Grade Four Mathematics

The fourth-grade standards place emphasis on 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 the relationships between and among points, lines, segments, and rays. Concrete materials will be used to solve problems involving perimeter, patterns, and probability. 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. Students also will identify real-life applications of the mathematical principles they are learning that can be applied to science and other disciplines they are studying.

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 and represent equivalent fractions and relate fractions to decimals, using concrete objects.

4.3 The student will compare the numerical value of fractions having denominators of 12 or less.

4.4 The student will read, write, represent, and identify decimals expressed through thousandths, and round to the nearest tenth and hundredth, using concrete materials, drawings, calculators, and symbols.

Computation and Estimation

4.5 The student will create and solve problems involving addition and subtraction of money amounts using various computational methods, including calculators, paper and pencil, mental computation, and estimation.

4.6 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.

4.7 The student will add and subtract whole numbers written in vertical and horizontal form, choosing appropriately between paper and pencil methods and calculators.

4.8 The student will find the product of two whole numbers when one factor has two digits or less and the other factor has three digits or less, using estimation and paper and pencil. For larger products (a two-digit numeral times a three-digit numeral), estimation and calculators will be used.

4.9 The student will estimate and find the quotient of two whole numbers given a one-digit divisor.

4.10 The student will
- add and subtract with fractions having like and unlike denominators of 12 or less and with decimals through thousandths, using concrete materials and paper and pencil; and
- solve problems involving addition and subtraction with fractions having like and unlike denominators of 12 or less and decimals expressed through thousandths.

Measurement

4.11 The student will

- estimate and measure weight/mass using actual measuring devices and express the results in both metric and U.S. Customary units, including ounces, pounds, 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. and metric units.*

4.12 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 (1/2, 1/4, and 1/8), inches, feet, yards, millimeters, centimeters, 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. and metric units.*

4.13 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; 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. and metric units.*

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

Geometry

4.15 The student will investigate and describe the relationships between and among points, lines, line segments, and rays.

4.16 The student will identify and draw representations of points, lines, line segments, rays, and angles, using a straightedge or ruler.

4.17 The student will identify lines which illustrate intersection, parallelism, and perpendicularity.

Probability and Statistics

4.18 The student will determine the probability of a given simple event, using concrete materials.

4.19 The student will collect, organize, and display data in line and bar graphs with scale increments of one or greater than one.

Patterns, Functions, and Algebra

4.20 The student will identify and locate missing whole numbers on a given number line.

4.21 The student will extend a given pattern, using concrete materials and tables.

4.22 The student will solve problems involving pattern identification and completion of patterns.