Grade Seven Mathematics

The seventh-grade standards place emphasis on solving problems involving consumer applications and proportional reasoning. The students will gain an understanding of the properties of real numbers, solve linear equations and inequalities, and use data analysis techniques to make inferences and predictions. While learning mathematics, students will be actively engaged, using concrete materials and appropriate technologies such as fraction calculators, computers, 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 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

7.1 The student will compare, order, and determine equivalent relationships between fractions, decimals, and percents, including scientific notation.

7.2 The student will find common multiples and factors, including least common multiple and greatest common factor.

7.3 The student will simplify expressions by using order of operations, mental mathematics, and appropriate tools. Exponents will be included.

7.4 The student will explain orally and in writing the following properties of operations with real numbers:
- the commutative and associative properties for addition and multiplication;
- the distributive property;
- the additive and multiplicative identity properties;
- the additive and multiplicative inverse properties; and
- the multiplicative property of zero.

Computation and Estimation

7.5 The student will solve consumer application problems involving tips, discounts, sales tax, and simple interest, using whole numbers, fractions, decimals, and percents.

7.6 The student will
- solve practical problems involving basic operations with integers by formulating rules for operating with integers and using a number line to compute; and
- explain the need for integers, using examples from real-life situations.

7.7 The student will use proportions to solve practical problems, including scale drawings that contain whole numbers, fractions, decimals, and percents.

Measurement

7.8 The student, given appropriate dimensions, will estimate and find the area of polygons by subdividing them into rectangles and right triangles.

7.9 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

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

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

7.12 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.

7.13 The student will construct a three-dimensional model using cubes, given the top, side, and/or bottom views,

and determine the volume and surface area of the model.

7.14 The student will inscribe equilateral triangles, squares, and hexagons in circles, using a compass and straightedge.

Probability and Statistics

7.15 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.

7.16 The student will make a sample space for selected experiments and represent it in the form of a list, chart, picture, or tree diagram.

7.17 The student will determine the probability of a given simple event and express that probability as a ratio, decimal, or a percent as appropriate for the given situation.

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

7.19 The student will create and solve problems involving the mean, median, mode, and range of a set of data.

7.20 The student will display data, using frequency distributions, line plots, stem-and-leaf plots, box-and-whisker plots, and scattergrams.

7.21 The student will make inferences and predictions based on the analysis of a set of data that the student(s) collect.

Patterns, Functions, and Algebra

7.22 The student will investigate and describe functional relationships, including the number of sides of a regular polygon and the sum of the measures of the interior angles.

7.23 The student will write verbal expressions/sentences as algebraic expressions/equations.

7.24 The student will use the following algebraic terms appropriately in written and/or oral expression: equation, inequality, variable, expression, term, coefficient, domain, and range.

7.25 The student will
- solve two-step linear equations and inequalities in one variable, using strategies involving inverse operations and integers; and
- solve practical problems requiring the solution of a two-step linear equation.

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