

St. Francis School District Mathematics Goals:

Grade: K4

In K4, children will be introduced to numbers in contexts that promote problem solving, reasoning, communication, making connections, creating and analyzing representations.

1. Identify numerals 1-10
2. Count accurately (one to one correspondence) to 10
3. Orally counts to 20
4. Identifies colors and shapes
5. Completes an AB pattern
6. Classify and sort by one attribute
7. Compare sizes of objects (more/less than, same, larger/smaller)

Grade: K5

In K5, children will learn that numbers are used to represent quantities. They will count, compare, add, and subtract numbers. They will sort, describe, and compare shapes. Children will collect, sort, and represent data. This content will be introduced in contexts that promote problem solving, reasoning, communication, making connections, creating and analyzing representations.

Number Operations & Relationships:

- Connect number words and numerals to quantities they represent
- Use strategies to count and keep track of quantities (direct modeling, counting on....) when solving problems
- Use various methods to find sums of numbers up to 10.

Geometry:

- Classify and describe characteristics of two and three-dimensional shapes
- Use spatial reasoning to describe two-dimensional shapes by breaking down the figure

Measurement:

- Explain measurable attributes of objects, time and temperature using non-standard units (length and weight)

Statistics and Probability:

- Collect, organize, represent and describe data using simple surveys to answer questions and predict likelihood of events.

Algebraic Relationships:

- Recognize and extend geometric patterns and describe the core repeating unit
- Use informal language to explain equality of number combinations and write number sentences using mathematical symbols (+, -, =)

Grade: 1

In grade 1, students will learn addition and subtraction operations. They will identify shapes, recognize patterns, and continue developing ideas in measurement, data and algebraic relationships. These content goals will be addressed in contexts that promote problem solving, reasoning, communication, making connections, creating and analyzing representations.

Number Operations & Relationships:

- Use numbers, monetary values, and fractions to show equivalency ($4+2=1+5$, 20 nickels is worth \$1.00, 3 thirds is the same as one whole)
- Use and communicate different strategies to solve addition/subtraction basic facts (doubles, doubles plus one, make a ten)
- Solve word problems using direct modeling, counting on....
- Explain strategies used to count collections of objects (make equal groups, skip counting)

Geometry:

- List, compare and explain geometric properties of two and three-dimensional figures
- Describe relationships between shapes when they have been combined or decomposed

Measurement:

- Estimate and measure length, weight, and capacity using standard/non-standard tools (objects, time, temperature)

Statistics and Probability:

- Ask and answer questions through data collection from experiments, surveys and spinners and draw conclusions.

Algebraic Relationships:

- Explain and extend patterns (repeating, increasing/decreasing) and relationships in tables and charts, including odd/even numbers
- Explain and use equality, properties and relationships to solve open and true/false number sentences using notations to communicate mathematical ideas.

Grade: 2

In grade 2, students will continue to learn addition and subtraction operations. Students will increase their knowledge of geometrical shapes and will describe data. They will learn to use measurement tools and continue to develop algebraic reasoning. These content goals will be addressed in contexts that promote problem solving, reasoning, communication, making connections, creating and analyzing representations.

Number Operations & Relationships:

- Explain and utilize strategies to compare and rename numbers
- Solve addition and subtraction basic facts and word problems
- Apply place-value concepts using money
- Use a variety of methods to solve multiplication (grouping, skip counting, repeated addition) and division (sharing, measuring, repeated subtraction) in real world situations
- Identify fractions as part of a whole and part of a set to solve everyday situations (equal sharing, partitioning)

Geometry:

- Explain and compare properties of two and three-dimensional figures (sides, faces, corners, edges) and represent on coordinate system.
- Predict results of combining and breaking down shapes using slides, flips and turns to two-dimensional shapes

Measurement:

- Estimate and find exact measurements of length, weight, area, temperature and time using a variety of strategies and standard/non-standard units

Statistics and Probability:

- Ask and answer questions through data collection from experiments, surveys and spinners and draw conclusions.

Algebraic Relationships:

- Describe and interpret how patterns are generated based on repetition, increase, and decrease (attribute, number, geometric)
- Explain and use equality, properties and relationships to solve open and true/false number sentences using notations to communicate mathematical ideas.

Grade: 3

In grade 3, students start to learn multiplication and division operations. They continue working with geometric shapes and the collection of data. They will also continue to use measurement tools and develop algebraic reasoning. These content goals will be addressed in contexts that promote problem solving, reasoning, communication, making connections, creating and analyzing representations.

Number Operations & Relationships:

- Communicate and use strategies to represent and compare numbers, estimate and solve real-world addition/subtraction problems, including money.
- Demonstrate knowledge of fractions using part-whole and set models to represent, compare and solve problems with fractions less than, equal to and greater than one whole.
- Represent concepts of multiplication (grouping, skip counting, repeated addition) and division (sharing, measuring, repeated subtraction) in real-life situations

Geometry:

- Describe and compare basic characteristics and properties of two and three-dimensional figures (sides, faces, corners and edges)
- Demonstrate how shapes can be combined or separated to make new shapes
- Apply geometrical concepts of slides, flips and turns

Measurement:

- Describe and compare attributes of objects, including area and perimeter using standard/non-standard units
- Convert simple units within a measurement system

Statistics and Probability:

- Create questions that lead to real-world data investigations
- Collect, organize, display, read and interpret data and draw reasonable conclusions
- Determine the likelihood and fairness of events and describe and predict outcomes and combinations of simple events.

Algebraic Relationships:

- Analyze, extend and make generalizations about geometric and numeric patterns (odd/even numbers)
- Explain the meaning of the equal sign and use symbols to represent problem situations (+, -, ÷, ·, =, <, >) using open-ended number sentences

Grade: 4

Grade 4 students expand their understanding and use of multiplication and division, and work with fractions and decimals. They study concepts of geometry, algebra, and data. These content goals will be addressed in contexts that promote problem solving, reasoning, communication, making connections, creating and analyzing representations.

Number Operations & Relationships:

- Use a variety of strategies to make estimates, pose and solve real-world problems (single and multi-step equations)
- Utilize all operations to compare and rename numbers and find factors and multiples
- Order, compare, rename, add/subtract decimals and fractions with/without context

Geometry:

- Describe, compare and identify properties of two and three-dimensional figures including symmetry
- Identify and describe transformations (slides, flips and turns)
- Use the coordinate system to plot locations and simple figures and identify relationships between objects

Measurement:

- Make measurement conversions within a system
- Describe and compare attributes of customary and metric units

Statistics and Probability:

- Design and conduct data investigations, display and describe data, summarize data sets (mean, median, mode, range) and draw conclusions
- Determine the likelihood and fairness of events and describe and predict outcomes and combinations of simple events

Algebraic Relationships:

- Recognize and extend patterns and describe rules for functional relationships
- Use symbols to represent problem situations and use properties and order of operations to solve equations involving operations

Grade: 5

In grade 5, students continue their work in number operations and relationships and learn more about using mathematical data to solve problems, including how to estimate, measure, and predict outcome. These content goals will be addressed in contexts that promote problem solving, reasoning, communication, making connections, creating and analyzing representations.

Number Operations & Relationships:

- Pose real-world problems and use a variety of strategies to solve single and multi-step word problems (number theory, place value, compare and estimate numbers)
- Create and represent equivalent forms of commonly used fractions, decimals and percents
- Compare and add/subtract fractions and decimals with/without context

Geometry:

- Describe, construct and classify polygons and polyhedra using properties of plane and coordinate geometry (angles, lines of symmetry, parallel lines, similarity)
- Identify, describe, and sketch three dimensional figures from multiple perspectives (transformations and movement between polyhedron)

Measurement:

- Compare measurement attributes and elapsed time
- Explain estimates, selection of unit and conversions of measure
- Determine measurement with tools and scales to specified degrees of accuracy (area, size of angle, elapsed time)

Statistics and Probability:

- Perform data investigations, interpret and summarize data sets (mean, median, mode, range) and draw conclusions (line plots and Venn diagrams)
- Determine the likelihood and fairness of events and describe and predict outcomes and combinations of simple events
- Represent probabilities as fractions and percents

Algebraic Relationships:

- Represent, extend and describe patterns and functional relationships using words, symbolic rules, tables and graphs.
- Create and justify use of equations, inequalities, properties
- Integrate order of operations to solve one and two-step problems with/without context

Grade: 6

In grade 6, students will apply their knowledge of basic skills to solve problems or predict results. These content goals will be addressed in contexts that promote problem solving, reasoning, communication, making connections, creating and analyzing representations.

Number Operations & Relationships:

- Identify prime and composite numbers and use factors, multiples, and prime factorization to solve and explain problems
- Rename numbers
- Apply, explain and evaluate a variety of strategies to estimate, compare and compute fractions, decimals and percents with/without context

Geometry:

- Compare and contrast properties of polygons and polyhedra (sides, angles, symmetry, faces) and draw or describe relationships of figures from multiple perspectives
- Plot, construct and transform points and shapes using the coordinate plane

Measurement:

- Estimate and measure attributes of objects (include angles)
- Make unit conversions within and between customary and metric systems
- Estimate, explain and calculate perimeter, circumference, area, distance and elapsed time in real-world contexts

Statistics and Probability:

- Interpret and summarize data sets and displays using measures of central tendency and variations and evaluate hypothesis and multiple representations for a given data set.
- Gather and display data from experiments and analyze outcomes based on theoretical and experimental probabilities to determine the likelihood and fairness of events

Algebraic Relationships:

- Examine, identify and extend patterns and functional relationships in sequences, tables and graphs and interpret graphs of real-life scenarios.
- Create mathematical models to represent real-life problem situations
- Compare expressions using order of operations and numerical properties
- Justify solutions to equations with letter variables

Grade: 7

In grade 7, students will develop a better understanding of the mathematical processes as they develop their ability to reason and draw conclusions. The focus is on understanding the mathematical processes and finding solutions and justifying their answers. These content goals will be addressed in contexts that promote problem solving, reasoning, communication, making connections, creating and analyzing representations.

Number Operations & Relationships:

- Write, rename, compare and identify equivalent forms of fractions, decimals and percents using place value and number theory concepts.
- Estimate and justify solutions to problems with and without context involving whole number, integers, and rational numbers
- Apply proportional reasoning to problem solving

Geometry:

- Identify polyhedra from multiple perspectives and determine the measure of angles and angle pairs in polygons
- Illustrate and classify symmetrical figures, transform figures on the coordinate plane
- Utilize properties of similarity in problem solving situations

Measurement:

- Perform estimates, measurements and conversions to determine distances using scales and formulas
- Apply proportional reasoning to enlarge and shrink figures
- Estimate and calculate perimeter/circumference and area of polygons and circles
- Determine volume and surface area of cylinders, prisms and pyramids

Statistics and Probability:

- Interpret and summarize data sets and displays using measures of central tendency and variations and evaluate hypothesis and multiple representations for a given data set.
- Design and conduct simulations to solve problems, determine likelihood and fairness of events, and make predictions and analyze outcomes based on theoretical and experimental probability.

Algebraic Relationships:

- Describe functional relationships in words, tables, graphs and symbolic rules, extend and justify sequence and describe graphs of real-world situations.

Grade: 8

In grade 8, students apply what they have learned in geometry and algebra. They get ready for higher level mathematics by manipulating symbols and understanding relationships. These content goals will be introduced in contexts that promote problem solving, reasoning, communication, making connections, creating and analyzing representations.

Number Operations & Relationships:

- Solve problems with/without contexts using comparisons, operations on real numbers and proportional reasoning (ratios and percents)

Geometry:

- Identify relationships between figures and their parts (Pythagorean Theorem), using properties of plane and coordinate geometry
- Use proportional reasoning, transformations and spatial visualization in problem solving situations

Measurement:

- Solve direct/indirect measurement problems using appropriate tools and procedures (perimeter, area, surface area, volume, angles and segments)

Statistics and Probability:

- Develop and analyze investigations, display data, analyze data using measures of central tendency/variation and evaluate methods and conclusions
- Invent and interpret experiments with simple and complex events.
- Predict likelihood of outcomes and justify strategies based on theoretical and experimental probabilities.

Algebraic Relationships:

- Analyze, describe and generalize mathematical and real-world patterns of change and functional relationships with emphasis on the role of variable quantities
- Model, solve and explain linear/non-linear equations using translations among tables, graphs and symbolic forms
- Understand properties to evaluate expressions and solve linear equations (commutative, associate and distributive)
- Plot and graph points/lines in coordinate plane
- Use order of operations to evaluate expressions

Grade: 9-12

High school students will focus on the foundation of algebraic thinking and learn algebraic models to solve problems. In geometry, student will apply formulas to analyze geometric shapes and solve problems. In intermediate levels of mathematics, students will interpret data using graphs, and formulas to develop their algebraic thinking. These content goals will be addressed in contexts that promote problem solving, reasoning, communication, making connections, creating and analyzing representations.

Number Operations & Relationships:

- Compare real numbers using order relations ($>$, $<$, $=$), ratios, proportions, percents and rates of change
- Perform and explain operations on real numbers (add, subtract, multiply, divide, exponents, roots, opposites, reciprocals, absolute value)
- Select and use appropriate strategies for problem solving situations (real-life)

Geometry:

- Identify, describe and analyze properties of figures and relationships
- Use geometric models to solve mathematical and real-world problems
- Present convincing argument through demonstration, proof informal proof or counter-examples
- Use the coordinate system and algebraic procedures to describe and characterize geometric properties and relationships (slope, intercepts, tangency, parallelism and perpendicularity)

Measurement:

- Identify, describe and use derived attributes to represent and solve problems.
- Utilize tools with appropriate degree of precision to determine measurements directly and indirectly within specified degrees of accuracy and error

Statistics and Probability:

- Analyze, organize, interpret data in the context of real world situations through investigations and data collection procedures
- Determine likelihood of occurrence of complex events

Algebraic Relationships:

- Analyze direct/inverse variation
- Use mathematical functions in a variety of methods (linear, quadratic, exponential, power)
- Solve linear and quadratic equations, linear inequalities and systems of linear equations and inequalities
- Model and solve a variety of mathematical and real-world problems by using algebraic expressions, equations and inequalities
- Write, solve and graph two-variable relationships