Mathematics | Grade 2

In Grade 2, instructional time should focus on four critical areas: (1) extending understanding of base-ten notation; (2) building fluency with addition and subtraction; (3) using standard units of measure; and (4) describing and analyzing shapes.

(1) Students will 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 will understand multi-digit numbers (up to 1,000) written in base-ten notation, recognizing that the digits in each place represent amounts of thousands, hundreds, tens, or ones *(for example, 853 is 8 hundreds + 5 tens + 3 ones)*.

(2) Students will use their understanding of addition to develop fluency with addition and subtraction within 100. They will solve problems within 1,000 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 will 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) Students will recognize the need for standard units of measure (such as centimeter and inch) and they use rulers and other measurement tools with the understanding that linear measure involves an iteration of units. They will recognize that the smaller the unit, the more iterations they need to cover a given length.

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

Strand: MATHEMATICAL PRACTICES (2.MP)

The Standards for Mathematical Practice in Second Grade describe mathematical habits of mind that teachers should seek to develop in their students. Students become mathematically proficient in engaging with mathematical content and concepts as they learn, experience, and apply these skills and attitudes **(Standards 2.MP1–6).**

- **Standard 2.MP.1 Make sense of problems and persevere in solving them.** Explain the meaning of a problem, look for entry points to begin work on the problem, and plan and choose a solution pathway. When a solution pathway does not make sense, look for another pathway that does. Explain connections between various solution strategies and representations. Upon finding a solution, look back at the problem to determine whether the solution is reasonable and accurate, often checking answers to problems using a different method or approach.

- **Standard 2.MP.2 Reason abstractly and quantitatively.** Make sense of quantities and their relationships in problem situations. Contextualize quantities and operations by using images or stories. Decontextualize a given situation and represent it symbolically. Interpret symbols as having meaning, not just as directions to carry out a procedure. Know and flexibly use different properties of operations, numbers, and geometric objects.

- **Standard 2.MP.3 Construct viable arguments and critique the reasoning of others.** Use stated assumptions, definitions, and previously established results to construct arguments. Explain and justify the mathematical reasoning underlying a strategy, solution, or conjecture by using concrete referents such as objects, drawings, diagrams, and actions. Listen to or read the arguments of others, decide whether they make sense, ask useful questions to clarify or improve the arguments, and build on those arguments.

- **Standard 2.MP.4 Model with mathematics.** Identify the mathematical elements of a situation and create a mathematical model that shows the relationships among them. Identify important quantities in a contextual situation, use mathematical models to show the relationships of those quantities, analyze the relationships, and draw conclusions. Models may be verbal, contextual, visual, symbolic, or physical.

- **Standard 2.MP.5 Use appropriate tools strategically.** Consider the tools that are available when solving a mathematical problem, whether in a real-world or mathematical context. Choose tools that are relevant and useful to the problem at hand, such as drawings, diagrams, technologies, and physical objects and tools, as well as mathematical tools such as estimation or a particular strategy or algorithm.

- **Standard 2.MP.6 Attend to precision.** Communicate precisely to others by crafting careful explanations that communicate mathematical reasoning by referring specifically to each important mathematical element, describing the relationships among them, and connecting their words clearly to representations. Calculate accurately and efficiently, and use clear and concise notation to record work.

■ **Standard 2.MP.7 Look for and make use of structure.** Recognize and apply the struc-
tures of mathematics such as patterns, place value, the properties of operations, or the
flexibility of numbers. See complicated things as single objects or as being composed of
several objects.

■ **Standard 2.MP.8 Look for and express regularity in repeated reasoning.** Notice repeti-
tions in mathematics when solving multiple related problems. Use observations and
reasoning to find shortcuts or generalizations. Evaluate the reasonableness of intermedi-
ate results.

Strand: OPERATIONS AND ALGEBRAIC THINKING (2.OA)

Represent and solve problems involving addition and subtraction **(Standard 2.OA.1). ** Fluently
add and subtract within 20 **(Standard 2.OA.2)** and work with equal groups of objects to gain
foundations for multiplication **(Standards 2.OA.3–4).**

■ **Standard 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, *for example, by using drawings and
equations with a symbol for the unknown number to represent the problem*.

■ **Standard 2.OA.2**   Fluently add and subtract within 20.

    a. Add and subtract within 20 using mental strategies such as counting on; making ten
(for example, $8 + 6 = 8 + 2 + 4 = 10 + 4 = 14$); decomposing a number leading to a ten
(for example, $13 - 4 = 13 - 3 - 1 = 10 - 1 = 9$); using the relationship between addition
and subtraction *(for example, knowing that $8 + 4 = 12$, one knows $12 - 8 = 4$)*; and creat-
ing equivalent but easier or known sums *(for example, adding $6 + 7$ by creating the
known equivalent $6 + 6 + 1 = 12 + 1 = 13$)*.

    b. By the end of Grade 2, know from memory all sums of two one-digit numbers.

■ **Standard 2.OA.3**   Determine whether a group of objects (up to 20) has an odd or even
number of members, (*for example, by pairing objects or counting them by twos*). Write an
equation to express an even number as a sum of two equal addends.

■ **Standard 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.

Strand: NUMBER AND OPERATIONS IN BASE TEN (2.NBT)

Understand place value **(Standards 2.NBT.1–4).** They use place value understanding and
properties of operations to add and subtract **(Standards 2.NBT.5–9).**

■ **Standard 2.NBT.1** Understand that the three digits of a three-digit number represent
amounts of hundreds, tens, and ones; *for example, 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).

■ **Standard 2.NBT.2**   Count within 1,000; skip-count by fives, tens, and hundreds.

■ **Standard 2.NBT.3**   Read and write numbers to 1,000 using base-ten numerals, number names, and expanded form.

■ **Standard 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.

■ **Standard 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.

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

■ **Standard 2.NBT.7**   Add and subtract within 1,000 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, and ones and ones, and that it is sometimes necessary to compose or decompose tens or hundreds.

■ **Standard 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.

■ **Standard 2.NBT.9**   Explain why addition and subtraction strategies work, using place value and the properties of operations. Explanations may be supported by drawings or objects

Strand: MEASUREMENT AND DATA (2.MD)

Measure and estimate lengths in standard units **(Standards 2.MD.1–4)** and relate addition and subtraction to length **(Standards 2.MD.5–6).** They work with time and money **(Standards 2.MD.7–8)**. They represent and interpret data **(Standards 2.MD.9–10)**.

■ **Standard 2.MD.1**   Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.

■ **Standard 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.

■ **Standard 2.MD.3**   Estimate lengths using units of inches, feet, centimeters, and meters.

■ **Standard 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. *For example, after measuring a pencil and a crayon, a student uses the measurements to determine that the pencil is two inches longer than the crayon.*

■ **Standard 2.MD.5**   Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units. *For example, use drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.*

■ **Standard 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… Represent whole-number sums and differences within 100 on a number line diagram.

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

■ **Standard 2.MD.8**   Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using $ and ¢ symbols appropriately. *For example, if you have 2 dimes and 3 pennies, how many cents do you have?*

■ **Standard 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.

■ **Standard 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 comparison problems using information presented in a bar graph.

Strand: GEOMETRY (2.G)

Reason with shapes and their attributes.

■ **Standard 2.G.1**   Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Sizes are compared directly or visually, not compared by measuring. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.

■ **Standard 2.G.2**   Partition a rectangle into rows and columns of same-size squares and count to find the total number of squares.

■ **Standard 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, or four fourths. Recognize that equal shares of identical wholes need not have the same shape.