Mathematics
Seventh 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 basic operations and problem solving with a transition into higher levels of math as it relates to functions, measurement, data, analysis, numeration, operations, and applications.

Content Criteria

Functions

- The learner will demonstrate the ability to represent and record patterns and functions in a variety of ways.
- The learner will demonstrate the ability to recognize and interpret linear and nonlinear relationships.

Measurement

- The learner will compare and contrast properties of one and two-dimensional figures.
- The learner will classify and describe the properties of three-dimensional objects.
- The learner will apply various formulas to geometric figures and three-dimensional objects.
- The learner will identify and demonstrate basic transformations.
- The learner will locate, plot, and interpret coordinate points on a grid.
- The learner will demonstrate the ability to convert within and between customary and metric systems.

Data Analysis

- The learner will construct and interpret tables, charts, and graphs.
- The learner will analyze a set of data by calculating measures of central tendency.
- The learner will calculate basic statistics, probabilities and frequencies.

Numeration

- The learner will perform operations using whole numbers and fractions.
- The learner will demonstrate the ability to apply the order of operations when solving a variety of problems.
- The learner will demonstrate an understanding of place value, scientific notation, and powers of 10.
- The learner will apply powers and roots of numbers to problems.

Operations

- The learner will demonstrate the ability to recognize a variety of uses for variables.
- The learner will solve and check problems involving proportions, percentages and algebraic equations.
- The learner will demonstrate the ability to apply properties of numbers to equalities and inequalities.

- The learner will demonstrate the ability to calculate and apply absolute value.

Applications

- The learner will demonstrate the ability to define terms and express mathematical reasoning.
- The learner will identify when and how to apply tools and technology appropriately.
- The learner will demonstrate the ability to apply a variety of problem solving strategies.
- The learner will demonstrate the ability to identify and practice appropriate mental math strategies.

Instructional Criteria

- The learner will be able to add, subtract, multiply and divide real numbers.
- The learner will be able to perform mathematical computations mentally.
- The learner will identify key words as they relate to the operations.
- The learner will create, predict, test, organize and interpret data and communicate the results in a logical format.

Scope

I. Functions
   A. Represent and record patterns and functions
      1. Tables
      2. Graphs
         a.) Bar
         b.) Double bar
         c.) Line
         d.) Circle

e.) Pictograph
f.) Stem and leaf
g.) Frequency table

3. Formulas
4. Linear/nonlinear

B. Recognize and interpret linear and nonlinear relationships

1. f(x) = mx+b
   a.) Slope (rate of change)
   b.) Y-intercept
2. Graph
3. Real life situation
4. Compare

II. Measurement

A. Compare and contrast one and two-dimensional figures

1. One dimensional
   a.) Lines
      1.) Perpendicular
      2.) Skew
      3.) Intersecting
      4.) Parallel
   b.) Line segments
   c.) Rays
   d.) Angles
      1.) Supplementary
      2.) Complementary
      3.) Transversal
      4.) Adjacent
      5.) Corresponding
      6.) Vertical
      7.) Alternate interior
      8.) Alternate exterior
      9.) Vertex
      10.) Acute/obtuse/right/straight
2. Two-dimensional
   a.) Polygons
      1.) Identify
      2.) Describe

3.) Classify
4.) Compare

b.) Circles
1.) Radius
2.) Diameter
3.) Chord
4.) Sector
5.) Arc

c.) Congruent/similar/symmetry

d.) Name one-dimensional and two-dimensional
1.) Verbal
2.) Written

e.) Construct
1.) One-dimensional
2.) Two dimensional

B. Compare and contrast three dimensional objects

1. Three-dimensional

a.) Identify

b.) Characteristics
1.) Faces
2.) Edges
3.) Vertices
4.) Curved surface
5.) Parallel faces
6.) Skew
7.) Parallel
8.) Perpendicular

c.) Name three-dimensional
1.) Verbal
2.) Written

d.) Construct

C. Apply formulas to geometric figures and objects

1. Area
2. Perimeter
3. Volume
4. Surface area
5. Lateral area

6. Circumference
7. Pythagorean Theorem

D. Identify and demonstrate basic transformations
1. Translation
2. Reflection
3. Rotation
4. Dilation
5. Tessellation

E. Locate, plot, and interpret coordinate points on a grid
1. Quadrants
2. Simple linear equations
3. Trends

F. Convert within and between customary and metric systems

III. Data Analysis

A. Construct and interpret tables, charts, and graphs
1. Tables
2. Graphs
a.) Bar
b.) Double bar
c.) Line
d.) Circle
e.) Pictograph
f.) Frequency table
3. Misleading information
4. Predictions
5. Comparisons
6. Trends
7. Scales
8. Inequalities

B. Analyze a set of data by calculating statistical measures or descriptors
1. Mean
2. Median
3. Mode
4. Range
5. Frequency
6. Outlier

7. Quartile

C. Calculate basic probabilities and frequencies
   1. Outcomes
   2. Conduct experiments
   3. Independent/dependent
   4. Venn diagrams

IV. Numeration

A. Perform operations using real numbers
   1. Integers
      a.) Addition
      b.) Subtraction
      c.) Multiplication
      d.) Division
      e.) Factorization
   2. Fractions
      a.) Addition
      b.) Subtraction
      c.) Multiplication
      d.) Division
      e.) Greatest Common Factor / Lowest Common Multiplier (GCF/LCM)
   3. Decimals
      a.) Addition
      b.) Subtraction
      c.) Multiplication
      d.) Division
   4. Converting between fractions, decimals and percents

B. Apply the order of operations when solving a variety of problems
   1. Parenthesis
   2. Exponents
   3. Multiplication
   4. Division
   5. Addition
   6. Subtraction

C. Understand place value, scientific notations, and powers of 10.

1. Place value
2. Scientific Notation
3. Exponents
4. Expanded form
5. Standard form
6. Words

D. Apply powers and roots of numbers to problems
1. Square roots (with and without calculators)
2. Exponents (with and without calculators)

V. Operations

A. Recognize a variety of uses for variables.
1. Representations
2. Expressions
3. Equations
4. Inequalities

B. Solve and check proportions, percentages, and algebraic equations
1. Proportions
a.) Cross products
b.) Ratios
c.) Rates
d.) Word problems
2. Percentages
3. Algebraic equations
a.) One step
b.) Two step
c.) Word problems

C. Apply properties of numbers to equalities and inequalities
1. Associative
2. Commutative
3. Distributive
4. Identity
5. Inverses
6. Opposites

D. Calculate and apply absolute value
1. Real numbers
2. Number linens

3. Variables
4. Inequalities

VI. Applications

A. Define terms and express mathematical reasoning
   1. Oral
   2. Written
   3. Illustration
   4. Manipulatives

B. Apply tools and technology
   1. Calculators
   2. Computers
   3. Manipulatives
   4. Rulers
   5. Protractors
   6. Compasses

C. Problem solving strategies
   1. Act out or make a model
   2. Diagram
   3. Guess, check, revise
   4. Make a table
   5. Look for a pattern
   6. Make an organized list
   7. Solve a simpler problem
   8. Work backwards
   9. Write an equation
   10. Make a graph
   11. Use technology
   12. Combine strategies

D. Mental math strategies