

Grade Six

The sixth-grade standards place continued emphasis on the study of whole numbers, decimals, and rational numbers (fractions). Students will use ratios to compare data sets; make conversions within a given measurement system; classify three-dimensional figures; collect, analyze, display, and interpret data, using a variety of graphical and statistical methods; begin using integers and percents; find the probability of an event; and investigate numerical and geometric patterns. Students will be introduced to algebraic terms and solving algebraic equations in one variable.

While learning mathematics, students will be actively engaged, using concrete materials and appropriate technologies such as fraction calculators, computers, spreadsheets, laser discs, and videos. 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 will also identify real-life applications of the mathematical principles they are learning and apply these 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

- 6.1 The student will identify representations of a given percent and describe orally and in writing the equivalence relationships among fractions, decimals, and percents.
- 6.2 The student will describe and compare two sets of data, using ratios, and will use appropriate notations, such as a/b , a to b , and $a:b$.
- 6.3 The student will
 - a) find common multiples and factors, including least common multiple and greatest common factor;
 - b) identify and describe prime and composite numbers; and identify and describe the characteristics of even and odd integers.
- 6.4 The student will compare and order whole numbers, fractions, and decimals, using concrete materials, drawings or pictures, and mathematical symbols.

6.5 The student will identify, represent, order, and compare integers.

Computation and Estimation

- 6.6 The student will
- a) solve problems that involve addition, subtraction, multiplication, and/or division with fractions and mixed numbers, with and without regrouping, that include like and unlike denominators of 12 or less, and express their answers in simplest form; and
 - b) find the quotient, given a dividend expressed as a decimal through thousandths and a divisor expressed as a decimal to thousandths with exactly one non-zero digit.
- 6.7 The student will use estimation strategies to solve multistep practical problems involving whole numbers, decimals, and fractions (rational numbers).
- 6.8 The student will solve multistep consumer-application problems involving fractions and decimals and present data and conclusions in paragraphs, tables, or graphs. Planning a budget will be included.

Measurement

- 6.9 The student will compare and convert units of measure for length, area, weight/mass, and volume within the U.S. Customary system and the metric system and estimate conversions between units in each system:
- a) length — part of an inch ($\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$), inches, feet, yards, miles, millimeters, centimeters, meters, and kilometers;
 - b) weight/mass — ounces, pounds, tons, grams, and kilograms;
 - c) liquid volume — cups, pints, quarts, gallons, milliliters, and liters; and
 - d) area — square units. *
- * 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.*
- 6.10 The student will estimate and then determine length, weight/mass, area, and liquid volume/capacity, using standard and nonstandard units of measure.
- 6.11 The student will determine if a problem situation involving polygons of four or fewer sides represents the application of perimeter or area and apply the appropriate formula.
- 6.12 The student will
- a) solve problems involving the circumference and/or area of a circle when given the diameter or radius; and
 - b) derive approximations for pi (π) from measurements for circumference and diameter, using concrete materials or computer models.

- 6.13 The student will
- a) estimate angle measures, using 45° , 90° , and 180° as referents, and use the appropriate tools to measure the given angles; and
 - b) measure and draw right, acute, and obtuse angles and triangles.

Geometry

- 6.14 The student will identify, classify, and describe the characteristics of plane figures, describing their similarities, differences, and defining properties.
- 6.15 The student will determine congruence of segments, angles, and polygons by direct comparison, given their attributes. Examples of noncongruent and congruent figures will be included.
- 6.16 The student will construct the perpendicular bisector of a line segment and an angle bisector.
- 6.17 The student will sketch, construct models of, and classify solid figures (rectangular prism, cone, cylinder, and pyramid).

Probability and Statistics

- 6.18 The student, given a problem situation, will collect, analyze, display, and interpret data in a variety of graphical methods, including
- a) line, bar, and circle graphs;
 - b) stem-and-leaf plots; and
 - c) box-and-whisker plots.
- Circle graphs will be limited to halves, fourths, and eighths.
- 6.19 The student will describe the mean, median, and mode as measures of central tendency, describe the range, and determine their meaning for a set of data.
- 6.20 The student will
- a) make a sample space for selected experiments and represent it in the form of a list, chart, picture, or tree diagram; and
 - b) determine and interpret the probability of an event occurring from a given sample space and represent the probability as a ratio, decimal or percent, as appropriate for the given situation.

Patterns, Functions, and Algebra

- 6.21 The student will investigate, describe, and extend numerical and geometric patterns, including triangular numbers, patterns formed by powers of 10, and arithmetic sequences.

- 6.22 The student will investigate and describe concepts of positive exponents, perfect squares, square roots, and, for numbers greater than 10, scientific notation. Calculators will be used to develop exponential patterns.
- 6.23 The student will
- a) model and solve algebraic equations, using concrete materials;
 - b) solve one-step linear equations in one variable, involving whole number coefficients and positive rational solutions; and
 - c) use the following algebraic terms appropriately: *variable*, *coefficient*, *term*, and *equation*.