Grade 2 Mathematics Overview

Grade 2 content is organized into five Alabama Content Areas as outlined in the table below: Operations and Algebraic Thinking; Operations with Numbers: Base Ten; Data Analysis; Measurement; and Geometry. Related standards are grouped into clusters, which are listed below each content area. Standards indicate what the student should know or be able to do by the end of the grade.

Alabama Content Areas	Operations and Algebraic Thinking	Operations with Numbers: Base Ten	Data Analysis	Measurement	Geometry
Clusters	• Represent and solve problems involving addition and subtraction. • Add and subtract within 20. • Work with equal groups of objects to gain foundations for multiplication. • Understand simple patterns.	• Understand place value. • Use place value understanding and properties of operations to add and subtract.	• Collect and analyze data and interpret results.	• Measure and estimate lengths in standard units. • Relate addition and subtraction to length. • Work with time and money.	• Reason with shapes and their attributes.

The eight Student Mathematical Practices listed in the chart below represent what students are doing as they learn mathematics. Students should regularly engage in these processes and proficiencies at every level throughout their mathematical studies. Proficiency with these practices is critical in using mathematics in the classroom and in everyday life. **The Student Mathematical Practices are standards which should be incorporated across all grades**.

Student Mathematical Practices	
1. Make sense of problems and persevere in solving them.	5. Use appropriate tools strategically.
2. Reason abstractly and quantitatively.	6. Attend to precision.
3. Construct viable arguments and critique the reasoning of others.	7. Look for and make use of structure.
4. Model with mathematics.	8. Look for and express regularity in repeated reasoning.

Content Priorities

In Grade 2, instructional time should focus on four critical areas:

1. building fluency with addition and subtraction;
2. extending understanding of base-ten notation;
3. using standard units of measure; and
4. describing and analyzing shapes.

Important information regarding these four critical areas of instruction follows.

1. Through their learning in the **Operations and Algebraic Thinking** Alabama Content Area, students
   - use their understanding of addition to develop fluency with addition and subtraction within 100, including ability to state automatically the sums of all one-digit numbers by the end of the grade;
   - solve problems within 1000 by applying their understanding of models for addition and subtraction, and 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;
   - 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; and
   - reproduce, extend, create, and describe patterns and sequences using a variety of materials.
     Note: Reproducing, extending, creating, and describing patterns are important processes in thinking algebraically.

2. Through their learning in the **Operations with Numbers: Base Ten** Alabama Content Area, 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; and
   - 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).

3. Through their learning in the **Measurement** Alabama Content Area, students
   - recognize the need for standard units of measure, including centimeter and inch, and use rulers and other measurement tools with the understanding that linear measure involves an iteration of units; and
   - recognize that the smaller the unit, the more iterations are needed to cover a given length.

4. Through their learning in the **Geometry** Alabama Content Area, students
   - describe and analyze shapes by examining their sides and angles;
   - investigate, describe, and reason about decomposing and combining shapes to make other shapes; and
   - draw, partition, and analyze two- and three-dimensional shapes to develop a foundation for understanding area, volume, congruence, similarity, and symmetry in later grades.

When standards indicate that drawings may be used, the drawings need not be detailed but should show the mathematics in the problem.

NOTE: Although not all content areas in the grade level have been included in the overview, all standards should be included in instruction.

***Note: fluency vs. automaticity.** Fluency involves a mixture of "just knowing" answers, knowing answers from patterns, and knowing answers from the use of strategies. The word *fluently* is used in the standards to mean accurately, efficiently and flexibly. Automaticity of facts becomes evident when a student no longer uses a pattern or mental algorithm to determine the answer.

Grade 2 Content Standards

Each content standard completes the stem *"Students will…"*

Operations and Algebraic Thinking	
Represent and solve problems involving addition and subtraction. *Note: Second grade problem types include adding to, taking from, putting together, taking apart, and comparing with unknowns in all positions.*	1. Use addition and subtraction within 100 to solve one- and two-step word problems by using drawings and equations with a symbol for the unknown number to represent the problem.
Add and subtract within 20. *See note regarding fluency vs. automaticity in the Overview.*	2. Fluently add and subtract within 20 using mental strategies such as counting on, making ten, decomposing a number leading to ten, using the relationship between addition and subtraction, and creating equivalent but easier or known sums. a. State automatically all sums of two one-digit numbers.
Work with equal groups of objects to gain foundations for multiplication.	3. Use concrete objects to determine whether a group of up to 20 objects is even or odd. a. Write an equation to express an even number as a sum of two equal addends. 4. Using concrete and pictorial representations and repeated addition, determine the total number of objects in a rectangular array with up to 5 rows and up to 5 columns. a. Write an equation to express the total number of objects in a rectangular array with up to 5 rows and up to 5 columns as a sum of equal addends.
Understand simple patterns.	5. Reproduce, extend, create, and describe patterns and sequences using a variety of materials.

Operations with Numbers: Base Ten	
Understand place value.	6. Explain that the three digits of a three-digit number represent amounts of hundreds, tens, and ones. a. Explain the following three-digit numbers as special cases: 100 can be thought of as a bundle of ten tens, called a "hundred," and 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). 7. Count within 1000 by ones, fives, tens, and hundreds. 8. Read and write numbers to 1000 using base-ten numerals, number names, and expanded form. 9. Compare two three-digit numbers based on the value of the hundreds, tens, and ones digits, recording the results of comparisons with the symbols >, =, and < and orally with the words "is greater than," "is equal to," and "is less than."
Use place value understanding and properties of operations to add and subtract.	10. Fluently add and subtract within 100, using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction. 11. Use a variety of strategies to add up to four two-digit numbers. 12. 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. a. Explain 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. 13. Mentally add and subtract 10 or 100 to a given number between 100 and 900. 14. Explain why addition and subtraction strategies work, using place value and the properties of operations. ***Note:*** *Explanations may be supported by drawings or objects.*

Data Analysis	
Collect and analyze data and interpret results.	15. Measure lengths of several objects to the nearest whole unit. a. Create a line plot where the horizontal scale is marked off in whole-number units to show the lengths of several measured objects. 16. Create a picture graph and bar graph to represent data with up to four categories. a. Using information presented in a bar graph, solve simple "put-together," "take-apart," and "compare" problems. b. Using Venn diagrams, pictographs, and "yes-no" charts, analyze data to predict an outcome.

Measurement	
Measure and estimate lengths in standard units.	17. Measure the length of an object by selecting and using standard units of measurement shown on rulers, yardsticks, meter sticks, or measuring tapes. 18. Measure objects with two different units, and describe how the two measurements relate to each other and the size of the unit chosen. 19. Estimate lengths using the following standard units of measurement: inches, feet, centimeters, and meters. 20. Measure to determine how much longer one object is than another, expressing the length difference of the two objects using standard units of length.
Relate addition and subtraction to length.	21. Use addition and subtraction within 100 to solve word problems involving same units of length, representing the problem with drawings (such as drawings of rulers) and/or equations with a symbol for the unknown number. 22. Create a number line diagram using whole numbers and use it to represent whole-number sums and differences within 100.
Work with time and money.	23. Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m. a. Express an understanding of common terms such as, but not limited to, *quarter past, half past,* and *quarter to.*

	24. Solve problems with money. a. Identify nickels and quarters by name and value. b. Find the value of a collection of quarters, dimes, nickels, and pennies. c. Solve word problems by adding and subtracting within one dollar, using the $ and ¢ symbols appropriately (not including decimal notation). *Example: 24¢ + 26¢ = 50¢*

Geometry	
Reason with shapes and their attributes.	25. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes. a. Recognize and draw shapes having specified attributes. *Examples: a given number of angles or a given number of equal faces* 26. Partition a rectangle into rows and columns of same-size squares, and count to find the total number of squares. 27. Partition circles and rectangles into two, three, or four equal shares. Describe the shares using such terms as *halves*, *thirds*, *half of*, or *a third of*, and describe the whole as *two halves*, *three thirds*, or *four fourths*. a. Explain that equal shares of identical wholes need not have the same shape.