Mathematics
Eighth Grade

Program Goal

The learner will develop and integrate mathematical strategies necessary to become a logical thinker, problem solver, competent communicator, responsible, successful, life-long learner and productive citizen in an ever changing world. The learner will apply math concepts to real-world situations including those related to human dignity and Catholic Social Teaching.

Grade Level Goal

The learner will apply and integrate mental math, problem solving, mathematical communication, and technology as it relates to functions, measurement, data analysis, numeration, and operation. Students who meet the criteria may take Algebra.

Content Criteria

Functions

- The learner will identify, use, and describe various patterns and recognize appropriate functions.
- The learner will apply relationships among variables and analyze patterns of change.

Measurement

- The learner will apply various formulas to solve problems involving geometric figures.
- The learner will demonstrate the ability to graph inequalities and linear equations.

- The learner will demonstrate the ability to apply metric conversion.
- The learner will apply and interpret the concepts of congruence and basic transformations.

Data Analysis

- The learner will construct and interpret data from graphs and tables.
- The learner will calculate basic statistics, probabilities, and frequencies.

Numeration

- The learner will identify and apply real numbers.
- The learner will identify the properties of equalities and inequalities.

Operations

- The learner will apply arithmetic operations accurately.
- The learner will demonstrate the ability to simplify using the order of operations.
- The learner will solve problems involving proportions, percentages, and algebraic equations.

Applications

- The learner will demonstrate an understanding of concepts using appropriate tools and technology.
- The learner will determine when to use appropriate mental math strategies.
- The learner will demonstrate the ability to communicate mathematical thinking clearly.

Instructional Criteria

- The learner will apply basic operations when solving equations.
- The learner will perform mental computations.
- The learner will communicate cooperatively using appropriate mathematical language.
- The learner will construct and apply the fundamentals of graphs.
- The learner will be competent in the knowledge of geometric figures.

Scope

I. Functions
   A. Identify, use, and describe various patterns and recognize appropriate functions
      1. Tables
      2. Constant sums
      3. Constant differences
      4. Linear equations from tables
   B. Apply relationships among variables and analyze patterns of change and recognize relationship between slopes and rate of change.

II. Measurement
   A. Apply area, perimeter, and volume formulas to solve problems
      1. Quadrilaterals
      2. Triangles
         a.) Pythagorean Theorem
      3. Circles
      4. Spheres
      5. Three-dimensional solids
         a.) Nets
   B. Construct graphs involving inequalities and linear equations
      1. Plotting points on number lines and coordinating planes
      2. Inequalities on number lines and coordinate planes

3. Linear equations in coordinating planes
4. Parallel lines
5. Intercepts

C. Apply metric conversions
1. Metric to metric
2. Metric to U.S. Customary

D. Apply and interpret concepts of congruence and transformations
1. Translate, reflect, rotate, and dilate plane figures
2. Identify congruence and symmetry of figures

III. Data Analysis

A. Construct and interpret data from graphs and tables
1. Box and whisker
2. Scatter plots
3. Bar graphs
4. Circle graphs
5. Histogram
6. Stem and leaf
7. Frequency tables

B. Calculate basic statistics
1. Mean
2. Median
3. Mode
4. Range
5. Relative frequency
6. Probability
7. Permutations

IV. Numeration

A. Identify and apply real numbers
1. Graph real numbers on a number line
2. Absolute value
3. Square roots
4. Least Common Multiple, Greatest Common factor, prime factorization
5. Change integers to fractions and decimals
6. Use scientific notation
7. Very small and vary large percentages

B. Identify the properties of equalities and inequalities
    1. Commutative
    2. Associative
    3. Distributive
    4. Identity
    5. Opposites
    6. Inverses

V. Operations
A. Apply operations on integers, fractions, percents and decimals
    1. Addition
    2. Subtraction
    3. Multiplication
    4. Dividision
    5. Simplify fractions
    6. Convert improper fractions and mixed numbers
    7. Exponents
B. Order of operations
    1. Parentheses
    2. Exponents
    3. Multiplication/Division
    4. Addition/Subtraction
C. Solve proportions, percentages, and algebraic equations
    1. One-step equations
    2. Two-step equations
    3. Cross-multiplication
    4. Word problems

VI. Applications
A. Use of appropriate tools
    1. Algebra tiles/manipulatives
    2. Calculator techniques
    3. Computer technology
B. Mental Math using various strategies
C. Communicate mathematical thinking
    1. Oral
    2. Written