Grade Seven

The seventh-grade standards place emphasis on solving problems involving consumer-applications, using proportional reasoning, and gaining proficiency in computations with integers. The students will gain an understanding of the properties of real numbers, solve one-step linear equations and inequalities, and use data analysis techniques to make inferences, conjectures, and predictions. Two- and three-dimensional representations, graphing transformations in the coordinate plane, and probability will be extended.

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

7.1 The student will compare, order, and determine equivalent relationships between fractions, decimals, and percents, including use of scientific notation for numbers greater than 10.

7.2 The student will simplify expressions that contain rational numbers (whole numbers, fractions, and decimals) and positive exponents, using order of operations, mental mathematics, and appropriate tools.

7.3 The student will identify and apply the following properties of operations with real numbers:

a) the commutative and associative properties for addition and multiplication;
b) the distributive property;
c) the additive and multiplicative identity properties;
d) the additive and multiplicative inverse properties; and
e) the multiplicative property of zero.

Computation and Estimation

7.4 The student will
a) solve practical problems using rational numbers (whole numbers, fractions, decimals) and percents; and
b) solve consumer-application problems involving tips, discounts, sales tax, and simple interest.

7.5 The student will formulate rules for and solve practical problems involving basic operations (addition, subtraction, multiplication, and division) with integers.

7.6 The student will use proportions to solve practical problems, which may include scale drawings, that contain rational numbers (whole numbers, fractions, and decimals) and percents.

Measurement

7.7 The student, given appropriate dimensions, will
a) estimate and find the area of polygons by subdividing them into rectangles and right triangles; and
b) apply perimeter and area formulas in practical situations.

7.8 The student will investigate and solve problems involving the volume and surface area of rectangular prisms and cylinders, using concrete materials and practical situations to develop formulas.

Geometry

7.9 The student will compare and contrast the following quadrilaterals: parallelogram, rectangle, square, rhombus, and trapezoid. Deductive reasoning and inference will be used to classify quadrilaterals.

7.10 The student will identify and draw the following polygons: pentagon, hexagon, heptagon, octagon, nonagon, and decagon.

7.11 The student will determine if geometric figures — quadrilaterals and triangles — are similar and write proportions to express the relationships between corresponding parts of similar figures.

7.12 The student will identify and graph ordered pairs in the four quadrants of a coordinate plane.

7.13 The student, given a polygon in the coordinate plane, will represent transformations — rotation and translation — by graphing the coordinates of the vertices of the transformed polygon and sketching the resulting figure.

Probability and Statistics

7.14 The student will investigate and describe the difference between the probability of an event found through simulation versus the theoretical probability of that same event.

7.15 The student will identify and describe the number of possible arrangements of several objects, using a tree diagram or the Fundamental (Basic) Counting Principle.

7.16 The student will create and solve problems involving the measures of central tendency (mean, median, mode) and the range of a set of data.

7.17 The student, given a problem situation, will collect, analyze, display, and interpret data, using a variety of graphical methods, including
a) frequency distributions;
b) line plots;
c) histograms;
d) stem-and-leaf plots;
e) box-and-whisker plots; and
f) scattergrams.

7.18 The student will make inferences, conjectures**,** and predictions based on analysis of a set of data.

Patterns, Functions, and Algebra

7.19 The student will represent, analyze, and generalize a variety of patterns, including arithmetic sequences and geometric sequences, with tables, graphs, rules, and words in order to investigate and describe functional relationships.

7.20 The student will write verbal expressions as algebraic expressions and sentences as equations.

7.21 The student will use the following algebraic terms appropriately: *equation, inequality,* and *expression.*

7.22 The student will
a) solve one-step linear equations and inequalities in one variable with strategies involving inverse operations and integers, using concrete materials, pictorial representations, and paper and pencil; and
b) solve practical problems requiring the solution of a one-step linear equation.