

Grades 1–2	
Learning Standards	Selected Problems or Classroom Activities
<p><i>Students engage in problem solving, communicating, reasoning, connecting, and representing as they:</i></p> <p>2.M.1 Identify parts of the day (e.g., morning, afternoon, evening), days of the week, and months of the year. Identify dates using a calendar.</p> <p>2.M.2 Tell time at quarter-hour intervals on analog and digital clocks using a.m. and p.m.</p> <p>2.M.3 Compare the length, weight, area, and volume of two or more objects by using direct comparison.</p> <p>2.M.4 Measure and compare common objects using metric and English units of length measurement, e.g., centimeter, inch.</p> <p>2.M.5 Select and correctly use the appropriate measurement tools, e.g., ruler, balance scale, thermometer.</p> <p>2.M.6 Make and use estimates of measurement, including length, volume, weight, and area.</p>	<p><i>Refers to standards 2.M.1 and 2.M.2</i> With the children's help, make a schedule of activities for the morning, recording times to the hour and half-hour. Set the alarms of both a digital clock and an analog clock to ring at the start of each hour. Call on children to read the clocks to verify that they match the times in the schedule.</p> <p><i>Refers to standards 2.M.3, 2.M.4, and 2.M.5</i> A teacher had given her class a list of things to measure, including the width of a doorway. She was finding out how the students would approach the task. She had little choice of measuring tools up to then. Aliza was using a ruler when the teacher stopped by the desk to observe her measuring her table. "It's twelve inches," Aliza said as she wrote the measurement on the recording sheet. Then she measured her pencil, which was noticeably shorter than the book. The teacher observed that Aliza's hand slipped as she was aligning her ruler with the pencil. Aliza made no comment but recorded this measurement as twelve inches also.</p> <p>"I notice that you wrote that each of these is twelve inches," said the teacher. "I'm confused. The book looks much longer than the pencil to me. What do you think?"</p> <p>Aliza pushed both items close together and studied them. "You're right," she said. "The book is longer, but they are both twelve inches."</p> <p>In her anecdotal records, the teacher noted what happened in order to address the issue in future lessons and conversations with Aliza and the class.</p>

Exploratory Concepts and Skills

Explore measurable attributes of objects, including length, perimeter, weight, area, volume, and temperature. Compare concrete objects using these measures.

Refers to standards 2.D.2 and 2.D.3
Place one green apple and one red apple into a bag. Have the students predict which color apple will come out most often. Next, have each student in turn pick one apple from the bag without looking. Make a tally of red vs. green apples for the entire class's picks. Have the class compare their predictions with the outcome of the experiment.

Data Analysis, Statistics, and Probability

Grades 1–2	
Learning Standards	Selected Problems or Classroom Activities
<p><i>Students engage in problem solving, communicating, reasoning, connecting, and representing as they:</i></p> <p>2.D.1 Use interviews, surveys, and observations to gather data about themselves and their surroundings.</p> <p>2.D.2 Organize, classify, represent, and interpret data using tallies, charts, tables, bar graphs, pictographs, and Venn diagrams. Interpret the representations.</p> <p>2.D.3 Formulate inferences (draw conclusions) and make educated guesses (conjectures) about a situation based on information gained from data.</p> <p>2.D.4 Decide which outcomes of experiments are most likely.</p>	<p>See below for sample problems.</p>

Exploratory Concepts and Skills

Investigate more likely, unlikely, and impossible outcomes by conducting experiments using spinners, counters, and other concrete objects.
List and count the number of possible pairings of objects from two sets.

Refers to standards 2.D.1 and 2.D.2
Mr. Greenleaf's class collected data on the number of children in each student's family. The first graders found the numbers of children to be:

2 2 1 1 1 2 2 1 3 4 1 1 2 3 5 2 4

1. Make a tally sheet and then a bar graph to show the number of children in the students' families.
2. Describe the results, e.g., what is the most common or frequent number of people in a family? How many more students have families with 2 or fewer children compared with families with 3 or more children?

Refers to standards 2.D.2 and 2.D.3
Students each trace one of their own shoes on paper and cut it out. Next, they place their cutouts on a floor graph (pictograph) that identifies the kind of footwear each is wearing, e.g., sneakers, boots, sandals. Discuss what the graph shows. Extend the activity by using tally marks and making a bar graph on inch-square graph paper.

Refers to standards 2.D.2 and 2.D.3
Caleb has lots of pennies, nickels, and dimes in his pocket. He takes out three coins and puts them on the table. How much money could he be on the table? Make a list.

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 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., 855 is 8 hundreds + 5 tens + 3 ones).
- (2) 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) 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) 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.

Grade 2 Overview

Operations and Algebraic Thinking

- Represent and solve problems involving addition and subtraction.
- Add and subtract within 20.
- Work with equal groups of objects to gain foundations for multiplication.

Number and Operations in Base Ten

- Understand place value.
- Use place value understanding and properties of operations to add and subtract.
- Relate addition and subtraction to length.
- Work with time and money.
- Represent and interpret data.

Geometry

- Reason with shapes and their attributes.

Mathematical Practices

- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.

Grade 2

Introduction

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.

- 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 1,000) written in base-ten notation, recognizing that the digits in each place represent amounts of thousands, hundreds, tens, or ones (e.g., 855 is 8 hundreds + 5 tens + 3 ones).
- Students use their understanding of addition to develop fluency with addition and subtraction within 100. They 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 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.
- 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.
- 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.

The Standards for Mathematical Practice complement the content standards so that students increasingly engage with the subject matter as they grow in mathematical maturity and expertise throughout the elementary, middle, and high school years.

Grade 2 Overview

Operations and Algebraic Thinking

- Represent and solve problems involving addition and subtraction.
- Add and subtract within 20.
- Work with equal groups of objects to gain foundations for multiplication.

Number and Operations in Base Ten

- Understand place value.
- Use place value understanding and properties of operations to add and subtract.
- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.

Measurement and Data

- Measure lengths indirectly and by iterating length units.
- Relate addition and subtraction to length.
- Work with time and money.
- Represent and interpret data.

Geometry

- Reason with shapes and their attributes.

Standards for Mathematical Practice

- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.

Grade 2 Content Standards

Operations and Algebraic Thinking

- Represent and solve problems involving addition and subtraction.
 - 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
 - Fluently add and subtract within 20 using mental strategies.² By end of grade 2, know from memory all sums of two single-digit numbers and related differences.
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 - Fluently add and subtract within 20 using mental strategies.³ By end of grade 2, know from memory all sums of two single-digit numbers and related differences.

For example, the sum $6 + 5 = 11$ has related differences of $11 - 5 = 6$ and $11 - 6 = 5$.
- Work with equal groups of objects to gain foundations for multiplication.
 - 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.
 - Use addition to find the total number of objects arranged in rectangular arrays with up to five rows and up to five columns; write an equation to express the total as a sum of equal addends.

Number and Operations in Base Ten

- Understand place value.
 - 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:
 - 100 can be thought of as a bundle of ten tens—called a “hundred.”
 - 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).
 - Count within 1,000; skip-count by 5s, 10s, and 100s. Identify patterns in skip counting starting at any number.
 - Read and write numbers to 1,000 using base-ten numerals, number names, and expanded form.
 - Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using $>$, $=$, and $<$ symbols to record the results of comparisons.
- Use place value understanding and properties of operations to add and subtract.
 - Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
 - Add up to four two-digit numbers using strategies based on place value and properties of operations.
 - 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.
 - Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900.
 - Explain why addition and subtraction strategies work, using place value and the properties of operations.⁴

¹ See Glossary, Table 1.
² Strategies such as counting on; making tens; decomposing a number; using the relationship between addition and subtraction; and creating equivalent but easier or known sums.
³ Explanations may be supported by drawings or objects.

Operations and Algebraic Thinking 2.OA

Represent and solve problems involving addition and subtraction.

- 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

Add and subtract within 20.

- 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.

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

- 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.
- 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.

Number and Operations in Base Ten 2.NBT

Understand place value.

- 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:
 - 100 can be thought of as a bundle of ten tens—called a “hundred.”
 - 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).
- Count within 1000; skip-count by 5s, 10s, and 100s.
- Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.
- Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using $>$, $=$, and $<$ symbols to record the results of comparisons.

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

- Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
- Add up to four two-digit numbers using strategies based on place value and properties of operations.
- 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.
- Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900.
- Explain why addition and subtraction strategies work, using place value and the properties of operations.³

¹ See Glossary, Table 1.
² See standard 1.OA.6 for a list of mental strategies.
³ Explanations may be supported by drawings or objects.

Measurement and Data 2.MD

Measure and estimate lengths in standard units.

- Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.
- 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.
- Estimate lengths using units of inches, feet, centimeters, and meters.
- Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.

Relate addition and subtraction to length.

- 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.
- 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.

Work with time and money.

- Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.
- 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?

Represent and interpret data.

- 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.
- 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 problems¹ using information presented in a bar graph.

Geometry 2.G

Reason with shapes and their attributes.

- Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.
- Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.
- 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.

¹ See Glossary, Table 1.
² Sizes are compared directly or visually, not compared by measuring.