

<u>Theme</u>	<u>Program Standard</u>
1. Numeration/Number Sense	Students will know numeration systems and have the skills to represent numbers in a variety of ways, and use correct processes for number operations
2. Computation/Estimation	Students will have quick recall of basic math facts, and be able to use appropriate methods of computation which include mental arithmetic, paper and pencil, calculator, and computer calculations.
3. Measurement	Students will estimate and measure using appropriate measuring instruments and units when solving problems. The student will know the structure and use of measurement systems.
4. Geometry/Spatial Concepts	Students will know the fundamentals of geometry from several perspectives and will apply spatial sense to two- and three-dimensional situations, solve problems, argue logically.
5. Data Analysis, Probability, and Statistical Concepts	Students will use statistical methods to represent and analyze data and use theoretical probability to represent and solve problems.
6. Algebraic Concepts	Students will use algebraic concepts, symbols and have the skills to analyze, represent, and solve a variety of problems.
7. Mathematics as Communication	Students will use mathematical language and symbols to read and write mathematics and to converse with others.

1. Numeration/Number Sense: Students will know number systems and have the skills to represent numbers in a variety of ways, and use correct processes for number operations

Primary students will recognize, write, and count numerals from 0-100. They will recognize the relationship between numerals and everyday life situations such as money, phone numbers, addresses, and room numbers. The intermediate student will order and compare numbers to the millions place and decimals to the hundredths place. They will also use equivalent forms to describe and apply relationships between numbers. During the middle grades students will apply relationships between fractions, decimals, and percents in a variety of real life situations. High school students will expand number relationships to also include exponents, radicals, scientific notation, and absolute values.

First Grade	Fourth Grade	Eighth Grade	Twelfth Grade
1. Communicate the sequential nature of the number system (1.1.1)	1. Demonstrate an understanding of place value through the millions and decimals to the hundredths place (4.1.1)	1. Recognize and utilize real numbers such as whole numbers, integers, and rational numbers (8.1.1)	1. Describe and compare the relationships among all subsets of real numbers (12.1.1)
2. Communicate the mathematical relations of the number system (1.1.2)	2. Represent numbers in equivalent forms (4.1.2)	2. Apply relationships between fractions, decimals, and percents in a variety of situations (8.1.2)	2. Express the equivalent forms of numbers using exponents, radicals, scientific notation, absolute values, fractions, decimals, and percents (12.1.2)
3. Recognize numbers and applications in everyday situations (1.1.3)	3. Describe and apply relationships between numbers by order, comparison, and across the operation, such as subtraction as the opposite of addition and multiplication as repeated addition (4.1.3)	3. Represent and use numbers in a variety of different forms (8.1.3)	
4. Demonstrate the value of numbers (0-20) using concrete objects (1.1.4)	4. Identify and demonstrate positive and negative numbers and zero (4.1.4)	4. Apply appropriate use of number theory such as prime and composite, factors and multiples, divisibility, powers, properties, and identities (8.1.4)	
	5. Make change and count out in amounts up to \$20.00 (4.1.5)		

2. Computation/Estimation: Students will have quick recall of basic math facts; be able to select and use appropriate methods of computation which include mental arithmetic, paper and pencil, calculator, and computer calculations; and use estimation to determine the reasonableness of results.

Primary students will recognize and use the symbols +, - and = to solve problems involving one-step solutions. They will make estimations and comparisons to determine the reasonableness of their answers. Intermediate students will estimate, calculate, and solve problems using addition, subtraction, multiplication, and division of whole numbers. They will also estimate and calculate decimals and fractions using addition and subtraction. Middle level students will expand on the use of the four mathematical operations incorporating a variety of number forms and order of operations to solve problems of varying complexity that can involve real life data. High school students will use computation and estimation to solve theoretical and applied problems with a new emphasis on radicals, scientific notation, absolute values, and ration and proportions. They will also justify the reasonableness of their solutions.

First Grade	Fourth Grade	Eighth Grade	Twelfth Grade
1. Demonstrate the concepts of addition and subtraction up to 10 (1.2.1)	1. Estimate and accurately calculate without and with calculators and solve problems involving addition, subtraction, multiplication, and division of whole numbers and understand the relationship among the operations (4.2.1)	1. Add, subtract, multiply, and divide decimals and proper, improper, and mixed fractions with uncommon and common denominators both with and without the use of technology. (8.2.1)	1. Solve theoretical and applied problems using numbers in equivalent forms, radicals, exponents, scientific notation, absolute values, fractions, decimals, and percents, ratios, and proportions, order of operations and properties of real numbers (12.2.1)
2. Determine the reasonableness of proposed solutions to mathematical problems (1.2.2)	2. Estimate and accurately calculate without and with calculators and solve problems involving addition and subtraction of decimals and understand the relationship among these two operations (4.2.2)	2. Identify the appropriate operation and do the correct calculations to solve word problems (8.2.2)	2. Justify the reasonableness of solutions (12.2.2)
	3. Estimate and accurately calculate without and with calculators and solve problems involving addition and subtraction of fractions and understand the relationships among these two operations. (4.2.3)	3. Solve problems involving whole numbers, integers, and rational numbers (fractions, decimals, ratios, proportions, and percents) both with and without the use of technology. Problems will be of varying complexities and can involve real-life data (8.2.3)	3. Perform estimations and computations mentally, with paper and pencil, and with technology (12.2.3)

2. Computation/Estimation (Continued)

First Grade	Fourth Grade	Eighth Grade	Twelfth Grade
		4. Apply the order of operations to solve problems both with and without the use of technology (8.2.4)	
		5. Apply strategies of estimation to a variety of problems both with and without the use of technology (8.2.5)	

3. Measurement: Students will estimate and measure using appropriate measuring instruments and units when solving problems. The student will know the structure and use of measurement systems.

Primary students will use every day items to compare the length, height, weight, and/or temperature of two or more items. They will identify and use appropriate tools of measurement. Intermediate students will estimate, accurately measure, and solve problems using both standard and metric units of measure. They will expand on their skills by reading an analog clock to the nearest minute and figuring elapsed time to the nearest quarter hour. Middle grade students will select appropriate tools of measurement and measure to a specific level of precision. They will make conversions, such as square foot to square yards, cubic decimeters to liters, etc. High school students will refine their skills and become more precise in their measurements. They will also convert between metric and standard units of measure.

First Grade	Fourth Grade	Eighth Grade	Twelfth Grade
1. Students will compare two or more items or sets using direct comparisons or nonstandard units of measure for the following attributes: length (shorter/longer), height (taller/shorter), weight (heavier/lighter), temperature (hotter/colder). Nonstandard unit examples are length of a human foot, hand span, new pencil, a toothpick, block, etc. (1.3.1)	1. Estimate, measure, and solve problems using metric units for linear measure, area, mass/weight, and capacity (4.3.1)	1. Select appropriate tools and properly measure quantities for temperature, time, money, length and width, area and perimeter, volume and capacity, weight and mass, both in standard and metric units at the level of precision required (8.3.1)	1. Select and use appropriate measuring units, tools, and/or technology to achieve a specified degree of accuracy and precision (12.3.1)
2. Recognize tools of measurement and their appropriate use, such as clocks, calendars, rulers, balance scales, and thermometers (1.3.2)	2. Estimate, measure, and solve problems using standard units for linear measure, area, mass/weight, and capacity (4.3.2)	2. Convert units within measurement systems using proper conversion factors (standard and metric) (8.3.2)	2. Convert between metric and standard units of measurement (12.3.2)
3. Tell time to the half-hour using an analog and digital clock (1.3.3)	3. Tell time to the minute on an analog clock (4.3.3)		
4. Identify the different units of measure used in their environment such as cents, dollars, pounds, gallons, liters, meters, miles, minutes, and hours (1.3.4)	4. Determine the perimeter of a many-sided figure (without a formula) using both standard and non-standard units of measure, such as the six-sided figure measures 30 inches or 15 toothpicks around the edges (4.3.4)		

3. Measurement *(Continued)*

First Grade	Fourth Grade	Eighth Grade	Twelfth Grade
5. Demonstrate an understanding of orientation in time for past, present, future, earlier, and later (1.3.5)			

4. Geometry/Spatial Concepts: Students will know the fundamentals of geometry from several perspectives and will apply spatial sense to two- and three-dimensional situations, solve problems, argue logically.

Primary students will identify, describe, and create common geometric shapes in their environment using circles, squares, triangles, and rectangles. They will also compare relative position and spatial relationships. Intermediate students will explore two- and three-dimensional geometric shapes and line relationships. In addition, they will use geometric properties such as symmetry, congruency, similarity, and motion. The middle level student will explore the attributes of geometric figures and apply formulas for solving problems including perimeter, circumference, area, volume, and surface area. They will also explore transformations and develop an appreciation of how geometry describes the physical world. High school students will investigate and deduce geometric properties as they pertain to the physical world.

First Grade	Fourth Grade	Eighth Grade	Twelfth Grade
1. Compare relative position and spatial relationships such as left/right, above/below, over/under, up/down, and near/far (1.4.1)	1. Identify, describe, and create two- and three-dimensional geometric shapes (4.4.1)	1. Identify, describe, compare, and classify geometric figures such as plane figures like polygons and circles; solid figures like prisms, pyramids, cones, spheres, and cylinders; and lines, line segments, rays, angles, parallel and perpendicular lines (8.4.1)	1. Calculate perimeter, area, and volume for two- and three-dimensional shapes (12.4.1)
2. Identify, describe, and create circles, squares, triangles, and rectangles (1.4.2)	2. Identify and draw points, lines, line segments, rays, and angles (4.4.2)	2. Understand and apply geometric properties and relationships of congruence, similarity, symmetry, and Pythagorean theorem (8.4.2)	2. Utilize geometric relationships and terms to describe the physical world (12.4.2)
	3. Analyze, compare, and solve problems with geometric figures using congruence, symmetry, similarity, and simple transformations (4.4.3)	3. Understand and apply the formulas to solve problems involving perimeter and area of a square, rectangle, parallelogram, trapezoid, and triangle and area and circumference of circles (8.4.3)	3. Analyze relationships among geometric forms (12.4.3)
		4. Solve problems using the formulas for volume and surface area of rectangular prisms, cylinders, and cones (8.4.4)	4. Apply coordinate geometry to locate objects and to describe objects algebraically (12.4.4)

4. Geometry/Spatial Concepts *(Continued)*

First Grade	Fourth Grade	Eighth Grade	Twelfth Grade
		5. Apply transformations to geometric figures such as translations or slides, rotations or turns, reflections or flips, and scale or dilate (8.4.5)	5. Apply right triangle trigonometry to solve problems (12.4.5)
		6. Use geometric representations to solve problems and describe the physical world (8.4.6)	6. Understand and apply geometric properties to solve problems (12.4.6)
			7. Apply deductive reasoning to arrive at valid conclusions (12.4.7)

5. Data Analysis, Probability, and Statistical Concepts: Students will use statistical methods to represent and analyze data and use theoretical probability to represent and solve problems.

Primary students will collect, count, and analyze information about objects and events in their every day life. They will use objects and pictures to organize and compare their findings. Intermediate students will collect, construct, and interpret data by using tables, charts, graphs, and tree diagrams. They will use the information they collect to draw valid conclusions. Middle level students will recognize and use appropriate sampling techniques and determine the appropriate representation for a specific situation. Students will conduct experiments or simulations to understand probability and then use the results and appropriate statistical methods as a means for decision-making. High school students expand their knowledge of sampling techniques to solve complex problems. They will use their knowledge of theoretical probability to solve problems, formulate conclusions, and calculate probabilities of independent events.

First Grade	Fourth Grade	Eighth Grade	Twelfth Grade
1. Count and collect information about objects and events in their environment such as what is your favorite candy bar, who has a brother, how many pets, and who is going to the library (1.5.1)	1. Collect, organize, and represent numerical and categorical data (4.5.1a)	1. Collect, analyze, interpret, and display data (8.5.1)	1. Apply sampling techniques to gather data, organize, display, and interpret data to solve complex problems (12.5.1)
2. Organize and display collected information using objects and pictures (1.5.2)	2. Read, interpret, and draw conclusions from the findings of tables, charts, and graphs (4.5.1b)	2. Read and interpret tables, charts, and graphs to make comparisons, predictions, and inferences (8.5.2)	2. Make inferences and predictions and write equations based on the analysis of sets of data (12.5.2)
3. Make comparisons from displayed data, such as more, less, and fewer (1.5.3)	3. Investigate and represent possible outcomes for simple probability situations (4.5.1c)	3. Conduct experiments or simulations to demonstrate an understanding of theoretical probability and relative frequency (8.5.3)	3. Interpret theoretical probability to represent problems, solve problems, and make informal decisions (12.5.3)
4. Describe the steps used in collecting and analyzing information (1.5.4)		4. Recognize appropriate use of statistical methods and appropriate use of probability as a means for decision making (8.5.4)	4. Analyze the effects of data transformation on measures of central tendency and variability such as linear and nonlinear relationships (12.5.4)

5. Data Analysis, Probability, and Statistical Concepts *(Continued)*

First Grade	Fourth Grade	Eighth Grade	Twelfth Grade
			5. Formulate conclusions based on interpretation of data represented by the normal distribution (12.5.5)
			6. Calculate probabilities of independent events and counting problems (12.5.6)

6. Algebraic Concepts: Students will use algebraic concepts, symbols and have the skills to analyze, represent, and solve a variety of problems.

Primary students will explore their environment by sorting and classifying objects according to one or more attributes. They will organize objects into specified or created patterns. The intermediate student will demonstrate the beginning concept of variables and writing formulas by using letters, boxes, or symbols to stand for an unknown. The middle level student will graph ordered pairs and linear equations. They will solve multi-step equations and use variables to describe patterns. High school students will solve complex algebraic equations and inequalities. They will apply and solve problems using direct and indirect variations, functions, regression analysis, etc.

First Grade	Fourth Grade	Eighth Grade	Twelfth Grade
1. Identify, describe, extend, and create a variety of patterns such as objects, sounds, movements, shapes, numbers, and colors (1.6.1)	1. Use and interpret variables, mathematical symbols, and properties to write and simplify expressions and sentences (4.6.1)	1. Demonstrate knowledge and use of the one- and two-dimensional coordinate systems (8.6.1)	1. Interpret algebraic equations and inequalities graphically and describe geometric relationships algebraically (12.6.1)
2. Sort and classify objects according to one or more attributes, such as size, shape, color, and thickness (1.6.2)	2. Identify, describe, and extend arithmetic patterns using concrete materials and tables (4.6.2)	2. Apply algebraic concepts and algebraic operations to solving problems (8.6.2)	2. Apply and solve problems involving equations and inequalities (12.6.2)
3. Identify and describe patterns in their environment (1.6.3)		3. Describe and represent relations using tables, graphs, and rules (8.6.3)	3. Apply and solve problems involving systems of equations and systems of inequalities and matrices (12.6.3)
			4. Apply and solve problems using patterns, algebraic expressions, functions, and regression analysis (12.6.4)

7. Mathematics as Communication: Students will use mathematical language and symbols to read and write mathematics and to converse with others.

Primary students will recite their numbers forward and backward and count by 1's, 2's, 5's, and 10's to 100. The intermediate student will communicate an understanding of mathematics concretely, verbally, and in a written form. The student will realize that representing, discussing, reading, writing, and listening to mathematics are vital parts of learning and using mathematics. The middle level student will broaden their skills in using mathematical language as a means of communicating ideas in a variety of ways. They will evaluate mathematical ideas and use appropriate mathematical notations. High school students will express generalizations made through various investigations. Also, they will ask relative questions and disclose their findings orally and in written form using mathematical language and symbols.

First Grade	Fourth Grade	Eighth Grade	Twelfth Grade
1. Demonstrate the sequential nature of the number system both orally and in written form.	1. Model mathematical ideas from one form to another (e.g., concretely, pictorially, orally, and in written form)	1. Model mathematical situations using oral, pictorial, concrete, graphical, written, and algebraic forms	1. Express mathematical ideas orally, visually, and in writing
2. Communicate the sequential nature of the number system	2. Listen to, represent, discuss, read, and write mathematical ideas and concepts	2. Develop common understandings of mathematical ideas including the role of definitions	2. Read written presentations of mathematics with understanding
3. Communicate the mathematical relations of the number system		3. Interpret and evaluate mathematical ideas to make appropriate conjectures	3. Translate mathematical ideas from one mode to another
		4. Use appropriate mathematical notations to express ideas	4. Ask clarifying and extending questions related to mathematics they have read or heard about
		5. Use appropriate mathematical techniques and problem-solving strategies when evaluating real-life situations and problems arising in other disciplines	5. Formulate mathematical definitions and express generalizations discovered through investigations

7. Mathematics as Communication *(Continued)*

First Grade	Fourth Grade	Eighth Grade	Twelfth Grade
			6. Model situations using oral, written, concrete, pictorial, graphical, and algebraic methods
			7. Participate in group discussions involving mathematics and summarize ideas presented