

## Grade Four

The fourth-grade standards place emphasis on multiplication and division with whole numbers and solving problems involving addition and subtraction of fractions and decimals. Students will continue to learn and use the basic multiplication facts as they become proficient in multiplying larger numbers. Students also will refine their estimation skills for computations and measurements and investigate relationships between and among simple two-dimensional (plane) figures and three-dimensional (solid) figures. Students will identify and draw representations of points, lines, line segments, and rays. Students will graph points in the first quadrant in the coordinate plane and extend and duplicate patterns. Concrete materials and two-dimensional representations will be used to solve problems involving perimeter, patterns, probability, and equivalence of fractions and decimals. Students will recognize a geometric transformation, such as reflection (flip), translation (slide), and rotation (turn).

While learning mathematics, students will be actively engaged, using concrete materials and appropriate technologies such as calculators and computers. However, facility in the use of technology shall not be regarded as a substitute for a student's understanding of quantitative concepts and relationships or for proficiency in basic computations.

Mathematics has its own language, and the acquisition of specialized vocabulary and language patterns is crucial to a student's understanding and appreciation of the subject. Students should be encouraged to use correctly the concepts, skills, symbols, and vocabulary identified in the following set of standards.

Problem solving has been integrated throughout the six content strands. The development of problem-solving skills should be a major goal of the mathematics program at every grade level. Instruction in the process of problem solving will need to be integrated early and continuously into each student's mathematics education. Students must be helped to develop a wide range of skills and strategies for solving a variety of problem types.

### Number and Number Sense

- 4.1 The student will
- identify (orally and in writing) the place value for each digit in a whole number expressed through millions;
  - compare two whole numbers expressed through millions, using symbols ( $>$ ,  $<$ , or  $=$ ); and
  - round whole numbers expressed through millions to the nearest thousand, ten thousand, and hundred thousand.
- 4.2 The student will
- identify, model, and compare rational numbers (fractions and mixed numbers), using concrete objects and pictures;
  - represent equivalent fractions; and
  - relate fractions to decimals, using concrete objects.

- 4.3 The student will compare the numerical value of fractions (with like and unlike denominators) having denominators of 12 or less, using concrete materials.
- 4.4 The student will
- read, write, represent, and identify decimals expressed through thousandths;
  - round to the nearest whole number, tenth, and hundredth; and
  - compare the value of two decimals, using symbols ( $<$ ,  $>$ , or  $=$ ), concrete materials, drawings, and calculators.

### **Computation and Estimation**

- 4.5 The student will estimate whole-number sums and differences and describe the method of estimation. Students will refine estimates, using terms such as *closer to*, *between*, and *a little more than*.
- 4.6 The student will add and subtract whole numbers written in vertical and horizontal form, choosing appropriately between paper and pencil methods and calculators.
- 4.7 The student will find the product of two whole numbers when one factor has two digits or fewer and the other factor has three digits or fewer, using estimation and paper and pencil. For larger products (a two-digit numeral times a three-digit numeral), estimation and calculators will be used.
- 4.8 The student will estimate and find the quotient of two whole numbers, given a one-digit divisor.
- 4.9 The student will
- add and subtract with fractions having like and unlike denominators of 12 or less, using concrete materials, pictorial representations, and paper and pencil;
  - add and subtract with decimals through thousandths, using concrete materials, pictorial representations, and paper and pencil; and
  - solve problems involving addition and subtraction with fractions having like and unlike denominators of 12 or less and with decimals expressed through thousandths, using various computational methods, including calculators, paper and pencil, mental computation, and estimation.

## Measurement

- 4.10 The student will
- estimate and measure weight/mass, using actual measuring devices, and describe the results in U.S. Customary/metric units as appropriate, including ounces, pounds, grams, and kilograms;
  - identify equivalent measurements between units within the U.S. Customary system (ounces and pounds) and between units within the metric system (grams and kilograms); and
  - estimate the conversion of ounces and grams and pounds and kilograms, using approximate comparisons (1 ounce is about 28 grams, or 1 gram is about the weight of a paper clip; 1 kilogram is a little more than 2 pounds). \*

*\* The intent of this standard is for students to make ballpark comparisons and not to memorize conversion factors between U.S. Customary and metric units.*

- 4.11 The student will
- estimate and measure length, using actual measuring devices, and describe the results in both metric and U.S. Customary units, including part of an inch ( $\frac{1}{2}$ ,  $\frac{1}{4}$ , and  $\frac{1}{8}$ ), inches, feet, yards, millimeters, centimeters, and meters;
  - identify equivalent measurements between units within the U.S. Customary system (inches and feet; feet and yards; inches and yards) and between units within the metric system (millimeters and centimeters; centimeters and meters; and millimeters and meters); and
  - estimate the conversion of inches and centimeters, yards and meters, and miles and kilometers, using approximate comparisons (1 inch is about 2.5 centimeters, 1 meter is a little longer than 1 yard, 1 mile is slightly farther than 1.5 kilometers, or 1 kilometer is slightly farther than half a mile). \*

*\* The intent of this standard is for students to make ballpark comparisons and not to memorize conversion factors between U.S. Customary and metric units.*

- 4.12 The student will
- estimate and measure liquid volume, using actual measuring devices and using metric and U.S. Customary units, including cups, pints, quarts, gallons, milliliters, and liters;
  - identify equivalent measurements between units within the U.S. Customary system (cups, pints, quarts, and gallons) and between units within the metric system (milliliters and liters); and
  - estimate the conversion of quarts and liters, using approximate comparisons (1 quart is a little less than 1 liter, 1 liter is a little more than 1 quart).\*

*\* The intent of this standard is for students to make ballpark comparisons and not to memorize conversion factors between U. S. Customary and metric units.*

- 4.13 The student will
- identify and describe situations representing the use of perimeter and area; and
  - use measuring devices to find perimeter in both standard and nonstandard units of measure.

### **Geometry**

- 4.14 The student will investigate and describe the relationships between and among points, lines, line segments, and rays.
- 4.15 The student will
- identify and draw representations of points, lines, line segments, rays, and angles, using a straightedge or ruler; and
  - describe the path of shortest distance between two points on a flat surface.
- 4.16 The student will identify and draw representations of lines that illustrate intersection, parallelism, and perpendicularity.
- 4.17 The student will
- analyze and compare the properties of two-dimensional (plane) geometric figures (circle, square, rectangle, triangle, parallelogram, and rhombus) and three-dimensional (solid) geometric figures (sphere, cube, and rectangular solid [prism]);
  - identify congruent and noncongruent shapes; and
  - investigate congruence of plane figures after geometric transformations such as reflection (flip), translation (slide) and rotation (turn), using mirrors, paper folding, and tracing.
- 4.18 The student will identify the ordered pair for a point and locate the point for an ordered pair in the first quadrant of a coordinate plane.

### **Probability and Statistics**

- 4.19 The student will
- predict the likelihood of outcomes of a simple event, using the terms *certain*, *likely*, *unlikely*, *impossible*; and
  - determine the probability of a given simple event, using concrete materials.
- 4.20 The student will collect, organize, and display data in line and bar graphs with scale increments of one or greater than one and use the display to interpret the results, draw conclusions, and make predictions.

**Patterns, Functions, and Algebra**

- 4.21 The student will recognize, create, and extend numerical and geometric patterns, using concrete materials, number lines, symbols, tables, and words.
- 4.22 The student will recognize and demonstrate the meaning of equality, using symbols representing numbers, operations, and relations [e.g.,  $3 + 5 = 5 + 3$  and  $15 + (35 + 16) = (15 + 35) + 16$ ].