

Mathematics

Fourth 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 recall math facts in order to compute accurately. The learner will recall, develop, expand, and apply accrued knowledge in the areas of multiplication, division, geometry, fractions, decimals, and over all problem solving skills using a variety of strategies and tools.

Content Criteria

Functions

- The learner will solve problems using a variety of patterns.
- The learner will demonstrate an understanding of the various patterns based on addition and subtraction.
- The learner will apply their understanding of various patterns based on multiplication and division.
- The learner will describe and interpret patterns of change over time.
- The learner will organize data and will be able to construct a model to represent change or patterns of variation.

Measurement

- The learner will compare and contrast plane and solid figures.
- The learner will identify and demonstrate an understanding of concepts of congruent and similar figures.
- The learner will identify and demonstrate an understanding of symmetry.
- The learner will identify and describe polygons and curves.
- The learner will construct the properties of shapes.
- The learner will locate and plot points on a coordinate grid.
- The learner will estimate, measure, compare, and label numbers using customary and metric measurement systems.

Data Analysis

- The learner will demonstrate the ability to organize and display data for a specific purpose.
- The learner will demonstrate the ability to analyze given data.
- The learner will demonstrate an understanding of the measures of central tendency.

Numeration

- The learner will demonstrate an understanding of whole numbers through the hundred millions place using various techniques.
- The learner will demonstrate an understanding of decimals through the thousandths place using various strategies.
- The learner will identify and demonstrate an understanding of fractional parts of objects and regions.
- The learner will identify improper fractions and mixed numbers.
- The learner will identify and define prime and composite numbers.

Operations

- The learner will recite and recall multiplication and division facts.
- The learner will use manipulatives to model operations.
- The learner will apply the appropriate method of computation to solve problems involving whole numbers, decimals, and fractions.

- The learner will calculate multi-digit multiplication and division problems.
- The learner will factor a composite number into primes.
- The learner will add and subtract fractions.
- The learner will add and subtract decimals.

Applications

- The learner will demonstrate the ability to problem solve using a systematic and logical approach.
- The learner will demonstrate the ability to mentally estimate solutions to problems.
- The learner will demonstrate the ability to check for accuracy using inverse operations.
- The learner will use appropriate technology to assist in problem solving.
- The learner will investigate and summarize the results of probability experiments.
- The learner will demonstrate the ability to communicate effectively with others using mathematical vocabulary.

Instructional Criteria

- The learner will recall basic math facts.
- The learner will read thermometers above and below zero.
- The learner will use a ruler to measure accurately.
- The learner will perform basic operations using a calculator.
- The learner will read analog and digital clocks accurately.

Scope

- I. Functions
 - A. Use patterns to solve problems
 - 1. Number
 - a.) Recognize
 - b.) Describe
 - c.) Extend

- 2. Geometric
 - a.) Recognize
 - b.) Describe
 - c.) Extend
- B. Addition and subtraction patterns
 - 1. Number lines
 - 2. Fact families
 - 3. Input/output
- C. Multiplication and division patterns
 - 1. Number lines
 - 2. Fact families
 - 3. Input/output
 - 4. Measurement conversions
- D. Patterns of change
 - 1. Identify
 - 2. Predict
- E. Demonstrate patterns
 - 1. Organize data
 - 2. Continue pattern
 - a.) Model
 - b.) Illustrate
 - c.) Manipulatives
- II. Measurement
 - A. Compare and contrast plane figures
 - 1. Circle
 - 2. Quadrilateral
 - a.) Square
 - b.) Rectangle
 - c.) Trapezoid
 - d.) Parallelogram
 - e.) Rhombus
 - f.) Kite
 - 3. Triangle
 - a.) Right
 - b.) Acute
 - c.) Obtuse
 - d.) Equilateral

- e.) Isosceles
 - f.) Scalene
 - 4. Other polygons
 - a.) Pentagons
 - b.) Hexagons
 - c.) Octagons
 - 5. Non-Polygons
- B. Compare and contrast solid figures
 - 1. Sphere
 - 2. Cube
 - 3. Prism
 - a.) Rectangular
 - b.) Triangular
 - 4. Pyramid
 - 5. Cylinder
 - 6. Cone
- C. Identify congruent and similar figures
 - 1. Translate (slide)
 - 2. Reflect (flip)
 - 3. Rotate (turn)
 - 4. Compare and contrast
 - 5. Demonstrate/illustrate
- D. Symmetry
 - 1. Reflected figures
 - 2. Lines of symmetry
- E. Geometric terms
 - 1. Point
 - 2. Line
 - 3. Line segment
 - 4. Ray
 - 5. Vertex
 - 6. Angle
 - a.) Right
 - b.) Obtuse
 - c.) Acute
 - d.) Straight
 - 7. Face (3-dimensional)

8. Edge
 9. Side (2-dimensional)
 10. Perimeter
 11. Area
 12. Volume
 13. Parallel
 14. Perpendicular
 15. Intersecting
- F. Coordinate grid
1. Ordered pairs
 2. Quadrants
- G. Measurement systems
1. Customary
 - a.) Length/distance
 - 1.) Inches to nearest $\frac{1}{8}^{\text{th}}$
 - 2.) Feet
 - 3.) Yard
 - 4.) Mile
 - b.) Weight
 - 1.) Ounce
 - 2.) Pound
 - 3.) Ton
 - c.) Temperature
 - 1.) Fahrenheit
 - 2.) Celsius
 - d.) Capacity
 - 1.) Cup
 - 2.) Pint
 - 3.) Quart
 - 4.) Gallon
 - 5.) Teaspoon
 - 6.) Tablespoon
 - e.) Time
 - 1.) Second
 - 2.) Minute
 - 3.) Hour
 - 4.) Day

- 5.) Month
- 6.) Year
- 7.) Decade
- 8.) Century
- 9.) A.M./P.M.
- 10.) Elapsed time
 - a.) Clock to minute
 - b.) Calendar
- 11.) Analog/digital clocks
- 12.) Time zones
- f.) U.S. Currency
 - 1.) Coins
 - 2.) Bills
 - 3.) Make change

2. Metric

- a.) Length/distance
 - 1.) Millimeter
 - 2.) Centimeter
 - 3.) Decimeter
 - 4.) Meter
 - 5.) Kilometer
- b.) Mass
 - 1.) Gram
 - 2.) Kilogram
- c.) Capacity
 - 1.) Millimeters
 - 2.) Liters

3. Conversions within same measurement system

III. Data Analysis

A. Analyze given data

- 1. Interpret charts, tables, and graphs
- 2. Compare/contrast

B. Collect, organize, and display data

- 1. Collect
 - a.) Survey
 - b.) Measure
 - c.) Count

2. Organize

- a.) List
- b.) Sort

3. Display

- a.) Tally chart
- b.) Line plot
- c.) Frequency chart
- d.) Stem-and-leaf plot
- e.) Graph

1.) Components

- a.) Titles
- b.) Labels
- c.) Scale

2.) Types

- a.) Line
- b.) Bar
- c.) Circle
- d.) Pictograph

4. Interpret

C. Measures of central tendency

- 1. Range
- 2. Median
- 3. Mean
- 4. Mode

IV. Numeration

A. Whole numbers to 100,000,000

1. Read and write

- a.) In standard form
- b.) In expanded form
- c.) In word form
- d.) In periods

2. Compare/contrast (<, >, =, and ≠)

- 3. Round to specific place value
- 4. Estimate
- 5. Order

B. Properties of numbers

1. Properties of addition

- a.) Zero
- b.) Commutative
- c.) Associative

2. Properties of multiplication

- a.) Zero
- b.) Identity
- c.) Commutative
- d.) Associative
- e.) Distributive

3. Properties of division

- a.) Zero as dividend
- b.) One

C. Decimals to thousandths

1. Read and write

- d.) In standard form
- e.) In fraction form
- f.) In word form

2. Compare/contrast ($<$, $>$, $=$, and \neq)

3. Round to a specific place

4. Estimate

5. Order

D. Fractions

1. Parts to whole

- a.) Objects
- b.) Sets

2. Representation

- a.) Read
- b.) Write
- c.) Model

3. Compare/contrast ($<$, $>$, $=$, and \neq)

4. Estimate

5. Order

6. Equivalent

7. Simplest form

E. Improper fractions/mixed numbers

F. Prime/composite numbers

- V. Operations
 - A. Multiplication and division facts to 12
 - 1. Recite
 - 2. Recall
 - B. Manipulatives to model operations
 - 1. Addition
 - 2. Subtraction
 - 3. Multiplication
 - 4. Division
 - C. Whole numbers
 - 1. Addition and subtraction
 - a.) Without regrouping
 - b.) With regrouping
 - c.) Inverse operations
 - 2. Multiplication
 - a.) 2, 3, and 4 digit by 2-digit factor
 - 1.) Without regrouping
 - 2.) With regrouping
 - b.) Estimation
 - 3. Division
 - a.) 1 and 2 digit divisors
 - 1.) Without remainders
 - 2.) With remainders
 - b.) Inverse operations
 - D. Fractions
 - 1. Equivalent fractions
 - 2. Add and subtract fractions less than one
 - a.) Like denominators
 - b.) Unlike denominators
 - 3. Simplify
 - 4. Convert
 - a.) Improper fraction to mixed number
 - b.) Mixed number to improper fraction
 - c.) Benchmark fractions to decimals
 - E. Decimals and money
 - 1. Add and subtract
 - a.) Without regrouping

- b.) With regrouping
 - 2. Multiplication and division of money (i.e., $\$3.75 \times 4$; $\$3.75 \div 5$)
 - 3. Convert decimals to fractions
- F. Factor composite numbers into primes
- G. Variables
 - 1. Identify the value of the variable
 - a.) Guess and check
 - b.) Inverse operations
 - 2. Algebraic representations
 - a.) Equation
 - b.) Expression

VI. Applications

A. Problem solving

1. Process

- a.) Read and understand
- b.) Plan
- c.) Solve
- d.) Check

2. Strategies

- a.) Act it out
- b.) Draw a diagram or picture
- c.) Find a pattern
- d.) Make a graph, model, or table
- e.) Make an organized list
- f.) Guess and check
- g.) Solve a simpler problem
- h.) Use logical reasoning
- i.) Work backwards
- j.) Write an equation
- k.) Too much/ too little information

3. Multi-step problems

B. Mental Math

- 1. Compensation
- 2. Estimation
- 3. Compatible numbers

4. Multiples of ten
 5. Break apart
- C. Technology
1. Computers
 2. Calculators
- D. Probability
1. Strategies
 - a.) Likely or unlikely
 - b.) Possible or impossible
 - c.) Fair or unfair
 - d.) Certain or uncertain
 2. Summarize
 - a.) Oral
 - b.) Written
- E. Vocabulary
1. Read and understand
 2. Oral
 3. Written