

Second Grade Mathematics

By the end of grade two, students understand place value and number relationships in addition and subtraction and they model simple concepts of multiplication and division. They measure quantities with appropriate units. They classify shapes and see relationships among them by paying attention to their geometric attributes. They collect and analyze data and verify the answers.

Standard I: Students will acquire number sense with whole numbers and fractions and perform operations with whole numbers.

Objective 1: Identify and represent the relationships among numbers, quantities, and place value in whole numbers up to 1000.

- a. Represent whole numbers in groups of hundreds, tens, and ones using base ten models and write the numeral representing the set in standard and expanded form.
- b. Identify the place and the value of a given digit in a three-digit numeral.
- c. Represent the composition and decomposition of numbers in a variety of ways.
- d. Compare and order numbers using the terms, greater than, less than, or equal to, and the symbols, $>$, $<$, and $=$, using various strategies, including the number line.
- e. Identify and describe even and odd whole numbers.

Objective 2: Use unit fractions to identify parts of the whole and parts of a set.

- a. Divide geometric shapes into two, three, or four equal parts and identify the parts as halves, thirds, or fourths.
- b. Divide sets of objects into two, three, or four parts of equal number of objects and identify the parts as halves, thirds, or fourths.
- c. Represent the unit fractions $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$ with objects, pictures, words (e.g., ___ out of ___ equal parts), and symbols.

Objective 3: Estimate, model, illustrate, describe, and solve problems involving two- and three-digit addition and subtraction.

- a. Demonstrate quick recall of addition facts (up to $10 + 10$) and related subtraction facts.
- b. Model addition and subtraction of two- and three-digit whole numbers (sums and minuends to 1000) in a variety of ways.
- c. Write a story problem that relates to a given addition or subtraction equation, and write a number sentence to solve a story problem that is related to the environment.
- d. Demonstrate fluency with two- and three-digit addition and subtraction problems, using efficient, accurate, and generalizable strategies that include standard algorithms and mental arithmetic, and describe why the procedures work.
- e. Use the mathematical relationship between addition and subtraction and properties of addition to model and solve problems.

Objective 4: Model, illustrate, and pictorially record solutions to simple multiplication and division problems.

- a. Represent multiplication with equal groups using concrete objects and skip counting by twos, fives, and tens.
- b. Represent division as fair shares using concrete objects or pictures.

Mathematical Language and Symbols Students Should Use

number line, add, sum, subtract, difference, greater than, less than, equal to, $>$, $<$, $=$, even, odd, halves, thirds, fourths, $1/2$, $1/3$, $1/4$.

Exploratory Concepts and Skills

- ✓ Investigate addition of common fractions (e.g., $1/2 + 1/2 = 1$, $1/4 + 1/4 = 1/2$).
- ✓ Investigate comparing fractions in terms of greater than, less than, and equal to.
- ✓ Understand situations that entail multiplication and division, such as equal groupings of objects and sharing equally.

Standard II: Students will model, represent, and interpret patterns and number relationships to create and solve problems with addition and subtraction.

Objective 1: Recognize, describe, create, and extend growing patterns.

- a. Determine the next term in linear patterns (e.g., 2, 4, 6...; the number of hands on one person, two people, three people).
- b. Construct models and skip count by twos, threes, fives, and tens and relate to repeated addition.

Objective 2: Model, represent, and interpret number relationships using mathematical symbols.

- a. Recognize that “ \neq ” indicates a relationship in which the two sides of the inequality are expressions of different numbers.
- b. Recognize that symbols such as x , \triangle , or \diamond in an addition or subtraction equation represent a number that will make the statement true.
- c. Use the commutative and associative properties of addition to simplify calculations.

Mathematical Language and Symbols Students Should Use

patterns, +, -, =, \neq

Exploratory Concepts and Skills

- ✓ Investigate situations with variables as unknowns and as quantities that vary.

Standard III: Students will understand simple geometry and measurement concepts as well as collect, represent, and draw conclusions from data.

Objective 1: Describe, classify, and create geometric figures.

- Describe and classify plane and solid geometric figures (i.e., circle, triangle, rectangle, square, trapezoid, rhombus, parallelogram, pentagon, hexagon, cube, sphere, cone) according to the number of sides and angles or faces, edges, and vertices.
- Compose and decompose shapes and figures by substituting arrangements of smaller shapes for larger shapes or substituting larger shapes for arrangements of smaller shapes.
- Compose and decompose shapes and figures and describe the part-whole relationships, similarities, and differences.

Objective 2: Identify and use units of measure, iterate (repeat) that unit, and compare the number of iterations to the item being measured.

- Identify and use measurement units to measure, to the nearest unit, length (i.e., inch, centimeter), weight in pounds, and capacity in cups.
- Estimate and measure length by iterating a nonstandard or standard unit of measure.
- Use different units to measure the length of the same object and recognize that the smaller the unit, the more iterations needed to cover a given length.
- Determine the value of a set of up to five coins that total \$1.00 or less (e.g., three dimes, one nickel, and one penny equals 36¢).
- Tell time to the quarter-hour and sequence a series of daily events by time (e.g., breakfast at 7:00 a.m., school begins at 9:00 a.m., school ends at 3:00 p.m.).

Objective 3: Collect, record, organize, display, and interpret numerical data.

- Collect and record data systematically, using a strategy for keeping track of what has been counted.
- Organize and represent the same data in more than one way.
- Organize, display, and label information, including keys, using pictographs, tallies, bar graphs, and organized tables.
- Describe data represented on charts and graphs and answer simple questions related to data representations.

Mathematical Language and Symbols Students Should Use

inch, centimeter, pound, cup, circle, triangle, rectangle, square, trapezoid, rhombus, parallelogram, pentagon, hexagon, cube, sphere, cone, vertices, angle, face, edge, weight, length, capacity

Exploratory Concepts and Skills

- ✓ Use verbal instructions to move within the environment.
- ✓ Determine simple equivalencies of measurements.
- ✓ Conduct simple probability experiments.