

Mathematics

Second 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

In second grade, the learner will see math as an integral part of life and apply learned concepts to everyday situations. The learner will use a variety of math strategies to problem solve. The learner will apply knowledge of basic facts to addition and subtraction of greater numbers.

Content Criteria

Functions

- The learner will identify various patterns.
- The learner will demonstrate how to continue a pattern.
- The learner will demonstrate how to create numeric and geometric patterns.
- The learner will describe the relationships within a pattern.

Measurement

- The learner will identify and create types of plane figures/polygons.
- The learner will identify and create types of solid figures.
- The learner will identify geometric properties.
- The learner will compare and contrast plane and solid figures using attributes or properties.
- The learner will match congruent figures.
- The learner will identify and draw lines of symmetry.
- The learner will demonstrate the appropriate use of units of measure including standard and non-standard.
- The learner will record, count money and make change.
- The learner will tell time to the nearest hour, half hour and quarter hour using digital and analog clocks.
- The learner will recognize plane and solid figures in their environment.
- The learner will locate and describe position of numbers/objects.

Data Analysis

- The learner will collect, organize, display, and interpret information from charts and graphs.
- The learner will apply organized data to answer a question or problem solve.
- The learner will predict outcomes based on the concepts of probability.

Numeration

- The learner will read, write, compare and order numbers to 1000.
- The learner will construct models to represent 3 digit numbers.
- The learner will identify the place-value of digits in a four-digit number.
- The learner will represent fractions and decimals using words, numerals, and physical models.
- The learner will round numbers to the nearest 10.
- The learner will use estimation to evaluate reasonable answers.
- The learner will apply numbers in various ways.
- The learner will use 0 (zero) to represent the number of elements in the empty set or as a place-holder in numerals.

- The learner will identify placement and recognize position of ordinal numbers.
- The learner will identify different representations of the same number ($5+1$, $3+3$, $4+2$).

Operations

- The learner will demonstrate knowledge of addition and subtraction fact families to 18.
- The learner will demonstrate strategies for basic addition facts.
- The learner will demonstrate strategies for basic subtraction facts.
- The learner will identify the properties of addition and subtraction (associative, commutative, fact families).
- The learner will add two and three digit numbers using multiple strategies.
- The learner will subtract two and three digit numbers using multiple strategies.
- The learner will relate multiple groups of objects to simple multiplication (up to 5).
- The learner will relate simple division to sharing objects equally.
- The learner will solve problems with multiple addends.
- The learner will add and subtract multiples of ten.
- The learner will use appropriate math vocabulary.
- The learner will use symbols to represent unknown quantities and identify value for symbols. (introduction to algebra; $\square + 6 = 10$, $\square = 4$)

Applications

- The learner will solve mathematical statements and story problems.
- The learner will apply estimation to evaluate reasonable answers.
- The learner will apply concepts of probability.
- The learner will analyze and apply math concepts to real world situations including issues related to human dignity and Catholic Social teaching.
- The learner will use the writing process to explain math concepts.

Instructional Criteria

- The learner will have a clear understanding of basic addition and subtraction facts and demonstrate strategies for counting on, counting back and using manipulatives.
- The learner will work independently, with partners, and in small groups.
- The learner will compare and order numbers to 100.
- The learner will read and interpret information from a simple graph.
- The learner will read, model, and solve simple word problems.
- The learner will use appropriate math vocabulary.

Scope

- I. Functions
 - A. Identify various patterns
 1. Numeric / 100 chart
 2. Geometric
 3. Symbols
 4. Calendar
 5. Time
 6. Auditory
 - B. Continue a pattern
 1. Skip counting by 2's, 5's, 10's
 2. Repetition
 3. Addition/Subtraction - Fact families
 4. Input/Output table
 - C. Create a pattern
 1. Numeric
 2. Symbols/shapes
 - D. Describe relationships in a pattern

1. Make predictions
 2. Explain rule
- II. Measurement
- A. Plane shapes/polygons
1. Circle
 2. Triangle
 3. Quadrilaterals
 - a. Square
 - b. Rectangle
 - c. Rhombus
 - d. Trapezoid
 - e. Parallelogram
 4. Pentagon
 5. Hexagon
- B. Solid figures
1. Cube
 2. Sphere
 3. Prism
 4. Cylinder
 5. Pyramid
 6. Cone
- C. Geometric concepts
1. Flat/curved surfaces
 2. Vertex
 3. Edge
 4. Face
 5. Base
 6. Sides
 7. Corners
 8. Angle
 9. Line/line segment
 10. Parallel lines
 11. Perimeter
 12. Area
 13. Volume
- D. Compare and contrast geometric concepts
- E. Congruent figures

- F. Symmetry
- G. Units of measure
 - 1. Standard
 - a. Length
 - 1.) Inch, foot, yard
 - 2.) Centimeter, meter
 - b. Weight
 - 1.) Ounce, pound
 - 2.) Gram, kilogram
 - c. Temperature
 - 1.) Fahrenheit
 - 2.) Celsius
 - d. Capacity
 - 1.) Quart, pint, cup, gallon
 - 2.) Liter, milliliter
 - 2. Non-standard
 - a. Paper clip
 - b. Unifix cube
 - c. Shoe
 - d. Various items available in classroom
- H. Money
 - 1. Penny, nickel, dime, quarter, half dollar, dollar
 - 2. Count coins up to \$1.00
 - 3. Make change
 - 4. Use cents (¢) and decimal representation
- I. Time
 - 1. Hour hand
 - 2. Minute hand
 - 3. Hour
 - 4. Half hour/ half past
 - 5. Quarter hour
 - 6. AM/PM
 - 7. Day, month, year
- J. Environment
- K. Position
 - 1. Points on a number line
 - 2. Hundred Chart

3. Timeline
4. Coordinate graph
5. Map

III. Data Analysis

- A. Collect, organize, display and interpret information
 1. Tally chart, survey
 2. Graphs
 - a. Bar graph
 - b. Pictograph
 - c. Line plots
 - d. Co-ordinate graph
 - e. Real object graph
 - f. Line graph
- B. Apply data to answer question
- C. Probability
 1. Predict
 2. Outcome
 3. Likelihood

IV. Numeration

- A. Numbers to 1000
- B. Three-digit numbers
 1. Place value blocks
 2. Link
 3. Unifix cubes
 4. Sticks
 5. Flipchart
 6. Other
- C. Place-value in four-digit numbers
 1. Ones
 2. Tens
 3. Hundreds
 4. Thousands
- D. Fractions
 1. Half, fourth, thirds

- a. $\frac{1}{2}$
 - b. $\frac{1}{4}$
 - c. $\frac{1}{3}$
 - 2. Picture representation
 - 3. Decimal representation
 - a. $.5 = \frac{1}{2}$
 - b. $.25 = \frac{1}{4}$
 - c. $.1 = \frac{1}{10}$
 - E. Round to the nearest 10
 - F. Estimation
 - G. Number sense
 - 1. Counting
 - 2. Ordering
 - 3. Naming
 - 4. Locating
 - 5. Measuring
 - 6. Odd/even
 - H. Zero
 - 1. Empty set
 - 2. Place holder
 - a. Whole number (104)
 - b. Decimal (\$1.04)
 - I. Ordinal numbers
 - 1. Identify placement
 - 2. Recognize position
 - J. Concepts of equivalence
 - 1. Equivalent forms (3+3, 5+1, 6+0)
 - 2. Regrouping (3 tens and 2 ones = 2 tens and 12 ones)
- V. Operations
- A. Addition and subtraction facts
 - 1. Recite
 - 2. Recall
 - 3. Know fact families through 18
 - B. Addition strategies
 - 1. Doubles
 - 2. Turn around facts

3. Doubles plus one
4. Counting on
5. Making 10
- C. Subtraction strategies
 1. Counting back
 2. Doubles
 3. Related addition
- D. Properties of addition and subtraction
 1. Associative
 2. Commutative
 3. Fact families
- E. Addition two and three digits
 1. Demonstrative with manipulatives
 2. Without regrouping
 3. With regrouping
 4. Estimate answer
 5. Adding 10's first
 6. Alternate algorithms, partial sum algorithms
 7. Adding money
- F. Subtraction - two and three digits
 1. Demonstrate with manipulatives
 2. Without regrouping
 3. With regrouping
 4. Estimate answer
 5. Check subtraction with addition (fact family)
 6. Subtract 10's first
 7. Alternate algorithms
 8. Subtracting money
- G. Multiplication
 1. Equal groups
 2. 0 (zero) to 5
 3. Multiplication sentence ($2 \times 3 = 6$)
- H. Division
 1. Sharing equally
 2. Division sentences (6 divided by 3 = 2)
 3. Relate to multiplication (fact family)
- I. Multiple addends

1. Look for tens
 2. Changing order
 - J. Multiples of ten
 1. Add
 2. Subtract
 - K. Math Vocabulary
 1. Addition
 2. Subtraction
 3. Addend
 4. Sum
 5. Minuend
 6. Subtrahend
 7. Equal
 - L. Finding unknown quantities
 1. $_ + 3 = 5, _ = 2$
 2. $\square - 2 = 4, \square = 6$
- VI. Applications
- A. Strategies
 1. Draw a picture
 2. Write a number sentence
 3. Logical reasoning
 4. Use manipulatives
 5. Mental math
 6. Make a model, graph or table
 7. Find a pattern
 - B. Estimation
 1. Make sense? Logical?
 2. Fit a pattern?
 - C. Probability
 1. Predict outcomes
 2. Likely result
 - D. Real-world application
 1. Fair wages
 2. Cooking ingredients
 3. Portion control
 4. Balancing a checkbook
 5. Fundraising

6. Math in daily life
 7. Math as outreach opportunities
- E. Writing process
1. Explain concepts
 2. Explain problem
 3. Explain solving methods