

## Grade 1 Math Unit 2-Numbers & Operations in Base Ten

### UNIT OVERVIEW

In grade 1, instructional focus should focus on four critical areas. This unit is connected to Focus #2, **Developing Understanding of whole number relationships and place value, including grouping in tens and ones.** (See Connections for further explanation)

There are 3 clusters within this unit:

- a. Extend the counting sequence (\* See Connections for further explanation)
- b. Understand place value \*\*
- c. Use place value understanding and properties of operations to add and subtract \*\*\*

### STANDARDS

**CC\_Common Core State Standards - Mathematics (2010) - Grade 1**

**Domain 1.NBT Number and Operations in Base Ten**

**Cluster Statement: *Extend the counting sequence.***

**Standard 1.NBT.1** Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.

**Cluster Statement: *Understand place value.***

**Standard 1.NBT.2** Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:

**1.NBT.2.a** 10 can be thought of as a bundle of ten ones - called a "ten."

**1.NBT.2.b** The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.

**1.NBT.2.c** The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).

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

**Cluster Statement: *Use place value understanding and properties of operations to add and subtract.***

**Standard 1.NBT.4** Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, 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 and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.

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

**Standard 1.NBT.6** Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), 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 and explain the reasoning used.

### Content Elaborations

1.NBT.1	<p><b>1.NBT.1</b> calls for students to rote count forward to 120 by Counting On from any number less than 120. Student should have ample experiences with the hundreds chart to see patterns between numbers, such as all of the numbers in a column on the hundreds chart have the same digit in the ones place and all of the numbers in a row have the same digit in the tens place. This standard also calls for students to read, write and represent a number. These representations can include cubes, place value (base ten) blocks, pictorial representations or other concrete materials. They use objects, words, and/or symbols to express their understanding of numbers. As students are developing accurate counting strategies they are also building an understanding of how the numbers in the counting sequence are related - each number is one more (or one less) than the number before (or after). They extend their counting beyond 100 to count up to 120 by counting by 1s. Some students may begin to count in groups of 10 (while other students may use groups of 2s or 5s to count). Counting in groups of 10 as well as grouping objects into 10 groups of 10 will develop students understanding of place value concepts. After counting objects, students write the numeral or use numeral cards to represent the number. Give a numeral, students read the numeral, identify the quantity that each digit represents using numeral cards, and count out the given number of objects. Students should experience counting from different starting points. To extend students; understanding of counting, they should be given opportunities to count backwards by ones and tens. The should also investigate patterns in the base 10 system.</p> <p><b>MP.2, MP.7, MP.8</b> are emphasized.</p>
1.NBT.2a	<p><b>1.NBT.2a</b> asks students to unitize a group of ten ones as a whole unit: a ten. This is the foundation of the place value system. So, rather than seeing a group of ten cubes as ten individual cubes, the student is now asked to see those ten cubes as a bundle - one bundle of ten.</p> <p><b>MP.2, MP.6, MP.7, MP.8</b> are emphasized.</p>
1.NBT.2b	<p><b>1.NBT.2b</b> asks students to extend their work from Kindergarten when they composed and decomposed numbers from 11 to 19 into ten ones and some further ones. In Kindergarten, everything was thought of as individual units: ones. In First Grade, students are asked to unitize those ten individual ones as a whole unit: one ten. Students in first grade explore the idea that the teen numbers can be expressed as one ten and some leftover ones. Ample experiences with ten frames will help develop this concept.</p>
1.NBT.2c	<p><b>1.NBT.2c</b> builds on work of <b>1.NBT.2b</b>. Students should explore the idea that decade numbers are groups of tens with no left over ones. Students can represent this with cubes or place value (base 10) rods. (Most first grade students view the ten stick (numeration rod) as ONE. It is recommended to make a ten with unifix cubes or other materials that students can group. Provide students with opportunities to count books, cubes, pennies, etc. counting 30 or more objects supports grouping to keep track of the number of objects.)</p> <p>Understanding the concept of 10 is fundamental to children's mathematical development. Students need multiple opportunities counting 10 objects and 'bundling' them into one group of ten. They count between 10 and 20 objects and make a bundle of 10 with or without some left over (this will help students who find it difficult to write teen numbers). Finally, students count any number of objects up to 99, making bundles of 10s with or without leftovers.</p> <p>As students are representing the various amounts, it is important that an emphasis is placed on the language associated with the quantity. For example, 53 should be expressed in multiple ways such as 53 ones or 5 groups of ten with 3 ones leftover. When students read numbers, they read them in standard form as well as using place value concepts. For example, 53 should be read as "fifty-three" as well as "five tens, 3 ones". Reading "10, 20, 30," as "one ten, 2 tens, 3 tens" helps students see the patterns in the number system.</p>
1.NBT.3	<p><b>1.NBT.3</b> builds on the work of 1.NBT.1 and 1.NBT.2 by having students compare two numbers by examining the amount of tens and ones in each number. Students are introduced to the symbols greater than (&gt;), less than (&lt;) and equal to (=). Students should have ample experiences communicating their comparisons using words, models and in context before using only symbols in this standard.</p> <p>Students use concrete models that represent two sets of numbers. To compare, students first attend to the number of tens, then, if necessary, to the number of ones. Students may also use pictures, number lines, and spoken or written words to compare two numbers. comparative language includes but is not limited to more than, less than, greater than, most, greatest, least, same as, equal to and not equal to.</p> <p><b>MP.2, MP.6, MP.7, MP.8</b> should be emphasized.</p>

1.NBT.4

**1.NBT.4** calls for students to use concrete models, drawings and place value strategies to add and subtract with 100. (Students should not be exposed to the standard algorithm of carrying or borrowing in first grade).

Students extend their number fact and place value strategies to add within 100. They represent a problem situation using any combination of words, numbers, pictures, physical objects or symbols. It is important for students to understand if they are adding a number that has 10s to a number with 10s, they will have more tens than they started with; the same applies to the ones. Also, students should be able to apply their place value skills to decompose numbers. Students should be exposed to problems both in and out of context and presented in horizontal and vertical forms. As students are solving problems, it is important that they use language associated with proper place value. They should always explain and justify their mathematical thinking both verbally and in a written format. Estimating the solution prior to finding the answer focuses students on the meaning of the operation and helps them attend to the actual quantities. This standard focuses on developing addition - the intent is not to introduce traditional algorithms or rules.

**MP.2, MP.3, MP.4, MP.7, MP.8 should be emphasized.**

1.NBT.5

**1.NBT.5** builds on students' work with tens and ones and requires them to understand and apply the concept of 10 by mentally adding 'ten more' and 'ten less than' any number less than 100. This understanding leads to future place value concepts. It is critical for students to do this without counting. Prior use of models such as base ten blocks, number lines, and 100 charts helps facilitate understanding. Ample experiences with ten frames will also help student see the pattern involved when adding or subtracting 10 and USE these patterns to solve such problems.

**MP.2, MP.3, MP.7, MP.8 should be emphasized.**

1.NBT.6

**1.NBT.6** calls for students to use concrete models, drawings and place value strategies to subtract multiples of 10 from decade numbers (e.g. 30, 40, 50).

This standard is foundational for future work in subtraction with more complex numbers. Students should have multiple experiences representing numbers that are multiples of 10 with models or drawings. Then they subtract multiples of 10 using these representations or strategies based on place value. These opportunities develop fluency of addition and subtraction facts and reinforce counting up and back by 10s.

**MP.2, MP.3, MP.4, MP.5, MP.7, MP.8 should be emphasized.**

**UNIT VOCABULARY**

tens

equal to

equal to

ones

greater than

hundred

regroup

less than

**BIG IDEAS**

**ENDURING UNDERSTANDINGS**

**ESSENTIALS QUESTIONS**

Choose a few questions based on the needs of your students

- Quantities up to 120 may be compared, counted, and represented in multiple ways, including grouping, pictures, words, number line locations, and symbols.
- Collections can be separated into equal groups of ten objects and can be counted by 10's.
- Numbers larger than 10 can be represented in terms of tens and ones.
- The order of numbers may be represented with a list, a number line, and a 99 chart.
- Two numbers may be compared by examining the amount of tens and ones in each number using words, models and symbols greater than ( $>$ ), less than ( $<$ ) and equal to ( $=$ ).
- Knowing and using number benchmarks can help make sense of numbers, estimating, and simplify computations.
- Concrete models, drawings, and place value strategies can be used to add within 100.

- How can I use place value?
- \* How can I add and subtract two-digit numbers?

## CONNECTIONS

\* This cluster is connected to **Know number names and the count sequence** and **Compare numbers** in Kindergarten, and to **Understand place value** in Grade 2.

\*\* This cluster is connected to **Work with numbers 11-19 to gain foundations for place value** in Kindergarten, and to **Understand place value** in Grade 2.

\*\*\* This cluster connects to work in Grade 1. In addition, it connects to **Add and subtract within 20, Use place value understanding and properties of operations to add and subtract** and **Relate addition and subtraction to length** in Grade 2.

**Standards for Mathematical Practice (SMP)**

**MP.1** Make sense of problems and persevere in solving them

**MP.2** Reason abstractly and quantitatively

**MP.3** Construct viable arguments and critique the reasoning of others

**MP.4** Model with mathematics

**MP.5** Use appropriate tools strategically

**MP.6** Attend to precision

**MP.7** Look for and make use of structure (Deductive reasoning)

**MP.8** Look for and express regularity in repeated reasoning (Inductive Reasoning)

**Extend the counting sequence**

	CONTENT	SKILLS
<b>1.NBT.1</b>	Count to 120.	Count to 120. 1. Count (saying the number sequence) to 120, starting at any number less than 120 2. Use hundreds chart to see patterns between numbers (all numbers in column have same digit in ones place, all numbers in row have same digit in tens place) 3. Count backwards by 1s and 10s 4. Read the numerals up to 120 5. Write numerals up to 120 6. When counting objects, begin to move from counting by 1s to counting in groups (10, 2, 5) 7. Represent a number of objects up to 120 using cubes, place ten blocks, pictorial representations or other concrete materials 8. Connect concrete representations of numbers to 120 to number words and written numerals

**Understand place value**

<b>1.NBT.2</b>	Understand that the two digits of a two-digit number represent amounts of tens and ones	Understand that the two digits of a two-digit number represent amounts of tens and ones 1. Explain what each digit of a two-digit number represents 2. Identify a bundle of 10 ones as a "ten" 3. Represent numbers 11 to 19 as composed of a ten and correct number of ones. 4. Represent the numbers 20, 30, 40, 50, 60, 70, 80 and 90 as composed of the correct number of tens.
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1.NBT.3	Compare two two-digit numbers	Compare two two-digit numbers 1. Identify the value of each digit represented in the two-digit number 2. Use concrete models to compare two two-digit numbers based on meanings of the tens and ones digits. 3. Use pictures, number lines and spoken or written words to compare two numbers 4. Use comparative language, such as more than, less than, greater than, most, greatest, least, same as, equal to and not equal to, to compare numbers. 5. Know what each symbol represents $>$ , $<$ , and $=$ . 6. Use $>$ , $=$ , and $<$ symbols to record the results of comparisons.
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**Use place value understanding and properties of operations to add and subtract**

1.NBT.4	Add within 100	Add within 100 1. Identify the value of each digit of a number within 100. 2. Decompose any number within one hundred into ten(s) and one(s). 3. Choose an appropriate strategy for solving an addition problem within 100. 4. Relate the chosen strategy (using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction) to a written method (equation) and explain the reasoning used. 5. Use composition and decomposition of tens when necessary to add within 100.
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1.NBT.5	Given a two-digit number, mentally find 10 more or 10 less	Given a two-digit number, mentally find 10 more or 10 less 1. Identify the value of each digit in a number within 100 2. Apply knowledge of place value to mentally add or subtract 10 to/from a given two digit number 3. Explain how to mentally find 10 more or 10 less than the given two-digit number.
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1.NBT.6	Subtract multiples of 10 from multiples of 10.	Subtract multiples of 10 from multiples of 10. 1. Identify the value of each digit of a number within 100. 2. Subtract multiples of 10 in the range of 10-90 from multiples of 10 in the range of 10-90 (positive or zero differences). 3. Choose appropriate strategy (concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction) for solving subtraction problems with multiples of 10. 4. Relate the chosen strategy to a written method (equation) and explain the reasoning used.
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**UNIT RESOURCES**

McGraw-Hill, **My Math** Chapter 5-6  
**Number Talks** by Sherry Parrish  
 Georgia Math frameworks, Grade 1, Unit 6  
 Debbie Diller Math Work Stations materials and process  
 Manipulatives