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

2^{nd} Grade Mathematics ● Unpacked Content

For the new Common Core State Standards that will be effective in all North Carolina schools in the 2012-13.

This document is designed to help North Carolina educators teach the Common Core (Standard Course of Study). NCDPI staff are continually updating and improving these tools to better serve teachers.

What is the purpose of this document?
To increase student achievement by ensuring educators understand specifically what the new standards mean a student must know, understand and be able to do. 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 CCSS.

What is in the document?
Descriptions of what each standard means a student will know, understand and be able to do. The “unpacking” of the standards done in this document is an effort to answer a simple question “What does this standard mean that a student must know and be able to do?” and to ensure the description is helpful, specific and comprehensive for educators.

How do I send Feedback?
We intend the explanations and examples in this document to be helpful and specific. That said, we believe that as this document is used, teachers and educators will find ways in which the unpacking can be improved and made ever more useful. Please send feedback to us at feedback@dpi.state.nc.us and we will use your input to refine our unpacking of the standards. Thank You!

Just want the standards alone?
You can find the standards alone at http://corestandards.org/the-standards

At A Glance

This page provides a snapshot of the mathematical concepts that are new or have been removed from this grade level as well as instructional considerations for the first year of implementation.

New to 2nd Grade:

- Addition with rectangular array (2.OA.4)
- Count within 1,000 by 5s, 10s, 100s (2.NBT.2)
- Mentally add and subtract by 10 & 100 (2.NBT.8)
- Measurement concepts (2.MD.2, 2.MD.4, 2.MD.5, 2.MD.6,)
- Money (2.MD.8)
- Line Plots, Picture graphs, bar graphs (2.MD.9, 2.MD.10)

Moved from 2nd Grade:

- Estimation while computing (1.01e, 1.04b)
- Temperature (2.01b)
- Cut and rearrange 2-D and 3-D figures (3.02)
- Symmetric and congruent figures (3.03a, 3.03b)
- Venn diagrams and pictographs (4.01)
- Probability (4.02)
- Repeating and growing patterns (5.01)

Notes:

- Topics may appear to be similar between the CCSS and the 2003 NCSCOS; however, the CCSS may be presented at a higher cognitive demand.
- For more detailed information see Math Crosswalks: http://www.dpi.state.nc.us/acre/standards/support-tools/

Instructional considerations for CCSS implementation in 2012-2013

- **2.OA.1** states that Second Grade students will be able to solve all 12 types of addition and subtraction problem types (See Table 1 at the end of the document). It is possible that Second Grade students will need to learn problem types stated in the CCSS for Kindergarten and First Grade, as well as the 4 types mentioned for Second Grade. Therefore, particular attention may need to be spent on these types of problems prior to the new problem types for Second Grade: Add To (Result Unknown, Change Unknown); Take From (Result Unknown, Change Unknown); Put Together/Take Apart (Total Unknown, Both Addends Unknown); Compare (Difference Unknown, Bigger Unknown- More Version, Smaller Unknown- Fewer Version).

Standards for Mathematical Practice in Second Grade

The Common Core State Standards for Mathematical Practice are practices expected to be integrated into every mathematics lesson for all students Grades K-12. Below are a few examples of how these Practices may be integrated into tasks that Grade 2 students complete.

1) Make Sense and Persevere in Solving Problems.	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- decontexualizing 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 others' 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.

Grade 2 Critical Areas

The Critical Areas are designed to bring focus to the standards at each grade by describing the big ideas that educators can use to build their curriculum and to guide instruction. The Critical Areas for Second Grade can be found on page 17 in the *Common Core State Standards for Mathematics*.

1. **Extending understanding of base-ten notation**
   Students extend their understanding of the base-ten system. This includes ideas of counting in fives, tens, and multiples of hundreds, tens, and ones, as well as number relationships involving these units, including comparing. Students understand multi-digit numbers (up to 1000) written in base-ten notation, recognizing that the digits in each place represent amounts of thousands, hundreds, tens, or ones (e.g., 853 is 8 hundreds + 5 tens + 3 ones).

2. **Building fluency with addition and subtraction.**
   Students use their understanding of addition to develop fluency with addition and subtraction within 100. They solve problems within 1000 by applying their understanding of models for addition and subtraction, and they develop, discuss, and use efficient, accurate, and generalizable methods to compute sums and differences of whole numbers in base-ten notation, using their understanding of place value and the properties of operations. They select and accurately apply methods that are appropriate for the context and the numbers involved to mentally calculate sums and differences for numbers with only tens or only hundreds.

3. **Using standard units of measure.**
   Students recognize the need for standard units of measure (centimeter and inch) and they use rulers and other measurement tools with the understanding that linear measure involves an iteration of units. They recognize that the smaller the unit, the more iterations they need to cover a given length.

4. **Describing and analyzing shapes.**
   Students describe and analyze shapes by examining their sides and angles. Students investigate, describe, and reason about decomposing and combining shapes to make other shapes. Through building, drawing, and analyzing two- and three-dimensional shapes, students develop a foundation for understanding area, volume, congruence, similarity, and symmetry in later grades.

Operations and Algebraic Thinking 2.0A

Common Core Cluster

Represent and solve problems involving addition and subtraction.

Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language. The terms students should learn to use with increasing precision with this cluster are: **add, subtract**, **more, less, equal, equation, putting together, taking from, taking apart**

Common Core Standard	Unpacking What do these standards mean a child will know and be able to do?

2.OA.1 Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.[1]

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[1] See Glossary, Table 1.

Second Grade students extend their work with addition and subtraction word problems in two major ways. First, they represent and solve word problems within 100, building upon their previous work to 20. In addition, they represent and solve one and two-step word problems of all three types (Result Unknown, Change Unknown, Start Unknown). Please see **Table 1** at end of document for examples of all problem types.

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

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. Brittany put some more stickers on the page. There are now 22 stickers on the page. How many stickers did Brittany 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 + 5 + 7 = ☐	There are 39 peas on the plate. Carlos ate 25 peas. Mother put 7 more peas on the plate. How many peas are on the plate now? 39 –2 5 + 7 = ☐

Two-Step Problems: Because Second Graders are still developing proficiency with the most difficult subtypes (shaded in white in Table 1 at end of the glossary): *Add To/Start Unknown; Take From/Start Unknown; Compare/Bigger Unknown; and Compare/Smaller Unknown*, two-step problems do **not** involve these sub-types (Common core Standards Writing Team, May 2011). Furthermore, most two-step problems should focus on single-digit addends.

As second grade students solve one- and two-step problems they use manipulatives such as snap cubes, place value blocks or hundreds charts; 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. By solving a variety of addition and subtraction word problems, second grade students determine 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. For example:

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

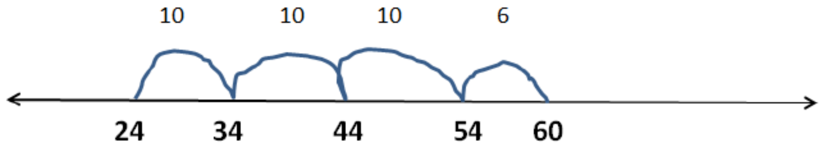
See Glossary, Table 1 for additional examples (found at end of document).

Second Graders use a range of methods, often mastering more complex strategies such as making tens and doubles and near doubles for problems involving addition and subtraction within 20. Moving beyond counting and counting-on, second grade students apply their understanding of place value to solve problems.

One-Step Example: **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.

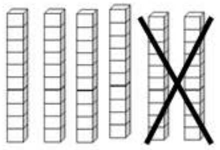
Student A: I read the equation and thought about how to write it with numbers. I thought, "What and 24 makes 60?" So, my equation for the problem is ☐ + 24 = 60. I used a number line to solve it.

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.

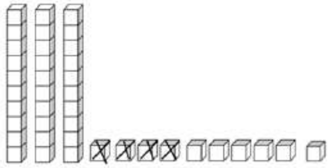


Student B: I read the equation and thought about how to write it with numbers. I thought, "There are 60 total. I know about the 24. So, what is 60 – 24?" So, my equation for the problem is 60 – 24 = □ I used place value blocks to solve it.

I started with 60 and took 2 tens away.



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

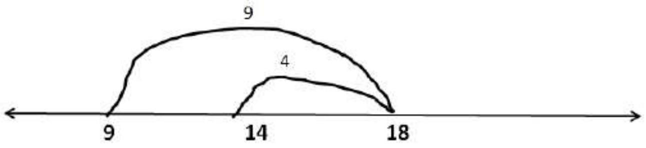


That left me with 36. So, 36 students were in the cafeteria at the beginning. 60 – 24 = 36

<u>Two-Step Example</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.

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.

Common Core Cluster

Add and subtract within 20.

Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language. The terms students should learn to use with increasing precision with this cluster are: **add, subtract, sum, more, less, equal, equation, putting together, taking from, taking apart**

Common Core Standard	**Unpacking** What do these standards mean a child will know and be able to do?
2.OA.2 Fluently add and subtract within 20 using mental strategies.[2] By end of Grade 2, know from memory all sums of two one-digit numbers. [2]See standard 1.OA.6 for a list of mental strategies.	Building upon their work in First Grade, Second Graders use various addition and subtraction strategies in order to fluently add and subtract within 20: **1.OA.6** Mental Strategies • Counting on • Making ten (e.g., 8 + 6 = 8 + 2 + 4 = 10 + 4 = 14) • Decomposing a number leading to a ten (e.g., 13 – 4 = 13 – 3 – 1 = 10 – 1 = 9) • Using the relationship between addition and subtraction (e.g., knowing that 8 + 4 = 12, one knows 12 – 8 = 4) • Creating equivalent but easier or known sums (e.g., adding 6 + 7 by creating the known equivalent 6 + 6 + 1 = 12 + 1 = 13) Second Graders internalize facts and develop fluency by repeatedly using strategies that make sense to them. When students are able to demonstrate fluency they are accurate, efficient, and flexible. Students must have efficient strategies in order to know sums from memory. Research indicates that teachers can best support students' memory of the sums of two one-digit numbers through varied experiences including making 10, breaking numbers apart, and working on mental strategies. These strategies replace the use of repetitive timed tests in which students try to memorize operations as if there were not any relationships among the various facts. When teachers teach facts for automaticity, rather than memorization, they encourage students to think about the relationships among the facts. (Fosnot & Dolk, 2001) It is no accident that the standard says "know from memory" rather than "memorize". The first describes an outcome, whereas the second might be seen as describing a method of achieving that outcome. So no, the standards are not dictating timed tests. (McCallum, October 2011)

Developing Fluency for Addition & Subtraction within 20

Example: **9 + 5= __**

Student A
Counting On

I started at 9 and then counted 5 more. I landed on 14.

Student B
Decomposing a Number-Leading to a 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.

Example: **13 - 9 = __**

Student A
Using the Relationship between Addition and Subtraction

I know that 9 plus 4 equals 13. So 13 minus 9 is 4.

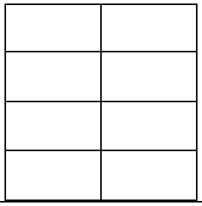
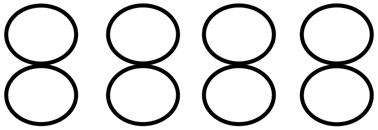
Student B
Creating an Easier Problem

Instead of 13 minus 9, I added 1 to each of the numbers to make the problem 14 minus 10. I know the answer is 4. So 13 minus 9 is also 4.

Common Core Cluster

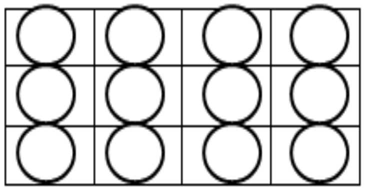
Work with equal groups of objects to gain foundations for multiplication.

Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language. The terms students should learn to use with increasing precision with this cluster are: **odd, even, row, column, rectangular array, equal**

Common Core Standard	**Unpacking** What do these standards mean a child will know and be able to do?
2.OA.3 Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.	Second graders apply their work with doubles to the concept of odd and even numbers. Students should have ample experiences exploring the concept 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 (10 in this case) 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. Example: **Is 8 an even number? Prove your answer.** **Student A** 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. **Student B** I grabbed 8 counters. I put them into 2 equal groups. There were 4 counters in each group, so 8 is an even number. **Student C** 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.  **Student D** I drew 8 circles. I matched one on the left with one on the right. Since they all match up I know that 8 is an even number.  **Student E** I know that 4 plus 4 equals 8. So 8 is an even number.

<table>
<tr>
<td>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</td>
<td>Second graders use rectangular arrays to work with repeated addition, a building block for multiplication in third grade. A rectangular array is any arrangement of things in rows and columns, such as a rectangle of square tiles. 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.

Example: What is the total number of circles below?



<table>
<tr><th>Student A</th><th>Student B</th></tr>
<tr><td>I see 3 counters in each column and there are 4 columns. So I added
3 + 3 + 3 + 3. That equals 12.</td><td>I see 4 counters in each row and there are 3 rows. So I added 4 + 4 + 4. That equals 12.</td></tr>
<tr><td>3 + 3 + 3 = 12</td><td>4 + 4 + 4 = 12</td></tr>
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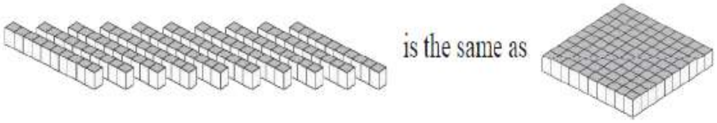
Number & Operations in Base Ten 2.NBT

Common Core Standard and Cluster

Understand place value.
Students extend their understanding of the base-ten system. This includes ideas of counting in fives, tens, and multiples of hundreds, tens, and ones, as well as number relationships involving these units, including comparing. Students understand multi-digit numbers (up to 1000) written in base-ten notation, recognizing that the digits in each place represent amounts of thousands, hundreds, tens, or ones (e.g., 853 is 8 hundreds + 5 tens + 3 ones).

Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language. The terms students should learn to use with increasing precision with this cluster are: **hundreds, tens, ones, skip count, base-ten,** *number names to 1,000* **(e.g., one, two, thirty, etc.), expanded form, greater than (>), less than (<), equal to (=), digit, compare**

Common Core Standard	**Unpacking** What do these standards mean a child will know and be able to do?
2.NBT.1 Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases: (See 2.NBT.1a & b)	Second Grade students extend their base-ten understanding to hundreds as they view 10 tens as a unit called a "hundred". They use manipulative materials and pictorial representations to help make a connection between the written three-digit numbers and hundreds, tens, and ones.  As in First Grade, Second Graders' understanding about hundreds also moves through several stages: **Counting By Ones; Counting by Groups & Singles;** and **Counting by Hundreds, Tens and Ones**. **Counting By Ones:** At first, even though Second Graders will have grouped objects into hundreds, tens and left-overs, they rely on counting all of the individual cubes by ones to determine the final amount. It is seen as the only way to determine how many. **Counting By Groups and Singles:** While students are able to group objects into collections of hundreds, tens and ones and now tell how many groups of hundreds, tens and left-overs there are, they still rely on counting by ones to determine the final amount. They are unable to use the groups and left-overs to determine how many. Example: **Teacher**: How many blocks do you have? **Student**: I have 3 hundreds, 4 tens and 2 left-overs. **Teacher**: Does that help you know how many? How many do you have? **Student**: Let me see. 100, 200, 300… ten, twenty, thirty, forty. So that's 340 so far. Then 2 more. 342.

Counting by Hundreds, Tens & Ones: Students are able to group objects into hundreds, tens and ones, tell how many groups and left-overs there are, and now use that information to tell how many. Occasionally, as this stage becomes fully developed, second graders rely on counting to "really" know the amount, even though they may have just counted the total by groups and left-overs.

Example:

Teacher: How many blocks do you have?
Student: I have 3 hundreds, 4 tens and 2 left-overs.
Teacher: Does that help you know how many? How many do you have?
Student: Yes. That means that I have 342.
Teacher: Are you sure?
Student: Um. Let me count just to make sure. 100, 200, 300,…340, 341, 342. Yes. I was right. There are 342 blocks.

Understanding the value of the digits is more than telling the number of tens or hundreds. Second Grade students 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.

Example: Student Mastered
Teacher: What is this number? 716
Student: Seven hundred sixteen.
Teacher: Make this amount using your place value cards.
Student: *Uses 7 hundreds card, 1 ten card and 6 singles.*
Teacher: *Pointing to the 6*, Can you show me where you have this?
Student: *Points to the 6 singles.*
Teacher: *Pointing to the 1*, Can you show me where you have this?
Student: *Points to the one ten.*
Teacher: *Pointing to the 7*, Can you show me where you have this?
Student*: Points to the 7 hundreds.*

Example: Student Not Yet Mastered
Teacher: What is this number? 716
Student: Seven hundred sixteen.
Teacher: Make this amount using your place value cards.
Student: *Uses 7 hundreds card, 1 ten card and 6 singles.*
Teacher: *Pointing to the 6*, Can you show me where you have this?

	Student: *Points to the 6 singles.* **Teacher**: *Pointing to the 1*, Can you show me where you have this? **Student**: *Points to one of the 6 singles (rather than a ten).*
a. 100 can be thought of as a bundle of ten tens — called a "hundred."	Second Graders extend their work from first grade by applying the understanding that "100" is the same amount as 10 groups of ten as well as 100 ones. This lays the groundwork for the structure of the base-ten system in future grades. <u>Example</u>: **Teacher**: I have a pile of base-ten rods. Count out 12 please. **Student:** Student gathers 12 ten-rods. **Teacher**: How many cubes do you think you have? **Student**: Makes an estimate. **Teacher**: Count them to see. **Student**: 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120. There's 120 here. **Teacher**: So, do you think you have enough to make a 100? **Student**: Yes. **Teacher**: Go ahead and trade some in to make a 100. **Student**: Student trades 10 rods for a 100 flat and leaves 2 tens remaining. **Teacher**: What do you have now? **Student**: I have 1 hundred and 2 tens. **Teacher**: Does that help you know how many you have in all? **Student**: Yes. 1 hundred and 2 tens is 120. There are 120 cubes here in all.
b. The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).	Second Grade students build on the work of **2.NBT.2a.** They explore the idea that numbers such as 100, 200, 300, etc., are groups of hundreds with zero tens and ones. Students can represent this with both groupable (cubes, links) and pre-grouped (place value blocks) materials.
2.NBT.2 Count within 1000; skip-count by 5s, 10s, and 100s.	Second Grade students count within 1,000. Thus, students "count on" from any number and say the next few numbers that come afterwards. <u>Example</u>: **What are the next 3 numbers after 498?** *499, 500, 501.* **When you count back from 201, what are the first 3 numbers that you say?** *200, 199, 198.* Second grade students also begin to work towards multiplication concepts as they skip count by 5s, by 10s, and by 100s. Although skip counting is not yet true multiplication because students don't keep track of the number of groups they have counted, they can explain that when they count by 2s, 5s, and 10s they are counting groups of items with that amount in each group.

<table>
<tr><td></td><td>As teachers build on students’ work with skip counting by 10s in Kindergarten, they explore and discuss with students the patterns of numbers when they skip count. For example, while using a 100s board or number line, students learn that the ones digit alternates between 5 and 0 when skip counting by 5s. When students skip count by 100s, they learn that the hundreds digit is the only digit that changes and that it increases by one number.</td></tr>
<tr><td>2.NBT.3 Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.</td><td>Second graders read, write and represent a number of objects with a written numeral (number form or standard form). These representations can include snap cubes, place value (base 10) blocks, pictorial representations or other concrete materials. Please be cognizant that 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 (125 can be written as 100 + 20 + 5) is a valuable skill when students use place value strategies to add and subtract large numbers in 2.NBT.7.</td></tr>
<tr><td>2.NBT.4 Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.</td><td>Second Grade students build on the work of 2.NBT.1 and 2.NBT.3 by examining the amount of hundreds, tens and ones in each number. When comparing numbers, students draw on the understanding that 1 hundred (the smallest three-digit number) is actually greater than any amount of tens and ones represented by a two-digit number. When students truly understand this concept, it makes sense that one would compare three-digit numbers by looking at the hundreds place first.

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 First Grade and continue to use them in Second Grade with numbers within 1,000.

<u>Example</u>: Compare these two numbers. 452 __ 455

<table>
<tr><td>Student A
<i>Place Value</i>
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</td><td>Student B
<i>Counting</i>
452 is less than 455. I know this because when I count up I say 452 before I say 455.
452 < 455
452 is less than 455.</td></tr>
</table>

While students may have the skills to order more than 2 numbers, this Standard focuses on comparing two numbers and using reasoning about place value to support the use of the various symbols.</td></tr>
</table>

Common Core Cluster

Use place value understanding and properties of operations to add and subtract.
Students use their understanding of addition to develop fluency with addition and subtraction within 100. They solve problems within 1000 by applying their understanding of models for addition and subtraction, and they develop, discuss, and use efficient, accurate, and generalizable methods to compute sums and differences of whole numbers in base-ten notation, using their understanding of place value and the properties of operations. They select and accurately apply methods that are appropriate for the context and the numbers involved to mentally calculate sums and differences for numbers with only tens or only hundreds.

Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language. The terms students should learn to use with increasing precision with this cluster are: **fluent, compose, decompose, place value, digit, ten more, ten less, one hundred more, one hundred less, add, subtract, sum, equal, addition, subtraction**

Common Core Standard	**Unpacking** What do these standards mean a child will know and be able to do?
2.NBT.5 Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.	There are various strategies that Second Grade students understand and use when adding and subtracting within 100 (such as those listed in the standard). By using various strategies that make sense to the student, the student begins to internalize facts, thus becoming fluent. Therefore, when students are able to demonstrate fluency, they are accurate (answer correctly), efficient (within 4-5 seconds) and flexible (use strategies such as decomposing numbers to make ten). Students must have efficient strategies in order for facts to become fluent. Example: **67 + 25 = __** *Place Value Strategy:* 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 equals 12 ones. I then combined my tens and ones. 8 tens plus 12 ones equals 92. *Decomposing into Tens:* 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 *Commutative Property:* 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.

Example: **63 – 32 = __**

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

Students use pictorial representations, concrete objects, and general and special strategies to solve a problem.

2.NBT.6 Add up to four two-digit numbers using strategies based on place value and properties of operations.

Second Grade students add a string of two-digit numbers (up to four numbers) by applying place value strategies and properties of operations.

Example: **43 + 34 + 57 + 24 = __**

Student A *Associative Property*	**Student B** *Place Value Strategies*
I saw the 43 and 57 and added them first. I know 3 plus 7 equals 10, so when I added them 100 was my answer. Then I added 34 and had 134. Then I added 24 and had 158. 43 + 57 + 34 + 24 = 158	I broke up all of the numbers into tens and ones. First I added the tens. 40 + 30 + 50 + 20 = 140. Then I added the ones. 3 + 4 + 7 + 4 = 18. That meant I had 1 ten and 8 ones. So, 140 + 10 is 150. 150 and 8 more is 158. So, 43 + 34 + 57 + 24 = 158

Student C

Place Value Strategies and Associative Property

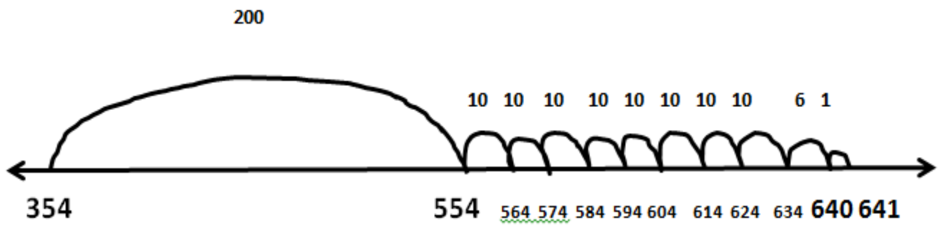
I broke up all the numbers into tens and ones. First I added up the tens.
40 + 30 + 50 + 20. I changed the order of the numbers to make adding easier. I know that 30 plus 20 equals 50 and 50 more equals 100. Then I added the 40 and got 140.
Then I added up the ones. 3 + 4 + 7 + 4. I changed the order of the numbers to make adding easier. I know that 3 plus 7 equals 10 and 4 plus 4 equals 8. 10 plus 8 equals 18.
I then combined my tens and my ones. 140 plus 18 (1 ten and 8 ones) equals 158.

<table>
<tr>
<td>2.NBT.7 Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.</td>
<td>
Second graders extend the work from 2.NBT. to two 3-digit numbers. Students should have ample experiences using concrete materials and pictorial representations to support their work.

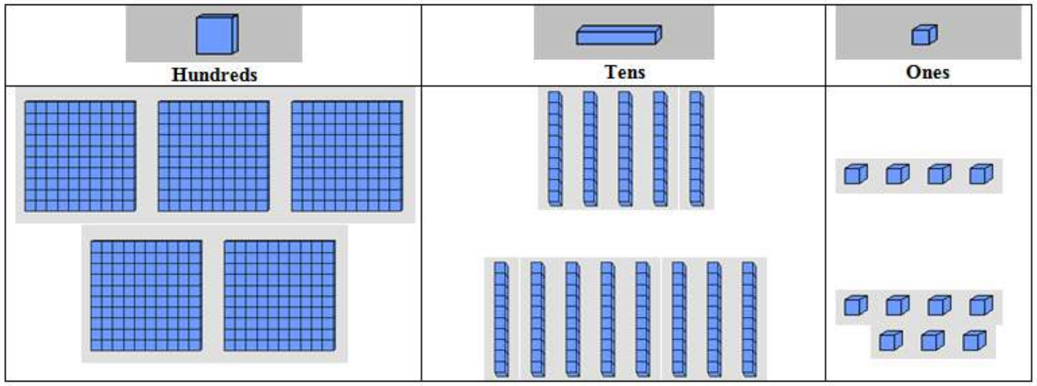
This standard also references composing and decomposing a ten. This work should include strategies such as making a 10, making a 100, breaking apart a 10, or creating an easier problem. The standard algorithm of carrying or borrowing is not an expectation in Second Grade. Students are not expected to add and subtract whole numbers using standard algorithms until the end of Fourth Grade.

<u>Example</u>: 354 + 287 = __

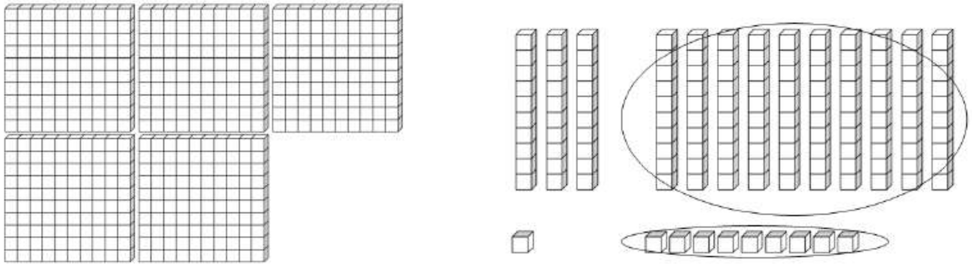
<table>
<tr>
<td>Student A</td>
<td>I started at 354 and jumped 200. I landed on 554. I then made 8 jumps of 10 and landed on 634. I then jumped 6 to land on 640. Then I jumped 1 more and landed on 641. 354 + 287 = 641



</td>
</tr>
<tr>
<td>Student B</td>
<td>I used place value blocks and a place value mat. I broke all of the numbers and placed them on the place value mat.
I first added the ones.4 + 7 = 11.
I then added the tens. 50 + 80 = 130.
I then added the hundreds. 300 + 200 = 500.
I then combined my answers. 500 + 130 = 630. 630 + 11= 641.

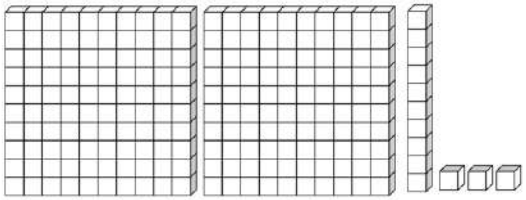
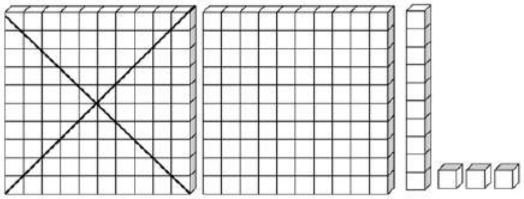


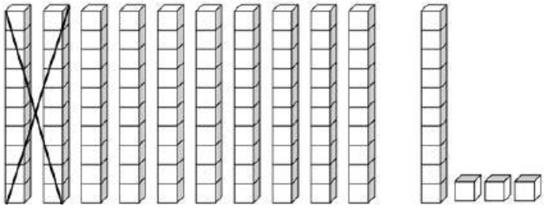
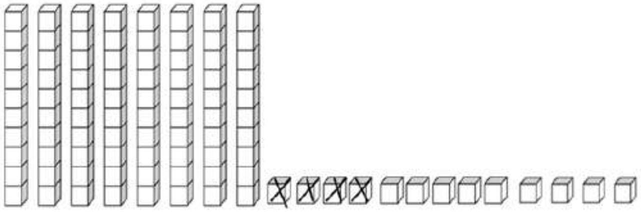
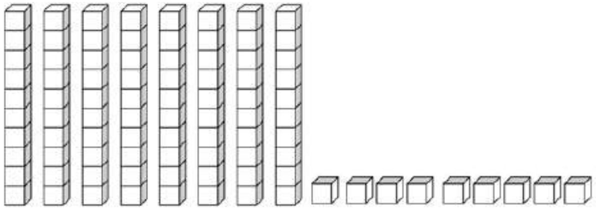
</td>
</tr>
</table>
</td>
</tr>
</table>

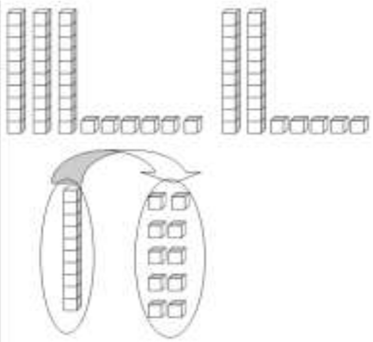
Student C	I used place value blocks. I made a pile of 354. I then added 287. That gave me 5 hundreds, 13 tens and 11 ones. I noticed that I could trade some pieces. I had 11 ones, and traded 10 ones for a ten. I then had 14 tens, so I traded 10 tens for a hundred. I ended up with 6 hundreds, 4 tens and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

Example**: 213 - 124 = __**

Student A

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. 

	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** 
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.	Second Grade students mentally add or subtract either 10 or 100 to any number between 100 and 900. As teachers provide ample experiences for students to work with pre-grouped objects and facilitate discussion, second graders realize that when one adds or subtracts 10 or 100 that only the tens place or the digit in the hundreds place changes by 1. As the teacher facilitates opportunities for patterns to emerge and be discussed, students notice the patterns and connect the digit change with the amount changed. Opportunities to solve problems in which students cross hundreds are also provided once students have become comfortable adding and subtracting within the same hundred.

	<u>Example</u>: *Within the same hundred* **What is 10 more than 218?** **What is 241 – 10?** <u>Example</u>**:** *Across hundreds* **293 + 10 = ☐** **What is 10 less than 206?** This standard focuses only on adding and subtracting 10 or 100. Multiples of 10 or multiples of 100 can be explored; however, the focus of this standard is to ensure that students are proficient with adding and subtracting 10 and 100 mentally.
2.NBT.9 Explain why addition and subtraction strategies work, using place value and the properties of operations.[1] [1] Explanations may be supported by drawings or objects.	Second graders explain why addition or subtraction strategies work as they apply their knowledge of place value and the properties of operations in their explanation. They may use drawings or objects to support their explanation. Once students have had an opportunity to solve a problem, the teacher provides time for students to discuss their strategies and why they did or didn't work. <u>Example</u>: **There are 36 birds in the park. 25 more birds arrive. How many birds are there? Solve the problem and show your work.** **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. 

	Example: **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 20 to get to 50. So, the answer is 22.” Is their strategy correct? Explain why or why not?** **Student**: 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. Example: **One of your classmates solved the problem 25 + 35 by adding 20 + 30 + 5 + 5. Is their strategy correct? Explain why or why not?** Student: 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.

Measurement & Data 2.MD

Common Core Cluster

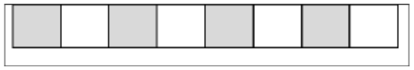
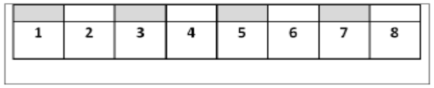
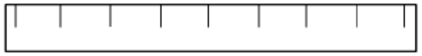
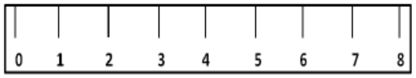
Measure and estimate lengths in standard units.
Students recognize the need for standard units of measure (centimeter and inch) and they use rulers and other measurement tools with the understanding that linear measure involves an iteration of units. They recognize that the smaller the unit, the more iterations they need to cover a given length.

Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language. The terms students should learn to use with increasing precision with this cluster are: **about, a little less than, a little more than, longer, shorter, inch, foot, centimeter, meter, ruler, yardstick, meter stick, measuring tape, estimate**

<table>
<tr><th>Common Core Standard</th><th>Unpacking
What do these standards mean a child will know and be able to do?</th></tr>
<tr><td>2.MD.1 Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.</td><td>
Second Graders build upon their non-standard measurement experiences in First Grade by measuring in standard units for the first time. Using both customary (inches and feet) and metric (centimeters and meters) units, Second Graders 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). As teachers provide rich tasks that ask students to perform real measurements, these foundational understandings of measurement are developed:

- Understand that larger units (e.g., yard) can be subdivided into equivalent units (e.g., inches) (partition).
- Understand that the same object or many objects of the same size such as paper clips can be repeatedly used to determine the length of an object (iteration).
- Understand the relationship between the size of a unit and the number of units needed (compensatory principal). Thus, the smaller the unit, the more units it will take to measure the selected attribute.

When Second Grade students are provided with opportunities to create and use a variety of rulers, they can connect their understanding of non-standard units from First Grade to standard units in second grade. <u>For example:</u>

<table>
<tr><td>By helping students progress from a “ruler” that is blocked off into colored units (no numbers),</td><td></td></tr>
<tr><td>to a “ruler” that has numbers along with the colored units,</td><td>
</td></tr>
<tr><td>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 understand students need when using such tools as rulers, yardsticks, meter sticks, and measuring tapes.</td><td>

</td></tr>
</table>
</td></tr>
</table>

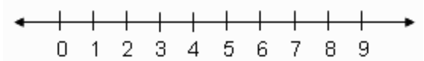
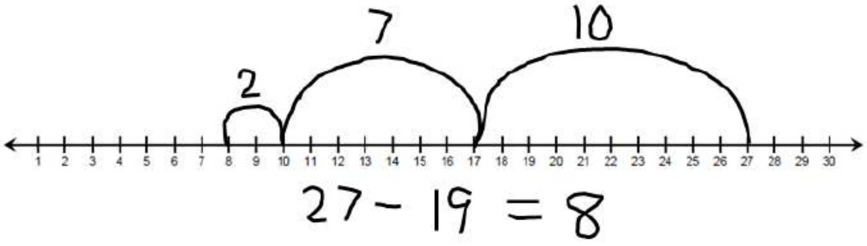
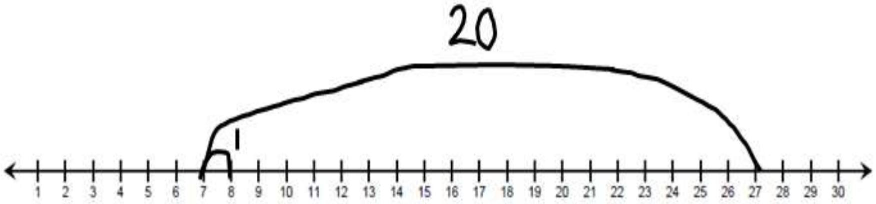
	By the end of Second Grade, students will have also learned specific measurements as it relates to feet, yards and meters: • There are 12 inches in a foot. • There are 3 feet in a yard. • There are 100 centimeters in a meter.
2.MD.2 Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.	Second Grade students measure an object using two units of different lengths. This experience helps students realize that the unit used is as important as the attribute being measured. This is a difficult concept for young children and will require numerous experiences for students to predict, measure, and discuss outcomes. Example: **A student measured the length of a desk in both feet and centimeters. She found that the desk was 3 feet long. She also found out that it was 36 inches long.** **Teacher**: Why do you think you have two different measurements for the same desk? **Student**: It only took 3 feet because the feet are so big. It took 36 inches because an inch is a whole lot smaller than a foot.
2.MD.3 Estimate lengths using units of inches, feet, centimeters, and meters.	Second Grade students estimate the lengths of objects using inches, feet, centimeters, and meters prior to measuring. Estimation helps the students focus on the attribute being measured and the measuring process. As students estimate, the student has to consider the size of the unit- helping them to become more familiar with the unit size. In addition, estimation also creates a problem to be solved rather than a task to be completed. Once a student has made an estimate, the student then measures the object and reflects on the accuracy of the estimate made and considers this information for the next measurement. Example: **Teacher**: How many inches do you think this string is if you measured it with a ruler? **Student**: An inch is pretty small. I'm thinking it will be somewhere between 8 and 9 inches. **Teacher**: Measure it and see. **Student**: It is 9 inches. I thought that it would be somewhere around there.
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.	Second Grade students determine the difference in length between two objects by using the same tool and unit to measure both objects. Students choose two objects to measure, identify an appropriate tool and unit, measure both objects, and then determine the differences in lengths. Example: **Teacher**: Choose two pieces of string to measure. How many inches do you think each string is? **Student**: I think String A is about 8 inches long. I think string B is only about 4 inches long. It's really short. **Teacher**: Measure to see how long each string is. *Student measures.* What did you notice? **Student**: String A is definitely the longest one. It is 10 inches long. String B was only 5 inches long. I was close! **Teacher**: How many more inches does your short string need to be so that it is the same length as your long string? **Student**: Hmmm. String B is 5 inches. It would need 5 more inches to be 10 inches. 5 and 5 is 10.

Common Core Cluster

Relate addition and subtraction to length.

Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language. The terms students should learn to use with increasing precision with this cluster are: **inch, foot, yard, centimeter, meter, ruler, yardstick, meter stick, measuring tape, estimate, length, equation, number line, equally spaced, point**

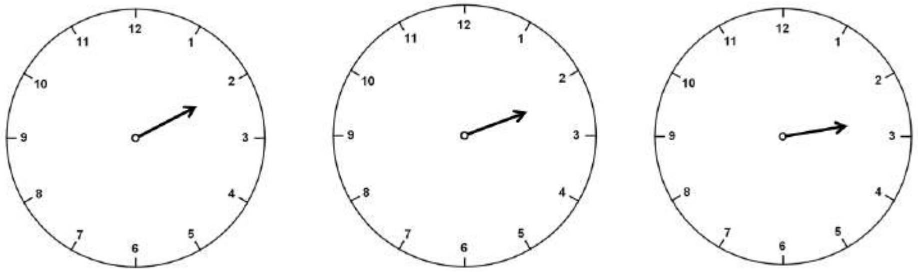
Common Core Standard	**Unpacking** What do these standards mean a child will know and be able to do?
2.MD.5 Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.	Second Grade students apply the concept of length to solve addition and subtraction word problems with numbers within 100. Students should use the same unit of measurement in these problems. Equations may vary depending on students' interpretation of the task. Notice in the examples below that these equations are similar to those problem types in Table 1 at the end of this document. Example: **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.** **Student A** My equation is 14 + __ = 23 since I thought, "14 and what makes 23?". I used Unifix 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

2.MD.6 Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, ..., and represent whole-number sums and differences within 100 on a number line diagram.	Building upon their experiences with open number lines, Second Grade students create number lines with evenly spaced points corresponding to the numbers to solve addition and subtraction problems to 100. They recognize the similarities between a number line and a ruler.  Example: **There were 27 students on the bus. 19 got off the bus. How many students are on the bus?** **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.  **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 

Common Core Cluster

Work with time and money.

Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language. The terms students should learn to use with increasing precision with this cluster are: **clocks, hand, hour hand, minute hand, hour, minute, a.m., p.m., o'clock,** *multiples of 5* (e.g., **five, ten, fifteen,** etc.**), analog clock, digital clock, quarter 'til, quarter after, half past, quarter hour, half hour, thirty minutes before, 30 minutes after, 30 minutes until, 30 minutes past, quarter, dime, nickel, dollar, cent(s), $, ¢, heads, tails**

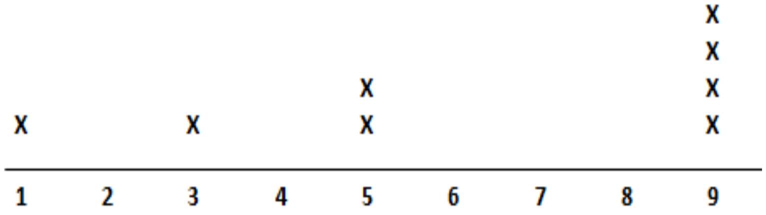
Common Core Standard	**Unpacking** What do these standards mean a child will know and be able to do?
2.MD.7 Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.	Second Grade students extend their work with telling time to the hour and half-hour in First Grade in order to tell (orally and in writing) the time indicated on both analog and digital clocks to the nearest five minutes. Teachers help students make connections between skip counting by 5s (2.NBT.2) and telling time to the nearest five minutes on an analog clock. Students also indicate if the time is in the morning (a.m.) or in the afternoon/evening (p.m) as they record the time. Learning to tell time is challenging for children. In order to read an analog clock, they must be able to read a dial-type instrument. Furthermore, they must realize that the hour hand indicates broad, approximate time while the minute hand indicates the minutes in between each hour. As students experience clocks with only hour hands, they begin to realize that when the time is two o'clock, two-fifteen, or two forty-five, the hour hand looks different- but is still considered "two". Discussing time as "about 2 o'clock", "a little past 2 o'clock", and "almost 3 o'clock" helps build vocabulary to use when introducing time to the nearest 5 minutes.  All of these clocks indicte the hour of "two", although they look slightly different. This is an important idea for students as they learn to tell time.

2.MD.8 Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using $ and ¢ symbols appropriately. *Example: If you have 2 dimes and 3 pennies, how many cents do you have?*	In Second Grade, students solve word problems involving either dollars or cents. Since students have not been introduced to decimals, problems focus on whole dollar amounts or cents. This is the first time money is introduced formally as a standard. Therefore, students will need numerous experiences with coin recognition and values of coins before using coins to solve problems. Once students are solid with coin recognition and values, they can then begin using the values coins to count sets of coins, compare two sets of coins, make and recognize equivalent collections of coins (same amount but different arrangements), select coins for a given amount, and make change. Solving problems with money can be a challenge for young children because it builds on prerequisite number and place value skills and concepts. Many times money is introduced before students have the necessary number sense to work with money successfully. For these values to make sense, students must have an understanding of 5, 10, and 25. More than that, they need to be able to think of these quantities without seeing countable objects… A child whose number concepts remain tied to counts of objects [one object is one count] is not going to be able to understand the value of coins. *Van de Walle & Lovin, p. 150, 2006* Just as students learn that a number (38) can be represented different ways (3 tens and 8 ones; 2 tens and 18 ones) and still remain the same amount (38), students can apply this understanding to money. For example, 25 cents can look like a quarter, two dimes and a nickel, and it can look like 25 pennies, and still all remain 25 cents. This concept of equivalent worth takes time and requires numerous opportunities to create different sets of coins, count sets of coins, and recognize the "purchase power" of coins (a nickel can buy the same things a 5 pennies). As teachers provide students with sufficient opportunities to explore coin values (25 cents) and actual coins (2 dimes, 1 nickel), teachers will help guide students over time to learn how to mentally give each coin in a set a value, place the random set of coins in order, and use mental math, adding on to find differences, and skip counting to determine the final amount. Example: **How many different ways can you make 37¢ using pennies, nickels, dimes, and quarters?** Example: **How many different ways can you make 12 dollars using $1, $5, and $10 bills?**

Common Core Standard and Cluster

Represent and interpret data.

Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language. The terms students should learn to use with increasing precision with this cluster are: **collect, organize, display, show, data, attribute, sort, line plot, picture graph, bar graph, question, category, chart, table, most, least, more than, less than, about, same, different, measure, inch, foot, yard, centimeter, meter, length,**

Common Core Standards	**Unpacking** What do these standards mean a child will know and be able to do?
2.MD.9 Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.	Second Graders use measurement data as they move through the statistical process of posing a question, collecting data, analyzing data, creating representations, and interpreting the results. In second grade students represent the length of several objects by making a line plot. Students should round their lengths to the nearest whole unit. Example: **Measure 8 objects in the basket to the nearest inch. Then, display your data on a line plot.** **Teacher**: What do you notice about your data? **Student**: Most of the objects I measured were 9 inches. Only 2 objects were smaller than 4 inches. I was surprised that none of my objects measured more than 9 inches! **Teacher**: Do you think that if you chose all new objects from the basket that your data would look the same? Different? Why do you think so? 
2.MD.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems[4] using information presented in a bar graph. [4] See Glossary, Table 1.	In Second Grade, students pose a question, determine up to 4 categories of possible responses, collect data, represent data on a picture graph or bar graph, and interpret the results. This is an extension from first grade when students organized, represented, and interpreted data with up to three categories. They are able to use the graph selected to note particular aspects of the data collected, including the total number of responses, which category had the most/least responses, and interesting differences/similarities between the four categories. They then solve simple one-step problems using the information from the graph.

Example:

The Second Graders were responsible for purchasing ice cream for an Open House event at school. They decided to collect data to determine which flavors to buy for the 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".

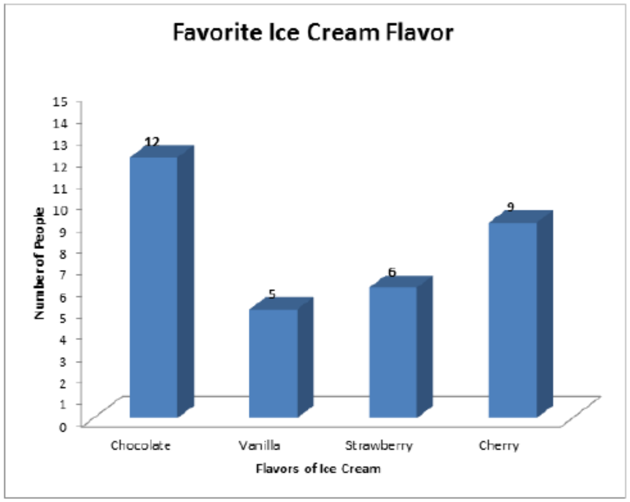
The students then divided into teams and collected data from different classes in the school. Each team decided how to keep track of the data. Most teams used tally marks to keep up with the responses. A few teams used a table and check marks.

When back in the classroom, each team organized their data by totaling each category in a chart or table. Team A's data was as follows:

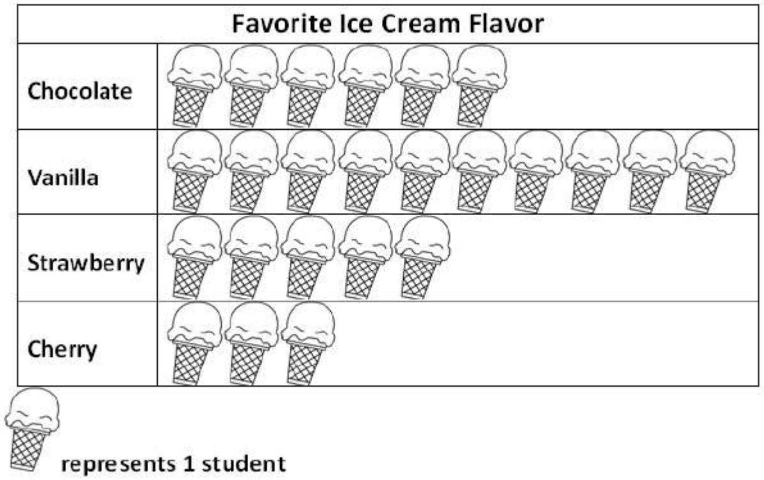
Flavor	Number of People
Chocolate	12
Vanilla	5
Strawberry	6
Cherry	9

Each team selected either a picture graph or a bar graph to display their data and created it using either paper or the computer. Team A and Team B graphs are provided here:

Team A: Bar Graph



Team B: Picture Graph



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

The teacher then facilitated a discussion around the combination of the data collected to determine the overall data of the school. Simple problems were posed:

- The total number of chocolate votes for Team A was 12 and the total number of chocolate votes for Team B was 6. How many chocolate votes are there altogether?
- Right now, with data from Team A, Team B, and Team C, vanilla has 45 votes and chocolate has 34 votes. How many more votes would we need from Team D so that chocolate had the same number of votes as vanilla?
- Right now, Cherry has a total of 22 votes. What if eleven people came and wanted to change their vote from Cherry to another choice. How many votes would Cherry have?

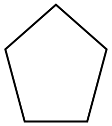
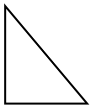
After a careful study of the data, students determined that Vanilla was the most preferred flavor. Chocolate was the second most popular. The class decided that more vanilla should be purchased than chocolate, but that both should be purchased. The teacher then asked the class, “If each gallon of ice cream served 20 children, how many gallons of ice cream would we need to buy for 460 students? How many of those total gallons should be chocolate? How many should be vanilla? Why?” The students were off solving the next task.

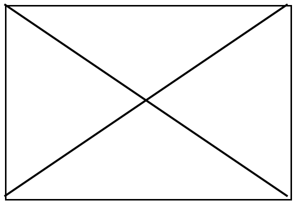
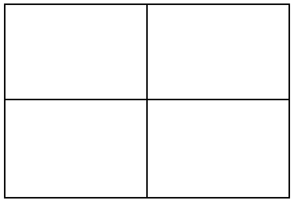
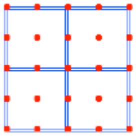
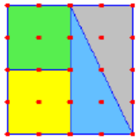
Geometry 2.G

Common Core Cluster

Reason with shapes and their attributes.
Students describe and analyze shapes by examining their sides and angles. Students investigate, describe, and reason about decomposing and combining shapes to make other shapes. Through building, drawing, and analyzing two- and three-dimensional shapes, students develop a foundation for understanding area, volume, congruence, similarity, and symmetry in later grades.

Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language. The terms students should learn to use with increasing precision with this cluster are: **attribute, angle, side, triangle, quadrilateral, square, rectangle, trapezoid, pentagon, hexagon, cube, face, edge, vertex, surface, figure, shape, closed, open, partition, equal size, equal shares, half, halves, thirds, half of, a third of, whole, two halves, three thirds, four fourths, partition**

Common Core Standard	**Unpacking** What do these standards mean a child will know and be able to do?
2.G.1 Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces.[5] Identify triangles, quadrilaterals, pentagons, hexagons, and cubes. [5] Sizes are compared directly or visually, not compared by measuring.	Second Grade students identify (recognize and name) shapes and draw shapes based on a given set of attributes. These include triangles, quadrilaterals (squares, rectangles, and trapezoids), pentagons, hexagons and cubes. Example: **Teacher**: Draw a closed shape that has five sides. What is the name of the shape? **Student**: I drew a shape with 5 sides. It is called a pentagon.  Example: **Teacher:** I have 3 sides and 3 angles. What am I? **Student**: A triangle. See, 3 sides, 3 angles. 
2.G.2 Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.	Second graders partition a rectangle into squares (or square-like regions) and then determine the total number of squares. This work connects to the standard 2.OA.4 where students are arranging objects in an array of rows and columns. Example: **Teacher**: Partition the rectangle into 2 rows and 4 columns. How many small squares did you make? **Student**: There are 8 squares in this rectangle. See- 2, 4, 6, 8. I folded the paper to make sure that they were all the same size. 

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, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.	Second Grade students partition circles and rectangles into 2, 3 or 4 equal shares (regions). Students should be given ample experiences to explore this concept with paper strips and pictorial representations. Students should also work with the vocabulary terms halves, thirds, half of, third of, and fourth (or quarter) of. While students are working on this standard, teachers should help them to make the connection that a “whole” is composed of two halves, three thirds, or four fourths. This standard also addresses the idea that equal shares of identical wholes may not have the same shape. Example: **Teacher**: Partition each rectangle into fourths a different way. **Student A**: I partitioned this rectangle 3 different ways. I folded the paper to make sure that all of the parts were the same size.    **Teacher:** In your 3 pictures, how do you know that each part is a fourth? **Student:** There are four equal parts. Therefore, each part is one-fourth of the whole piece of paper. Example: **How many different ways can you partition this 4 by 4 geoboard into fourths?**  **Student A**: I partitioned the geoboard into four equal sized squares. **Teacher**: How do you know that each section is a fourth? **Student A**: Because there are four equal sized squares. That means that each piece is a fourth of the whole geoboard.  **Student B**: I partitioned the geoboard in half down the middle. The section on the left I divided into two equal sized squares. The other section I partitioned into two equal sized triangles. **Teacher**: How do you know that each section is a fourth? **Student B**: Each section is a half of a half, which is the same as a fourth.

Glossary

Table 1 Common addition and subtraction situations[1]

	Result Unknown	Change Unknown	Start Unknown
Add to	Two bunnies sat on the grass. Three more bunnies hopped there. How many bunnies are on the grass now? 2 + 3 = ? **(K)**	Two bunnies were sitting on the grass. Some more bunnies hopped there. Then there were five bunnies. How many bunnies hopped over to the first two? 2 + ? = 5 **(1st)**	Some bunnies were sitting on the grass. Three more bunnies hopped there. Then there were five bunnies. How many bunnies were on the grass before? ? + 3 = 5 **(2n**
Take from	Five apples were on the table. I ate two apples. How many apples are on the table now? 5 – 2 = ? **(K)**	Five apples were on the table. I ate some apples. Then there were three apples. How many apples did I eat? 5 – ? = 3 **(1st)**	Some apples were on the table. I ate two apples. Then there were three apples. How many apples wer on the table before? ? – 2 = 3 **(2n**
	Total Unknown	**Addend Unknown**	**Both Addends Unknown[2]**
Put Together/ Take Apart[3]	Three red apples and two green apples are on the table. How many apples are on the table? 3 + 2 = ? **(K)**	Five apples are on the table. Three are red and the rest are green. How many apples are green? 3 + ? = 5, 5 – 3 = ? **(K)**	Grandma has five flowers. How many can she put in her red vase and how many in her blue vase? 5 = 0 + 5, 5 = 5 + 0 5 = 1 + 4, 5 = 4 + 1 5 = 2 + 3, 5 = 3 + 2 **(1s**
	Difference Unknown	**Bigger Unknown**	**Smaller Unknown**
Compare[4]	(“How many more?” version): Lucy has two apples. Julie has five apples. How many more apples does Julie have than Lucy? **(1st)**	(Version with “more”): Julie has three more apples than Lucy. Lucy has two apples. How many apples does Julie have? **(1st)**	(Version with “more”): Julie has three more apples than Lucy. Julie has five apples. How many apples does Lucy have? **(1s**
	(“How many fewer?” version): Lucy has two apples. Julie has five apples. How many fewer apples does Lucy have than Julie? 2 + ? = 5, 5 – 2 = ? **(1st)**	(Version with “fewer”): Lucy has 3 fewer apples than Julie. Lucy has two apples. How many apples does Julie have? 2 + 3 = ?, 3 + 2 = ? **(1st)**	(Version with “fewer”): Lucy has 3 fewer apples than Julie. Julie has five apples. How many apples does Lucy have? 5 – 3 = ?, ? + 3 = 5 **(2n**

K: Problem types to be mastered by the end of the Kindergarten year.

1st: Problem types to be mastered by the end of the First Grade year, including problem types from the previous year(s). However, First Grade students should have experiences with all 12 problem types.

2nd: Problem types to be mastered by the end of the Second Grade year, including problem types from the previous year(s).

1Adapted from Box 2-4 of Mathematics Learning in Early Childhood, National Research Council (2009, pp. 32, 33).

2These take apart situations can be used to show all the decompositions of a given number. The associated equations, which have the total on the left of the equal sign, help children understand that the = sign does not always mean makes or results in but always does mean is the same number as.

3Either addend can be unknown, so there are three variations of these problem situations. Both Addends Unknown is a productive extension of this basic situation, especially for small numbers less than or equal to 10.

4For the Bigger Unknown or Smaller Unknown situations, one version directs the correct operation (the version using more for the bigger unknown and using less for the smaller unknown). The other versions are more difficult.

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