

Mathematics

Sixth 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 be competent in calculating and solving complex problems using all four operations. The learner will become proficient in addition, subtraction, multiplication and division of fractions and decimals. The learner will successfully solve mathematical problems using customary and metric units. The learner will become proficient in basic geometry concepts.

Content Criteria

Functions

- The learner will describe numerical patterns and explain their rules.
- The learner will construct and analyze patterns and rules.
- The learner will identify the pattern of change in the graph of a line.
- The learner will demonstrate the ability to predict what happens to a shape when the measurements are changed.
- The learner will demonstrate the ability to solve simple equations involving variables.

Measurement

- The learner will classify and describe geometric figures according to their properties.
- The learner will compare and contrast the characteristics of a variety of polygons.
- The learner will apply knowledge of triangles and quadrilaterals to determine the measures of interior angles.
- The learner will accurately draw two-dimensional shapes using various tools.
- The learner will demonstrate the ability to transform figures.
- The learner will identify components of a three-dimensional object.
- The learner will locate and plot coordinate points on a grid.
- The learner will demonstrate the ability to convert within units of measurement.
- The learner will demonstrate the ability to apply various formulas to geometric figures.

Data Analysis

- The learner will organize and display data in appropriate graphs.
- The learner will compare and contrast representations of the same data in different graphs.
- The learner will demonstrate the ability to calculate the measures of central tendency.
- The learner will make predictions based on statistical data.

Numeration

- The learner will demonstrate the ability to read, recite, and write numbers.
- The learner will demonstrate the ability to apply the properties of numbers to simplify and solve problems.
- The learner will formulate equivalent representations of a number.
- The learner will demonstrate the ability to factor numbers.
- The learner will demonstrate the ability to graph rational numbers on a number line.

- The learner will use real-life examples to solve percent and ratio problems.
- The learner will apply their knowledge of number relationships in solving problems.

Operations

- The learner will practice basic operations.
- The learner will make predictions based on theoretical probabilities.

Applications

- The learner will apply problems solving steps and strategies to determine solutions.
- The learner will use appropriate technology to compute complex problems.
- The learner will communicate with others using mathematical vocabulary.
- The learner will use mental math when appropriate.

Instructional Criteria

- The learner will use different strategies to demonstrate an understanding of mathematical concepts.
- The learner will be provided with independent practice daily.
- The learner will demonstrate the steps and strategies used in problem solving.
- The learner will work cooperatively to solve mathematical problems.
- The learner will apply mathematical concepts across the curriculum.

Scope

I. Functions

A. Patterns

1. Use manipulative to show
2. Describe
 - a.) Addition

- b.) Subtraction
- c.) Multiplication
- d.) Division
- e.) Exponents
- 3. Explain the rule
- 4. Problem solve
 - a.) Analyze
 - b.) Construct
 - c.) Make rule
- 5. Graph of a line
 - a.) Upward trend
 - b.) Downward trend
 - c.) No trend
- 6. Change in shapes
 - a.) Perimeter
 - b.) Area

B. Variables

- 1. Read and write algebraic expressions
 - a.) Addition
 - b.) Subtraction
 - c.) Multiplication
 - d.) Division
- 2. Solve
 - a.) Equation
 - b.) Inequalities

II. Measurement

A. Classify polygons

- 1. Triangles
 - a.) Right
 - b.) Acute
 - c.) Obtuse
 - d.) Equilateral
 - e.) Scalene
 - f.) Isoceles
- 2. Quadrilaterals
 - a.) Square
 - b.) Rectangle

- c.) Trapezoid
 - d.) Parallelogram
 - e.) Rhombus
 - 3. Pentagon
 - 4. Hexagon
 - 5. Octagon
- B. Properties of shapes
 - 1. Congruency
 - 2. Similarity
 - 3. Symmetry
 - a.) Reflectional symmetry
 - b.) Rotational symmetry
- C. Angles
 - 1. Acute
 - 2. Obtuse
 - 3. Right
 - 4. Interior
 - a.) Triangles
 - b.) Quadrilaterals
- D. Construct and illustrate shapes
 - 1. Tools
 - a.) Protractor
 - b.) Compass
 - c.) Ruler
 - 2. Units
 - a.) Degrees
 - b.) Metric
 - c.) U.S. customary
- E. Transformations
 - 1. Slide (translate)
 - 2. Flip (reflect)
 - 3. Turn (rotate)
- F. Three-dimensional objects
 - 1. Faces
 - 2. Edges
 - 3. Vertices
- G. Coordinate grid (4 quadrants)

1. Locate points
 - a.) Map
 - b.) Graph
2. Plot points
- H. Conversions with same system
 1. U.S. customary
 2. Metric
- I. Formulas (Actual and Estimate)
 1. Perimeter
 - a.) Square
 - b.) Rectangle
 - c.) Triangle
 - d.) Parallelogram
 2. Area
 - a.) Square
 - b.) Rectangle
 - c.) Triangle
 - d.) Parallelogram
 3. Circumference
- III. Data Analysis
 - A. Organize and display
 1. Charts
 2. Tables
 3. Graphs
 - a.) Bar
 - b.) Double bar
 - c.) Line
 - d.) Pie (circle)
 - e.) Frequency
 - f.) Pictograph
 - g.) Stem and leaf
 - h.) Histogram
 - B. Compare and contrast same data in different graphs
 - C. Calculate
 1. Central tendency
 - a.) Mean
 - b.) Median

- c.) Mode
 - d.) Outliers
 - 2. Range
 - a.) Maximum
 - b.) Minimum
 - D. Make prediction based on statistical data
- IV. Numeration
- A. Read, write, recite, compare and order numbers
 - 1. Integers
 - 2. Fractions
 - 3. Decimals
 - 4. Whole numbers
 - a.) Standard form
 - b.) Expanded form
 - c.) Written form
 - d.) Scientific notation
 - B. Properties
 - 1. Addition
 - a.) Associative
 - b.) Commutative
 - c.) Identity property of zero
 - 2. Multiplication
 - a.) Associative
 - b.) Commutative
 - c.) Distributive
 - d.) Identity property of one
 - e.) Zero property
 - f.) Reciprocal
 - C. Equivalence
 - 1. Whole numbers
 - 2. Fractions in simplest form
 - 3. Decimals
 - 4. Percents
 - D. Factor numbers
 - 1. Divisibility rules
 - 2. Prime factorization
 - 3. Greatest common factor

- 4. Least common multiple
- E. Graph numbers on a number line
 - 1. Integers
 - 2. Fractions
 - 3. Decimals
- F. Number relationships
 - 1. Ratio
 - 2. Percent
 - a.) Real-life
- V. Operations
 - A. Addition
 - 1. Whole numbers
 - 2. Decimals
 - 3. Fractions
 - B. Subtraction
 - 1. Whole numbers
 - 2. Decimals
 - 3. Fractions
 - C. Multiplication
 - 1. Whole numbers
 - 2. Decimals
 - 3. Fractions
 - a.) Model
 - b.) Algorithm
 - D. Division
 - 1. Whole numbers
 - 2. Decimals
 - 3. Fractions
 - a.) Model
 - b.) Algorithm
 - E. Order of operations
 - F. Estimation
 - 1. Numbers
 - a.) Whole numbers
 - b.) Decimals
 - 1.) $\geq .5$ round up
 - 2.) $> .5$ round down

- c. Fractions
 - 1.) $\geq \frac{1}{2}$ round up
 - 2.) $< \frac{1}{2}$ round down
 - 2. Operations
 - a.) Addition
 - b.) Subtraction
 - c.) Multiplication
 - d.) Division
 - G. Probability
 - 1. Design
 - 2. Test
 - 3. Explain
- VI. Application
 - A. Problem solving
 - 1. Use steps
 - a.) Understand
 - 1.) Identify relevant vs. irrelevant
 - 2.) Question
 - b.) Estimate
 - c.) Plan
 - d.) Solve
 - e.) Check
 - 2. Use strategies
 - a.) Act out or make a model
 - b.) Draw a diagram
 - c.) Guess, check, revise
 - d.) Make a table
 - e.) Look for a pattern
 - f.) Make an organized list
 - g.) Solve a simpler problem
 - h.) Work backwards
 - i.) Write an equation
 - j.) Make a graph
 - k.) Use technology
 - l.) Combine strategies
 - B. Technology
 - 1. Calculator

- 2. Computer
- C. Communication
 - 1. Oral
 - 2. Written
- D. Mental math