



GRADE 2: UNIT 1 OVERVIEW

NUMBER AND PLACE VALUE

Length of Unit: 3-4 weeks

Mathematical Practices (CCSS)	Grade Level Focus Areas	Grade Level Domains and Standards <i>(See Appendix A)</i>
<ol style="list-style-type: none"> 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning. 	<p>FA.1. Base-Ten Understanding: Extend understanding of base-ten notation</p>	<p>Major Domain: Number and Operations in Base Ten Understand place value Use place value understanding and properties of operations to add and subtract.</p> <p>Supporting Domains: Operations and Algebraic Thinking Represent and solve problems involving addition and subtraction</p>
Structural Components (focusing lens)	Explanation (based on grade level and unit topic)	
Units and Unitizing	The units students will be using here are the units of 1, 10, and/or 100.	
Composing and Decomposing	The ability to put objects together and then break them apart while still retaining number.	
Partitioning and Iterating	The ability to copy a unit of the same size or measure over and over again or split it up into equivalent units. The units – ones, tens, hundreds – can be copied or split into multiple equivalent units. Each unit has a relation to the other by a factor of ten.	
Equivalence and Relationships	Understanding how numbers or quantities are related to each other	
Situations	Addition and subtraction with Join and Separate problem types	

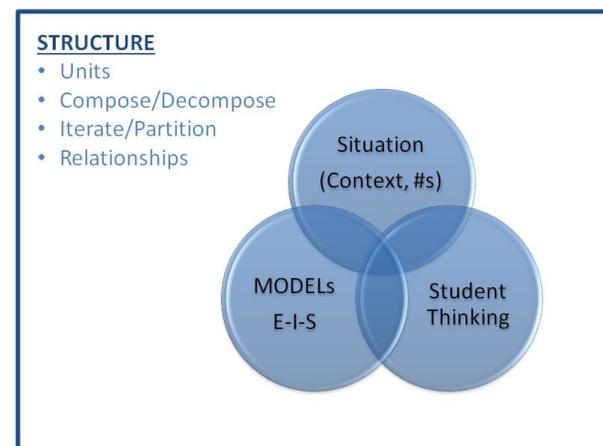
Accumulation	When the different units (ones, tens, hundreds) are composed together or accumulated they total a composed unit or number.
Formative Assessment Questions, Tasks, or Examples	
Skill/Procedure/Rote	<p>What digit is in the tens place?</p> <p>What is the value of the digit in the tens place?</p> <p>How many units of ten do you need to compose this number if you can only use tens and ones?</p> <p>What is the sum for two 2-digit numbers?</p> <p>What is the difference between two 2-digit numbers?</p>
Problem Solving	<p>Explain how you solved the problem.</p> <p>Use join and separate problem types and ask what language in the context tells you to add or subtract a set of numbers.</p>
Conceptual	<p>How can you use a table to organize the number of ones, tens and hundreds for a given 2 or 3-digit number? What are some different ways?</p> <p>How can we count our objects in some way that would be more efficient than counting by ones?</p> <p>Draw models to represent units of place value and flexibly decompose by place value using models.</p>
Reasoning & Justification	<p>Compare two different representations of the same number. How are they alike? How are they different?</p> <p>When comparing two three-digit numbers, what are some ways to model how much more or how much less one number is than the other number?</p> <p>Explain why the digit 0 (zero) is important in a number?</p> <p>Which strategy or model is more efficient and why?</p>
Models	
Enactive	Cubes
Iconic	Drawing of cubes, bar model, number line
Symbolic	Tree diagram, ratio table, number sentences
Vocabulary	
Domain Specific	Units, sum, difference, expanded form, word form, standard form, tree diagram, arrow language, open number line, addend, bar model, digit, partial sums, commutative property, associative property, decompose, compose, inverse operations
General	Count up (count on), count back, skip count, equal (same as), less than, greater than, place value, ones, tens, hundreds
Inclusion Topics	
Data Analysis	Create a survey where students must use a bar graph to generate addition and subtraction problems within 100. Generate questions related to the survey and solve problems involving the data collected.

	Make predictions from the data to another, similar situation.
Patterns	Place counters on a number chart while skip counting and look for patterns. Use a ratio table to skip count by 2s, 5s, 10s, and 100s while labeling the number of groups, group size and total (2.NBT.2). Cut a hundred chart into strips of ten. Students can then make the strips into a number line. Have students discuss and share patterns found and connections between a hundreds chart and a number line.
Fluency Development	Students should practice addition and subtraction flexibility by using the following strategies (doubles when appropriate, making the next ten, place value, and compensation).

Description of Key Ideas for Learning Goals

There are four units in grade 2 that focus on number, counting, number operations, and place value. Each unit builds specific skills within the topic of number. In this first unit on number the focus is on place value and adding and subtracting using joining and separating problem types (within 150); representing the different situations using enactive, iconic, and symbolic models; and building place value understanding including units of 100. The key ideas for this unit are:

- The quantity one is the unit size of one or a measure of one; the quantity ten is its own unit which is composed of ten units of size one; the quantity one hundred is a unit composed of 10 units of size 10 and 100 units of size 1.
- Commutative property: the sum of adding two numbers is the same no matter the order, $a + b = b + a$
- Associative property: the sum of adding three or more numbers is the same no matter the grouping or ordering of any two addends, $(a + b) + c = a + (b + c)$
- Equivalence: The equal sign is used to represent two equal amounts and the quantities on both sides represent “the same” amount. For instance, $3 + 4$ represents the same amount as $5 + 2$.

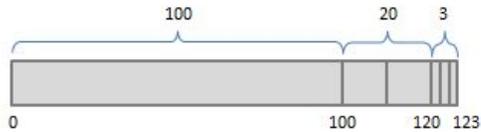


Examples of Models and Situations for Multiplication

Situation: Use joining and separating problem types with different numbers sets.

Examples of Models with Place Value

Situation: Mrs. Forte wants to decompose (break up) the number 123 by place value units. What does that look like using a bar model?
Bar Model example



Build or draw using a bar model the following numbers using units of size 100, 10 and 1. Then, write a number sentence that matches the drawing.



56

135 E.g., $100 + 30 + 5 = 135$



279

Situation: Mrs. Forte decided to count the number of fingers in the class. She had each student hold up a hand and she began counting by 5's from 0. She began to write down the process by using a ratio table. How would you finish the table if there were 24 students in the class?

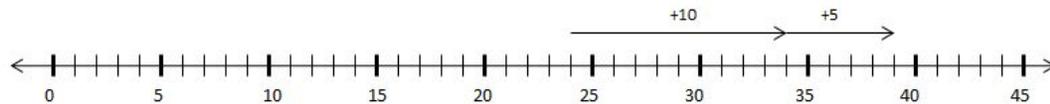
Ratio Table example

Fingers per hand	0	5	10	15	20
Students	0		1		2

Examples of Problem Solving with Problem Types

Situation: (JRU) Rachel has 24 gumballs. She bought 15 more gumballs. How many gumballs does she have now?

Use a number line to solve the problem.



Write an equation to match how you solved it.

$$24 + 10 = 34$$

$$34 + 5 = 39$$

Write an equation to match the story problem.

$$24 + 15 = \square$$

Continuation of situations

Next, put students in situations where the unknown value changes – JCU and SSU. After these situations, give students the number line model or the equation and ask them to generate a context from the given examples. Repeat this process with all of the different active problem types for addition and subtraction.

Examples of Data Analysis and Extended Thinking

Investigate boxes of cereal on a store shelf. Create a bar graph where each bar represents the number of cereal boxes (by 10) on a shelf. For example, if there were 30 boxes on a shelf, the bar graph would be the height of 3.

Appendix A

Number and Operations in Base Ten

2.NBT

A. Understand place value.

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:
 - a. 100 can be thought of as a bundle of ten tens – called a “hundred.”
 - 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).
2. Count within 1000; skip-count by 5s, 10s, and 100s.
3. Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.
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.

B. Use place value understanding and properties of operations to add and subtract.

5. Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
6. Add up to four two-digit numbers using strategies based on place value and properties of operations.
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.
8. Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900.
9. Explain why addition and subtraction strategies work, using place value and the properties of operations.

Operations and Algebraic Thinking

2.OA

A. Represent and solve problems involving addition and subtraction.

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.

