Bethlehem Lutheran School
Math Grade 8 (Algebra)

In recognizing the need for understanding and mastering mathematical computations and concepts, the philosophy of the mathematics program is to involve each student in a learning program that blends mathematical skills with practical applications to their daily Christian lives.

State Standard 1

Students develop number sense and use of numbers and number relationships in problem-solving situation and communicate the reasoning used in solving these problems.

Classroom objectives

The student will:

1.1 Demonstrate meanings for integers, rational numbers, percents, exponents, square roots, and pi (π); use physical materials and technology in problem-solving situations.
1.2 Read, write, and order integers, rational numbers, and common irrational numbers such as $\sqrt{2}$, $\sqrt{5}$, and π.
1.3 Apply number-theory concepts (for example, primes, factors, and multiples) to represent numbers in various ways.
1.4 Use the relationships among fractions, decimals, and percents, including the concepts of ratio and proportion, in problem-solving situations.
1.5 Develop, test, and explain conjectures about properties of integers and rational numbers.
1.6 Use number sense to estimate and justify the reasonableness of solutions to problems involving integers, rational numbers, and common irrational numbers such as $\sqrt{2}$, $\sqrt{5}$, and π.
1.7 Demonstrate meanings for real numbers, absolute value, and scientific notation using physical materials and technology in problem-solving situations.
1.8 Calculate elapsed time.

State Standard 2

Students use algebraic methods to explore, model, and describe patterns and functions involving numbers, shapes, data, and graphs in problem-solving situations and communicate the reasoning used in solving these problems.

Classroom objectives

The student will:

2.1 Represent, describe, and analyze patterns and relationships using tables, graphs, verbal rules, and standard algebraic notation.
2.2 Describe patterns using variables, expressions, equations, and inequalities in problem-solving situations.
2.3 Analyze functional relationships to explain how a change in one quantity results in a change in another (for example, how the area of a circle changes as the radius increases, or how a person's height changes over time).
2.4 Distinguish between linear and nonlinear functions through informal investigations.
2.5 Solve simple linear equations in problem-solving situations using a variety of methods (informal, formal, and graphical) and a variety of tools (physical materials and calculators).
2.6 Model real-world phenomena (for example, distance versus-time relationships, compound interest, amortization tables, and mortality rates) using functions, equations, inequalities, and matrices.

State Standard 3

Students use data collection and analysis, statistics, and probability in problem-solving situations and communicate the reasoning used in solving these problems.

Classroom objectives

The student will:

3.1 Read and construct displays of data using appropriate techniques (for example: line graphs, circle graphs, scatter plots, box plots, and stem-and-leaf plots) and appropriate technology.
3.2 Display and use measures of central tendency, such as mean, median, and mode, and measures of variability, such as range and quartiles.

3.3 Evaluate arguments that are based on statistical claims.
3.4 Formulate hypotheses, draw conclusions, and make convincing arguments based on data analysis (science curriculum).
3.5 Determine probabilities through experiments or simulations.
3.6 Make predictions and compare results using both experimental and theoretical probability drawn from real-world problems.
3.7 Use counting strategies to determine all the possible outcomes from an experiment (for example, the number of ways students can line up to have their picture taken).

State Standard 4

Students use geometric concepts, properties, and relationships in problem-solving situations and communicate the reasoning used in solving these problems.

Classroom objectives

The student will:

4.1 Construct two-and three-dimensional models using a variety of materials and tools.
4.2 Describe, analyze, and reason informally about the properties (for example, parallelism, perpendicularity, and congruence) of two- and three-dimensional figures.
4.3 Apply the concepts of ratio, proportion, and similarity in problem-solving situations.
4.4 Solve problems using coordinate geometry.
4.5 Solve problems involving perimeter and area in two dimensions and involving surface area and volume in three dimensions.
4.6 Use methods to measure perimeter, area, and volume of regular geometric figures.

State Standard 5

Students use a variety of tools and techniques to measure, apply the results in problem-solving situations, and communicate the reasoning used in solving these problems.

Classroom objectives

The students will

5.1 Estimate, use, and describe measures of distance, perimeter, area, volume, capacity, weight, mass, and angle comparison.
5.2 Develop and use formulas and procedures to solve problems involving measurement.

Standard 6

Students link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil, calculators, and computers in problem solving situations and communicate the reasoning used in solving these problems.

Classroom objectives

The student will:

6.1 Use models to explain how ratios, proportions, and percents can be used to solve real-world problems.
6.2 Construct, use, and explain procedures to compute and estimate with whole numbers, fractions, decimals, and integers.
6.3 Develop, apply, and explain a variety of different estimation strategies in problem-solving situations and explain why an estimate may be acceptable in place of an exact answer.
6.4 Select and use appropriate algorithms for computing with commonly used fractions and decimals, percents, and integers in problem-solving and determine whether the results are reasonable.
6.5 Use ratios, proportions, and percents in problem-solving situations.