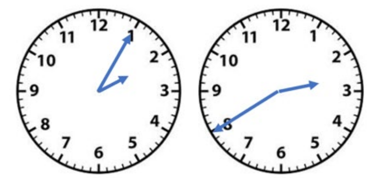
On the clocks draw the hands on the clock for 2:05 and 2:40.

How are the positions of the hour hands different?
How are the positions of the hour hands the same?
How are the positions of the minute hands different?

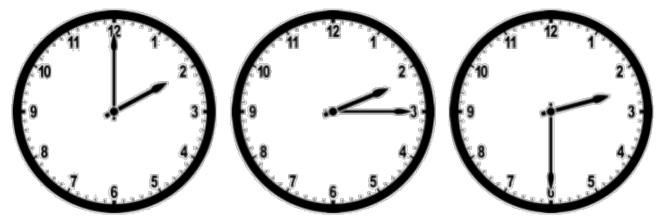


Possible Response:

The hour hands are between 2 and 3 for both times.
The hour hands are different since the hour hand for 2:40 is closer to the 3 than the 2. But for 2:05 it is really close to the 2.
The minute hand for 2:05 is at 1 since 5 is the first number that I write when I skip count by 5. But, the minute hand for 2:40 is at the 8 since 40 is the 8th number that I say when I skip count by 5.



Write the times shown on the 3 clocks below:



Explain how the positions of the hour hand are different between the clock on the left and the clock on the right. Explain why the positions of the hour hand are different.

Possible Response:
2:00, 2:15, 2:30

The hour hand for 2:00 is directly on the 2 since it is the beginning of the hour. But for 2:30 the hour hand is in the middle of 2 and 3 since it the time is getting farther from 2:00 and closer to 3:00.

Return to Standards

Build understanding of time and money.
NC.2.MD.8 Solve word problems involving:
- Quarters, dimes, nickels, and pennies within 99¢, using ¢ symbols appropriately.
- Whole dollar amounts, using the $ symbol appropriately.

Clarification	Checking for Understanding
In this standard, students solve word problems involving either dollars or cents. Students are not expected to solve problems that involve both dollars and cents and are not expected to use decimals. This standard extends work in First Grade when students identified coins and the equivalence of each coin in terms of pennies. For example, a dime is equal to 10 pennies. In second grade students are expected to solve word problems where they find multiple ways to make a collection of coins that has a specific value. This extends place value work from Grade 1 and earlier in the year in Grade 2. For example, the number (25) can be represented different ways (2 tens and 5 ones, 1 ten and 15 ones, or 25 ones) and still remain the same amount (25). In this standard, students should apply this understanding in the context of money. For example, 25 cents can look like a quarter, two dimes and a nickel, one dime and 3 nickels, and it can look like 25 pennies. In all those cases the value of the coins are 25 cents.	Show three different ways to make 37¢ using pennies, nickels, dimes, and quarters? Show your solutions. Write equations that show the value of each type of coin. *Possible Responses:* *Note: The order of the addends may vary.* *1 quarter, 1 dime and 2 pennies: 25 + 10 + 2 = 37* *1 quarter, 2 nickels and 2 pennies: 25 + 5 + 5 + 2 = 37* *1 quarter, 1 nickel and 7 pennies: 25 + 5 + 7 = 37* *3 dimes, 1 nickel and 2 pennies: 30 + 5 + 2 = 37* *3 dimes and 7 pennies: 30 + 7 = 37* *2 dimes, 3 nickels and 2 pennies: 20 + 15 + 2 = 37* *2 dimes, 2 nickels and 7 pennies: 20 + 10 + 7 = 37* *2 dimes, 1 nickel, and 12 pennies: 20 + 5 + 12 = 37* *2 dimes and 17 pennies: 20 + 17 = 37* *1 dime, 5 nickels and 2 pennies: 10 + 25 + 2 = 37* *1 dime, 4 nickels and 7 pennies: 10 + 20 + 7 = 37* *1 dime, 3 nickels and 12 pennies: 10 + 15 + 12 = 37* *1 dime, 2 nickels and 17 pennies: 10 + 10 + 17 = 37* *1 dime, 1 nickel and 22 pennies: 10 + 5 + 22 = 37* *1 dime and 27 pennies: 10 + 27 = 37* *7 nickels and 2 pennies: 35 + 2 = 37* *6 nickels and 7 pennies: 30 + 7 = 37* *5 nickels and 12 pennies: 25 + 12 = 37* *4 nickels and 17 pennies: 20 + 17 = 37* *3 nickels and 22 pennies: 15 + 22 = 37* *2 nickels and 27 pennies: 10 + 27 = 37* *1 nickel and 32 pennies: 5 + 32 = 37* *37 pennies: 37 1s added together* Find 3 different ways to make 82 dollars using $1, $5, and $10 bills? For each solution write an equation that shows the value of each different type of bill. *Possible Responses:* *Note: The order of the addends may vary.* *8 $10 bills and 2 $1 bills, 80 + 2 = 82* *7 $10 bills, 2 $5 bills, and 2 $1 bills, 70 + 10 + 2 = 82* *7 $10 bills, 1 $5 bill, and 7 $1 bills, 70 + 5 + 7 = 82*

Build understanding of time and money.

NC.2.MD.8 Solve word problems involving:

- Quarters, dimes, nickels, and pennies within 99¢, using ¢ symbols appropriately.
- Whole dollar amounts, using the $ symbol appropriately.

Clarification	Checking for Understanding
	7 $10 bills, 12 $1 bills, 70 + 12 = 82 *6 $10 bills, 4 $5 bills, 2 $1 bills, 60 + 20 + 2 = 82* *6 $10 bills, 3 $5 bills, 7 $1 bills, 60 + 15 + 7 = 82* *6 $10 bills, 2 $5 bills, 12 $1 bills, 60 + 10 + 12 = 82* *6 $10 bills, 1 $5 bills, 17 $1 bills, 60 + 5 + 17 = 82* *6 $10 bills, 22 $1 bills, 60 + 22 = 82*

Return to Standards

Represent and interpret data.
NC.2.MD.10 Organize, represent, and interpret data with up to four categories.
- Draw a picture graph and a bar graph with a single-unit scale to represent a data set.
- Solve simple put-together, take-apart, and compare problems using information presented in a picture and a bar graph.

Clarification

In this standard, students are expected to pose a question, collect data, analyze data (including representing data in a graph), and interpreting data. Students should be posing questions that yield categorical data with up to four categories (e.g., eye color, favorite dinner food, age, number of pets at home, etc.).

Students are expected to interpret data in a graph to answer questions such as: the total number of responses, which category had the most/least responses, and differences/ similarities between the four categories. Students solve problems using the data in a graph. The range of numbers for these one-step problems is within 100 since it intersects standard NC.2.OA.1

Checking for Understanding

Pose a question to collect survey data and create a table and a graph to match the data.

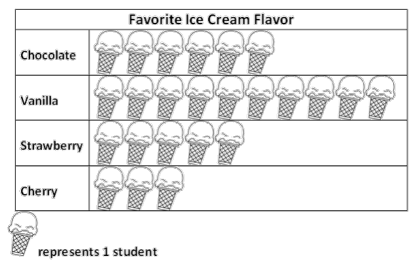
Possible response:

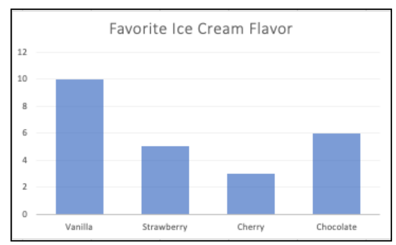
The second graders decided to collect data to determine which ice cream flavors to buy for an event. As a group, the students decided on the question, “What is your favorite flavor of ice cream?” and 4 likely responses, “chocolate”, “vanilla”, “strawberry”, and “cherry”.

The students then divided into teams and collected data from different classes in the school. Each team decided how to keep track of the data, then organized their data by totaling each category in a chart or table.

Once the data were represented on a graph, the teams then analyzed and recorded observations made from the data. Statements such as, “Vanilla had the most votes” and “Vanilla had more votes than strawberry and cherry votes combined” were made.

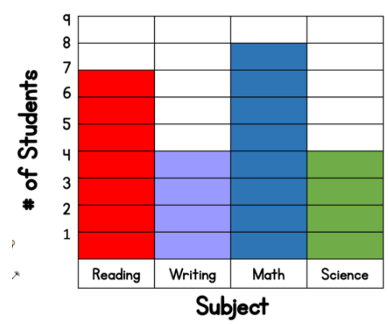
Flavor	Number of People
Vanilla	10
Strawberry	5
Cherry	3
Chocolate	6





The bar graph shows data when students were asked what their favorite subject was in school.

a. How many people were surveyed?
b. How many fewer people prefer writing than math?
c. How many more people prefer reading than science?
d. Some of the students were absent and did not vote. The students who were absent preferred math. When those votes were counted 12 students preferred math. How many students were absent?



Possible Response:

a. 8 + 7 + 4 + 4 = 23
b. 8 - 4 = 4
c. 7 - 4 = 3
d. 8 prefer math on the graph. 8 + __ = 12. The answer is 4 students.

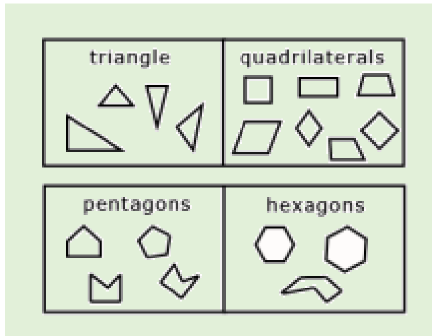
Return to Standards

Reason with shapes and their attributes.

NC.2.G.1 Recognize and draw triangles, quadrilaterals, pentagons, and hexagons, having specified attributes; recognize and describe attributes of rectangular prisms and cubes.

Clarification

In this standard, students work with both 2-dimensional and 3-dimensional shapes.



<u>2-Dimensional Shapes</u>

In Grade 2 students are expected to recognize, draw, and describe triangles, quadrilaterals, pentagons, and hexagons based on specific defining attributes. Students are expected to use the terms vertices and angles instead of the informal words corners or points. However, students do not learn the specific types of angles until Grade 4.

Students should have ample experiences to recognize, draw, and describe shapes that are traditional looking as well as other shapes that share defining attributes but may look different than traditional looking shapes (e.g., a triangle with a vertex at the bottom of the shape and a horizontal side at the top of the shape.

In previous grades, students were expected to identify squares, rectangles, and trapezoids. In second grade, they are expected to name those shapes and recognize that any polygon with four sides is a quadrilateral.

Note: North Carolina has adopted the exclusive definition for a trapezoid. **A trapezoid is a quadrilateral with *exactly* one pair of parallel sides**.

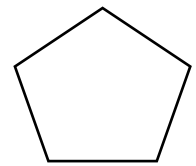
3-Dimensional Shapes

Students are expected to recognize and describe two-dimensional shapes used to construct rectangular prisms (squares or rectangles) and cubes (cubes). With 3-dimensional shapes, second grade students are expected to identify and describe attributes of rectangular prisms and cubes including the number of faces, edges and vertices. Students are not expected to draw three-dimensional objects.

Checking for Understanding

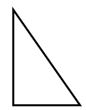
Draw a closed shape that has five sides. What is the name of the shape?

Possible response:



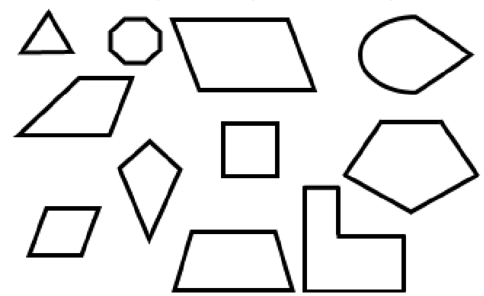
I drew a shape with 5 sides.
It is called a pentagon.

I am a shape that has 3 sides and 3 angles. What am I?



A triangle.

Circle all of quadrilaterals among these geometric figures.



Look at this rectangular prism and this cube. *(Provide the actual shapes)*.
How are they similar?
How are they different?

Possible Response:

Similarities: Both shapes have 6 faces, 8 vertices, and 12 edges.
Differences: The rectangular prism has 4 faces that are rectangles and 2 that are squares. The cube has 6 faces that are all the same size squares.

Return to Standards

Reason with shapes and their attributes.

NC.2.G.3 Partition circles and rectangles into two, three, or four equal shares.

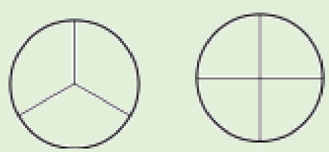
- Describe the shares using the words halves, thirds, half of, a third of, fourths, fourth of, quarter of.
- Describe the whole as two halves, three thirds, four fourths.
- Explain that equal shares of identical wholes need not have the same shape

Clarification

In this standard, students partition rectangles, including squares, and circles of various sizes into two, three, or four equal shares (pieces). Students are expected to describe two aspects of fractions. First, students are expected to describe both the shares (pieces) of a whole using words such as halves, half of, thirds, a third of, fourths, a fourth of, and a quarter of. Second, students are expected to describe a whole as being composed of smaller pieces, including two halves, three thirds, and four fourths.

All of students' work with this standard should include students partitioning rectangles, including squares, and circles by folding paper, drawing, or shading graphs paper. While discussing their partitioning, students should use the words, *halves, thirds* and *fourths,* and the phrases *half of, third of* and *fourth of (or quarter of)* to describe their thinking and solutions. Working with "the whole", students understand that "the whole" is composed of two halves, three thirds, or four fourths.

Students should recognize that when a circle is cut into three equal pieces, each piece will equal one-third of its original whole. Students should describe the whole as three thirds. If a circle is cut into four equal pieces, each piece will equal one-fourth of its original whole and the whole is described as four fourths.



The last bullet of this standard requires students to independently explain that equal shares of identically sized wholes may not have the same shape. Students should understand that fractional parts may not be the same shape. The only criteria for equivalent fractions is that the area is equal. Students should partition circles and rectangles in multiple ways, so they learn to recognize that equal shares can be different shapes within the same whole.

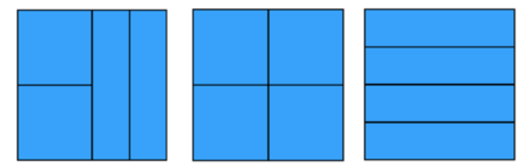
This work related to this standard integrates the concept that there are multiple ways to partition shapes. For example, a half can be created with a horizontal, vertical, or diagonal line through a rectangle, including a square, or a circle. Fourths can be created by first partitioning a shape in half, and then partitioning each shape in half to make 4 equal pieces which are fourths. This

Checking for Understanding

Partition each rectangle into fourths a different way. Explain how you know that each part is a fourth.

Possible response:

I partitioned this rectangle 3 different ways. I folded or cut the paper to make sure that all of the parts were the same size. There are four equal parts. So, each part is one-fourth of the whole rectangle.



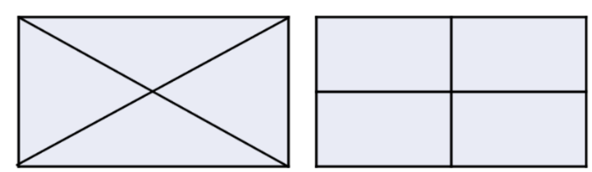
Tomika and Neraj both have rectangles that are the same size and shape. Tomika cut her rectangle into fourths by drawing diagonal lines through the middle to make 4 triangles. Neraj drew a line down the middle of his rectangle and then a horizontal line through the middle.

Draw Tomika's and Neraj's work in the rectangles below.

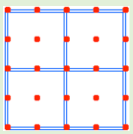
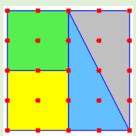
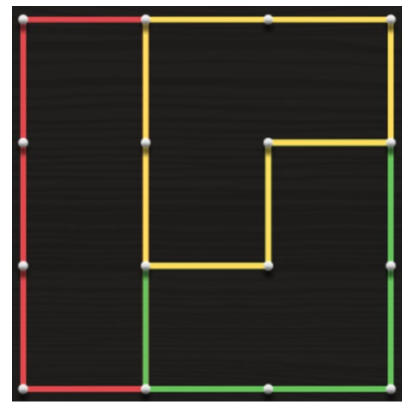
Do Tomika and Neraj both have 4 equal pieces? Explain how you know?

Possible Response:

Tomika's first line cut the rectangle into two triangles. The second line cut each half into half which means



Reason with shapes and their attributes.
NC.2.G.3 Partition circles and rectangles into two, three, or four equal shares.
- Describe the shares using the words halves, thirds, half of, a third of, fourths, fourth of, quarter of.
- Describe the whole as two halves, three thirds, four fourths.
- Explain that equal shares of identical wholes need not have the same shape

Clarification	Checking for Understanding
idea that “half of a half is a fourth” is to be explored and discussed in Grade 2 as it is foundational for fractions work in future grades. **For example:**  When partitioning this geoboard into fourths, the student divided the square into four equal sized squares to show that each piece is a fourth.  When partitioning this geoboard into fourths, the student partitioned the geoboard in half down the middle. Then, he divided the section on the left into two equal sized squares, and the section on the right into two equal sized triangles. The student explains that each section of the geoboard is half of a half, which is the same as a fourth.	*each piece is one-fourth.* *Neraj’s first line also cut his rectangle into half with 2 smaller rectangles. His second line cut the shape into 4 equal rectangles that are also the same shape.* Aaron partitioned the rectangle in the following way. Describe whether or not the pieces are equal. Explain your thinking. If the sections are equal, how would you describe the size of one of the sections?  *Possible response:* *There are 3 sections Each section has 3 smaller squares, so the sections are equal.* *Each section is a third of the whole.*

Return to Standards