MATH CURRICULUM

EIGHTH GRADE

Goal

Students in the eighth grade mathematics program will gain proficiency in computation with rational numbers (positive and negative fractions, positive and negative decimals, whole numbers, and integers) and use proportions to solve a variety of problems. The students will use techniques for solving linear equations, inequalities, and systems of equations. They will understand and apply variables, expressions, equations, and inequalities. Students in the eighth grade will evaluate and graph various functions and represent them using tables, graphs, and rules. In addition, students will apply proportional reasoning to solve problems involving scale drawings and similar figures, and will connect geometric situations to algebraic and numerical situations.

While learning mathematics, students should be actively engaged and using appropriate technologies, such as calculators, computers, spreadsheets, laser discs, and videos to enhance their understanding of qualitative concepts and for proficiency in basic computations. Students should correctly use the concepts, skills, symbols, and vocabulary associated with mathematics.

Number Sense and Operations

1. **The student will compute with rational numbers expressed in a variety of forms.**
   a. Represent, compare, and order numbers in a variety of equivalent forms (e.g. integers, fractions, terminating and non-terminating decimals, percents, radicals, and numbers written in scientific notation.
   b. Simplify numerical and algebraic expressions using order of operations and properties of operations.
   c. Identify and describe the relationship between the subsets of the real number system.
   d. Identify and describe rational and irrational numbers.
   e. Evaluate powers, squares, square roots, and simplify non-perfect squares.
   f. Determine the absolute value of a number.
   g. Solve radical expressions.

2. **The student will solve problems using exponents and scientific notation.**
   a. Use scientific notation to express large numbers and small numbers in scientific and standard notation.
   b. Use rules of exponents.

Patterns, Relations, and Algebra

1. **The student will solve equations and inequalities.**
   a. Solve one- and two-step linear equations.
   b. Graph a linear equation using ordered pairs.
   c. Investigate the information provided in a table, or graph, to determine if a function is linear.
   d. Predict the effects on the graph of a linear equation when the slope is changed.
   e. Solve two-step equations and inequalities in one variable.
   f. Graph the solution to linear inequalities.
   g. Describe and represent relations and functions using tables, graphs, and rules.
   h. Create and solve problems using proportions, formulas, and functions.

Geometry

1. **The student will solve graphing problems.**
   a. Graph a solution set on a line.
   b. Graph one- and two-variable functions.
   c. Graph one- and two-variable inequalities.
   d. Identify and plot the slope of a line.

Measurement

1. **The student will solve problems involving two- and three-dimensional measurement situations.**
   a. Find the surface area and volume of three-dimensional shapes and models.
   b. Determine the effect on the volume of solid figures when one or more dimension is changed.

2. **The student will use the Pythagorean theorem to solve problems.**
   a. Use the Pythagorean theorem, and its converse, to find the length of the missing side of a right triangle and the lengths of the other line segments.
   b. Verify the Pythagorean theorem by direct measurement.

3. **The student will solve measurement problems using proportional relationships and properties of similar geometric figures.**
   a. Calculate distance and area from scale drawings.
   b. Use measures expressed as rates (e.g. speed and density) to solve problems.

Data Analysis, Statistics, and Probability

1. **The student will collect, analyze, display, and interpret data in a variety of methods.**
   a. Select and apply appropriate formats in the presentation of data (e.g. line plots, bar graphs, stem and leaf plots, scatter plots, histograms, and circle graphs). Explain how different displays of data can lead to different interpretations.
   b. Analyze data by the mean, median, mode, and range.

2. **The student will explore probability and chance.**
   a. Use a ratio to explain the likelihood of uncertain events happening.
   b. Find all possible combinations and permutations involving a limited number of variables.