

# KINDERGARTEN – SECOND GRADE OVERVIEW

Students in Grades K-2 experience a time of profound change. This period of change demands a curriculum based upon developmentally appropriate principles. To meet this demand, the curriculum for Grades K-2 provides opportunities for students to explore important mathematical ideas in ways that allow them to develop confidence and competence in their ability to make sense of mathematics. The understanding of mathematical ideas is of primary importance, but acquisition of essential skills is also important. The curriculum for Grades K-2 represents high expectations for all students. Accommodations must be made for those students with special needs.

Students come to school with diverse mathematical backgrounds. Some have been provided numerous opportunities to make connections with real-world materials and experiences, while others lack this important foundation. Students in Grades K-2 are developing a sense of themselves, growing in motor coordination, and expanding their social skills. They are highly inquisitive and need opportunities to participate in authentic and relevant mathematical experiences using hands-on materials.

The learning environment of an early childhood classroom builds on K-2 students' natural interest in mathematical ideas and the connection of these ideas to everyday living experiences. Students are given opportunities to construct mathematical understanding while encountering ideas in context, manipulating concrete objects, using appropriate tools, and communicating about mathematical ideas. Real-life situations requiring higher-order thinking skills are emphasized. Participation in small and large groups provides opportunities for students to share and compare strategies for solutions.

*Principles and Standards for School Mathematics* states that “A curriculum is more than a collection of activities; it must be coherent, focused on important mathematics, and well articulated across the grades.” (NCTM, p. 14) The content of the Grades K-2 program reflects such a curriculum. Content standards are sequential, building on prior experiences and grade levels. It is not intended that the standards be taught in isolation but rather as an integrated whole. The implementation of these standards requires that students be involved in mathematics activities that encourage them to reason, communicate, and reflect; help them to make sense of their world; and prepare them for continued study. The use of this curriculum empowers students to explore ideas related to patterns, shapes, numbers, and space, thereby establishing a solid foundation for future studies.

In Grades K-2, the primary content emphasis is placed on number sense and geometry. Number sense, as included here, involves understanding the relative sizes of numbers in the base ten system of numeration and knowing how to use them in problem solving, estimation, measurement, and classification. Foundations of algebra are established through the generalization of arithmetic in which letters represent numbers or specified sets of numbers. Data analysis and probability are introduced through the collection and analysis of data. Geometry in these grades begins by having students recognize shapes according to characteristics and is extended to making and representing spatial relationships. All five content areas are interconnected in these grades in order to build a strong foundation for future success in mathematics.

## SECOND GRADE

Students in second grade are able to solve increasingly challenging problems, explore mathematical ideas in a variety of ways, and consider multiple solutions to problems. They begin to evaluate their own thinking as well as that of others in classroom discourse about mathematical ideas.

The second-grade learning environment should reflect the developmental changes of students while focusing on the need for fundamental mathematics, interactive exploration, reflection, and justification of findings. The learning environment should allow students to investigate practical applications as they work to solve real-life problems. Students gain confidence and flexibility in problem solving as they demonstrate understanding of mathematical concepts using extended project investigations.

The content in second grade focuses on fluency with numbers, place value, reasoning, and problem solving. Algorithms for addition and subtraction may be formally introduced. Additionally, concepts such as using standard units of measure, creating and extending patterns, describing plane and solid figures through geometry, and collecting data are included. Learning with understanding is enhanced by students' use of concrete objects and a variety of mathematical tools.

### Number and Operations

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Students will:

1. Demonstrate concepts of number sense by using multiple representations of whole numbers up to 1000, counting forward and backward by threes from a given number, identifying a number that is 100 more or 100 less than a given number, and differentiating between odd and even numbers.

Examples: 251, two hundred fifty-one,  $200 + 50 + 1$

- Identifying position using ordinal numbers to 100th
- Determining the value of a digit in the ones, tens, hundreds, and thousands place
- Determining the value of a number expressed in expanded notation

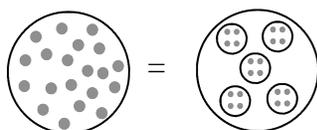
Example:  $700 + 70 + 3 = 773$

2. Apply the operations of addition and subtraction to solve problems involving two-digit numerals, using multiple strategies with and without regrouping.

Example: using concrete objects, mental calculations, or paper-and-pencil activities

- Demonstrating computational fluency for basic addition and subtraction facts with sums through 18 and differences with minuends through 18, using horizontal and vertical forms
- Interpreting multiplication as repeated addition and division as equal groupings  
Examples:  $3 \times 5 = 5 + 5 + 5 = \begin{array}{|l} \text{|||} \\ \text{|||} \\ \text{|||} \end{array} + \begin{array}{|l} \text{|||} \\ \text{|||} \\ \text{|||} \end{array} + \begin{array}{|l} \text{|||} \\ \text{|||} \\ \text{|||} \end{array}$

$$20 \div 4 = 5$$



- Solving multistep addition and subtraction problems originating from real-life experiences  
Example: There were 5 students on the bus after the first stop. Three students got on at the second stop. The bus made one more stop before arriving at school. When the bus arrived at school, 18 students got off. How many students got on at the last stop?
- Justifying the strategy used to solve addition and subtraction problems
- Using an estimate to determine if an answer is reasonable

3. Label equal parts of a whole using  $\frac{1}{2}$ ,  $\frac{1}{3}$ , and  $\frac{1}{4}$ .
4. Determine the monetary value of sets of coins and bills up to \$2.00.
- Exchanging coins of equivalent value
  - Applying monetary symbols, including dollar (\$), cent (¢), and decimal point (.)
  - Recognizing the decimal numbers .10, .25, .50, and .75 as related to money

## Algebra

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5. Create growing patterns.  
Examples: ف, فف, ففف, فففف; a b, a a b, a a a b
6. Solve problems using the associative property of addition.
7. Describe change over time in observable (qualitative) and measurable (quantitative) terms.  
Examples: recognizing that a plant grew taller (qualitative, requiring observation); recognizing that a plant grew three inches (quantitative, requiring measurement)

8. Describe attributes of two-dimensional (plane) and three-dimensional (solid) figures using the terms *side*, *surface*, *edge*, *vertex*, and *angle*.

- Identifying quadrilaterals, pentagons, hexagons, or octagons
- Identifying line symmetry in plane geometric figures
- Creating designs that exhibit line symmetry
- Recognizing the results of changing the position (transformation) of objects or shapes by sliding (translation), turning (rotation), or flipping (reflection)

Examples:

sliding (vertically)

b  
↓  
b

turning

b ↻  
q

flipping (horizontally)

b → d

9. Describe the route from one location to another by applying concepts of direction and distance.

Examples: direction—left, right, north, south, east, west;

distance (nonstandard)—twenty-five steps from the library;

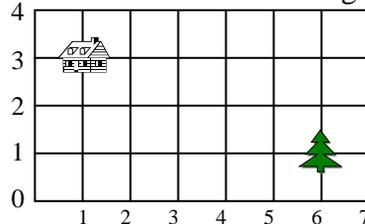
distance (standard)—ten feet from the walkway

- Following multistep directions to locate objects
- Reading maps of the school environment

Example: using a school map to tell how to get from the classroom to the office

- Using grids for movement between points

Example: moving from the house (🏠) to the tree (🌲) by moving two down and five over on the grid



## Measurement

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10. Measure length in customary units, including inches, feet, and yards.
  - Using metric units
  - Using appropriate tools, including rulers, yard sticks, meter sticks, or tape measures
11. Estimate weight and capacity by making comparisons with familiar objects.  
Examples: a desk weighing more than a pencil, a cup holding less than a bucket
12. Tell time to the minute using analog and digital clocks.

## Data Analysis and Probability

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13. Create displays, including appropriate labels, for a given set of data using pictographs, tally charts, bar graphs, or single- or double-loop Venn diagrams.
  - Interpreting graphic displays
14. Determine if one event related to everyday life is more likely or less likely to occur than another event.  
Example: determining if it is more likely to rain or snow on July 4th in Alabama