



Curriculum

Mathematics

Scope and Sequence P-8

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Rationale for the Mathematics Department

At St. Anne's Episcopal School, the development of each student's mathematical literacy and understanding is of critical importance. Students need a strong mathematics foundation in order to expand their knowledge, interpret information, make reasonable decisions, and solve increasingly complex problems. Students will use various approaches and tools, including calculators and computers to solve problems and communicate their understanding.

Goals of the Mathematics Department

The mathematics program at St. Anne's Episcopal School should, in accordance with NCTM standards:

1. Provide students with skill in computation within their own level of understanding and mathematical ability.
2. Develop in students the ability to think and reason independently and creatively.
3. Reinforce the students' mathematical curiosity and interest in various areas including technology.
4. Develop in students the ability to apply mathematical concepts to practical areas of daily life.

	PRESCHOOL	KINDERGARTEN	GRADE ONE	GRADE TWO	GRADE THREE
Mathematics	<p>Numbers</p> <ul style="list-style-type: none"> name, count and order numbers 1–10 simple patterns ordinal position count to 10 <p>Operations</p> <ul style="list-style-type: none"> introduction of simple addition and subtraction <p>Geometry</p> <ul style="list-style-type: none"> name basic shapes circle, triangle, rectangle, square, oval and rhombus spatial relationships: before/after, above/below <p>Measurement/Graphing</p> <ul style="list-style-type: none"> basic measures of length, weight, mass, size, capacity, and time comparative terms: longer/shorter, more/less <p>Technology Estimation/Statistics and Probability</p> <ul style="list-style-type: none"> estimating amounts 1–10 	<p>Numbers</p> <ul style="list-style-type: none"> read, write, and order whole numbers 1–20 understand ordinal numbers first through tenth sets: comparisons, concept of zero, 1:1 correspondence copying, extending, classifying and creating patterns rote counting to 100 skip count by 2s, 5s and 10s identify coins and their values count money count up to 20 objects <p>Operations</p> <ul style="list-style-type: none"> explore concept of more/less with manipulatives explore concept of + and – using manipulatives <p>Geometry</p> <ul style="list-style-type: none"> identify and compare basic geometric shapes introduce concept of symmetry <p>Measurement/Graphing</p> <ul style="list-style-type: none"> length, weight, size comparisons: longer/shorter nonstandard units of measure time: 1/2 hour, hour, day, week, month, calendar read, use graphs: concrete, picture, line and bar graphs interpret data <p>Technology</p> <ul style="list-style-type: none"> educational computer programs in class <p>Estimation/Statistics and Probability</p> <ul style="list-style-type: none"> develop estimation skills with numbers up to 100 	<p>Numbers</p> <ul style="list-style-type: none"> read, write, count and find numbers 0–120 on number line and number grid recognize and create numbers patterns skip counting by 1s, 2s, 3s, 5s and 10s place value through hundreds recognize fractions as part of a whole monetary value of coins decimal notation as parts of a dollar introduce monetary value of coins counting simple change counting of simple change <p>Operations</p> <ul style="list-style-type: none"> use a number line and 100 grid to add and subtract practice addition and subtraction fact families comparisons and relationships using symbols <, >, = introduce word problems and number stories <p>Geometry</p> <ul style="list-style-type: none"> name and recognize basic 2- and 3-dimensional shapes recognize and create patterns using 2 and 3 dimensional shapes copy and transform shapes, using template ruler, pattern blocks and tangrams <p>Measurement/Graphing</p> <ul style="list-style-type: none"> measure elapsed time, length, area, capacity, weight and temperature using standard and metric units read and use calendar and daily schedule read and compare bar graphs and pictographs <p>Technology</p> <ul style="list-style-type: none"> computer software used for math practice and reinforcement of skills calculator used for reinforcement of skills: entering numbers, addition, subtraction, and use of clear key <p>Estimation/Statistics and Probability</p> <ul style="list-style-type: none"> telling time to the hour and 1/2 hour on an analog clock introduce minutes and quarter hours measure, order and estimate size and number of objects estimate temperatures to nearest degree 	<p>Numbers</p> <ul style="list-style-type: none"> identify 1s, 10s, 100s, 1000s place write numbers through 1000 skip count by 2s, 3s, 4s, 5s, and 10s and sequencing patterns recognize even and odd numbers explore and compare fractions identify equivalent fractions expanded notation <p>Operations</p> <ul style="list-style-type: none"> master whole number + facts to 18 introduce multiplication and division concepts relation symbols <, >, and = 2 addition and subtraction with regrouping word problems using + and – <p>Geometry</p> <ul style="list-style-type: none"> explore 2- and 3-dimensional shapes classify objects according to shape (polygons vs. not-polygons) identify and name points and line segments find lines of symmetry <p>Money</p> <ul style="list-style-type: none"> count money to \$999.99 make change under \$5.00 <p>Measurement/Graphing</p> <ul style="list-style-type: none"> use Fahrenheit and Celsius read and place ordinal numbers to 20th review measuring using inches, centimeters and balance scales review telling time reading and using calendar <p>Technology</p> <ul style="list-style-type: none"> review calculator basics use memory key computer software for drill and practice games <p>Estimation/Statistics and Probability</p> <ul style="list-style-type: none"> estimation strategies 	<p>Numbers</p> <ul style="list-style-type: none"> counting patterns whole number place value through 1,000,000 rounding to nearest 100 decimals as fractions place value of decimals through hundredths understanding meaning of fractions identify numerator and denominator compare fractions expanded notation <p>Operations</p> <ul style="list-style-type: none"> mastery of addition and subtraction facts through 18 solve addition and subtraction word problems use estimation to add and subtract find sum and differences of 4 and 5 digit numbers, with regrouping introduction to multiplication and division fact families to 18 using arrays and manipulatives <p>Geometry</p> <ul style="list-style-type: none"> identify and describe plane and solid geometric figures by their attributes identify and compare lines, line segments and rays find perimeter of polygons and area of rectangles determine symmetry of shapes <p>Measurement/Graphing</p> <ul style="list-style-type: none"> collect, order, and display data using tables, charts and graphs use linear measurement to nearest 1/4 inch and centimeter use calendar to answer questions measure time to nearest five minutes elapsed time solve money and time story problems measure capacity using cups, quarts, gallons, teaspoons and tablespoons choose appropriate tools and units to measure length, liquid volume and weight <p>Technology</p> <ul style="list-style-type: none"> use calculators to supplement math skills and procedures use online games and tests to supplement learning of basic facts.
	<p><i>Numbers</i></p> <p><i>Operations</i></p> <p><i>Geometry</i></p> <p><i>Measurement/Graphing</i></p> <p><i>Technology</i></p> <p><i>Estimation/Statistics and Probability</i></p>				

	GRADE FOUR	GRADE FIVE
Mathematics	<p>Numbers</p> <ul style="list-style-type: none"> • read, write and compare: whole numbers through millions, decimals, fractions and integers • decimal place value through thousandths • find equivalent fractions • rename fractions as decimals and percents • operations • mastery of +, -, and x facts • add, subtract, multiply and divide multi-digit whole numbers • add, subtract, multiply and divide fractions and decimals • introduce exponential notation for powers of ten • introduce scientific notation <p>Geometry</p> <ul style="list-style-type: none"> • expand knowledge of vocabulary, notation and properties for geometric shapes including, rays, line segments, and lines • classify angles • find area and perimeter of polygons • make compass, protractors and straight edge constructions • properties of solids: surfaces, edges, faces, vertices, <p>Measurement/Graphing</p> <ul style="list-style-type: none"> • collect, organize, display and analyze data • use tables, graphs and charts • determine mean, median, mode and range <p>Technology</p> <ul style="list-style-type: none"> • use calculator games to promote mastery of facts • use computer software to practice facts, skills and concepts <p>Estimation/Statistics and Probability</p> <ul style="list-style-type: none"> • chance events • compare actual results with predicted results • determine the reliability of data 	<p>Numbers</p> <ul style="list-style-type: none"> • place value through billions and hundred thousandths • understand properties of odd/even numbers, prime/composite numbers, repeating and terminating decimals, integers • find squares/roots • use exponents and scientific notation to write large numbers • fractions, decimals, mixed numbers • rename fractions as decimals and percents <p>Operations</p> <ul style="list-style-type: none"> • practice algorithms for four operations: +, -, x and ÷ with whole numbers, fractions, decimals • add and subtract and multiply integers • learn Order of Operations and use of parentheses • introduce ratios and learn of Pi as a ratio <p>Geometry</p> <ul style="list-style-type: none"> • vocabulary, notation, definitions and basic relationships for 2- and 3-dimensional figures • congruence, similarity and transformations • area and perimeter of various polygons • area and circumference of circles • volume of rectangular prisms <p>Measurement/Graphing</p> <ul style="list-style-type: none"> • area and notation for square units • volume and notation for cubic units • organize and display data: number-line plot, stem-and-leaf plot, bar, circle and line graphs • recognize and use statistical landmarks: mean, median, mode, range, maximum and minimum • find and place ordered pairs on a coordinate grid <p>Technology</p> <ul style="list-style-type: none"> • use fraction, square [x2] square root [√] keys on calculator • adding, subtracting and multiplying integers on calculator • use spreadsheet to solve problems and graph information <p>Estimation/Statistics and Probability</p> <ul style="list-style-type: none"> • estimate using rounded numbers • ascertain the reasonableness of answers • determine likelihood of events
<i>Numbers</i>		
<i>Operations</i>		
<i>Geometry</i>		
<i>Measurement/Graphing</i>		
<i>Technology</i>		
<i>Estimation/Statistics and Probability</i>		

	GRADE SIX – Self Paced	GRADE SIX & Honors	GRADE SEVEN – Self Paced	GRADE SEVEN & Honors	GRADE EIGHT – Self Paced
Mathematics <i>Numbers</i> <i>Operations</i> <i>Geometry</i> <i>Measurement/ Graphing</i> <i>Technology</i> <i>Estimation/ Statistics and Probability</i>	<p>Numbers</p> <ul style="list-style-type: none"> • exploration of number theory • study of the decimal system • develop an understanding of positive exponents • extension of mathematical vocabulary • introduction to variables and solving basic one variable equations • writing variable expressions, equations, and inequalities <p>Operations</p> <ul style="list-style-type: none"> • develop mastery of +, −, x, and ÷ of rational numbers both mentally and in written computation • master the order of operations • understand the use of the commutative, associative and distributive properties and the importance of their application as they pertain to basic operations • extension of fractions, decimals, and percents • Automazation of common fractional and decimal conversions • introduction to simple and compound interest • extension of exponents and square roots <p>Geometry</p> <ul style="list-style-type: none"> • identification of geometric figures • construction and measurement of angles • introduction of point, line, and plane geometry including perimeter, area, and volume <p>Measurement and Graphing</p> <ul style="list-style-type: none"> • extension of English and metric measurements • extension of scale drawings <p>Technology</p> <ul style="list-style-type: none"> • extension of calculator skills • introduction to the spreadsheet and its graphing capabilities <p>Estimation, Statistics, and Probability</p> <ul style="list-style-type: none"> • understanding estimation and mental math • exploration of rounding applications 	<p>Numbers</p> <ul style="list-style-type: none"> • develop an understanding of both negative and positive exponents and scientific notation • study of the decimal system • exploration of number theory • writing variable expressions, equations, and inequalities • solving basic one variable equations • solving basic linear equations <p>Operations</p> <ul style="list-style-type: none"> • develop mastery of +, −, x and ÷ of rational numbers both mentally and in written computation • understand the use of the commutative, associative and distributive properties and the importance of their application as they pertain to basic operations • extension of exponents and square roots • Automazation of common fractional and decimal conversions • develop an understanding of ratios, proportions, and percent • introduction to simple interest • conversion of English and metric measurements • learn fraction and decimal equivalents <p>Geometry</p> <ul style="list-style-type: none"> • study of points, lines and planes • study of angle relationships • compass and straight edge construction • develop an understanding of perimeter and circumference of various shapes • area of various 2-dimensional shapes • volume, mass and surface area of 3-dimensional shapes • exploration of Pi and the Pythagorean theorem <p>Measurement and Graphing</p> <ul style="list-style-type: none"> • collect, organize and display data graphically • cartesian graphs • graphs of equations <p>Technology</p> <ul style="list-style-type: none"> • use of the calculator to explore more complex problems and to search for number patterns <p>Estimation, Statistics, and Probability</p> <ul style="list-style-type: none"> • identification of mean, median, and mode from data 	<p>Numbers</p> <ul style="list-style-type: none"> • manipulating exponents and powers of ten • exploring number theory and set notation • introduction to irrational numbers • translating word sentences and word problems to variable expressions and equations • solving complex single variable equations and inequalities <p>Operations</p> <ul style="list-style-type: none"> • extension of +, −, x and ÷ of rational numbers • use of commutative, associative and distributive properties • exploration of exponents and square roots • application of ratios and proportions • application of percents <p>Geometry</p> <ul style="list-style-type: none"> • study of point, line, and plane geometry • study of angle relationships • area of various 2-dimensional shapes • volume, mass and surface area of 3-dimensional shapes • exploration of Pi • the Pythagorean theorem <p>Measurement and Graphing</p> <ul style="list-style-type: none"> • collect, organize and display data graphically • create and interpret linear graphs • graph single variable equations and inequalities <p>Technology</p> <ul style="list-style-type: none"> • use of the calculator to explore more involved problems and to search for number patterns • use of manipulatives to understand concepts of perimeter, area, and volume <p>Estimation/Statistics and Probability</p> <ul style="list-style-type: none"> • extension of estimation and mental math when using the four basic operations and exponents 	<p>Numbers</p> <ul style="list-style-type: none"> • exploration of number theory and set notation • writing variable expressions • translating word sentences to algebraic equations and equations • solving complex single variable equations and inequalities • introduction of bases other than ten • *exploration of force and pressure • *exploration of Boyle's Law • *exploration of buoyancy <p><i>*Apply to the Honors section only</i></p> <p>Operations</p> <ul style="list-style-type: none"> • develop mastery of +, −, x and ÷ of real numbers • develop an understanding of positive and negative exponents • explore various roots and develop an understanding of fractional exponents • use ratios and proportions • study simple and compound interest, percent increase and percent decrease, and percent of change problems <p>Geometry</p> <ul style="list-style-type: none"> • study of points, lines, and planes • study of angle relationships • compass and straight edge construction • area of various 2-dimensional shapes • volume, mass and surface area of 3-dimensional shapes • extension of the Pythagorean theorem • explore special right triangles • introduction to the trigonometric ratios of sine, cosine and tangent • introduction of law of sines • introduction to proofs • *introduction to vectors <p><i>*Apply to the Honors section only</i></p> <p>Measurement and Graphing</p> <ul style="list-style-type: none"> • collect, organize and display data graphically • cartesian graphs • graphs of equalities and inequalities • introduction to linear graphs • introduction to solving systems of equations graphically <p>Technology</p> <ul style="list-style-type: none"> • extension of spreadsheet usage • use of the sin, cos, and tan keys on the calculator • use of calculator to explore more complex problems and to search for number patterns 	<p>Numbers</p> <ul style="list-style-type: none"> • exploration of number theory and set notation • writing variable expressions • translating word expressions and sentences to algebraic expressions, equations, and inequalities • solving compound equations and inequalities • exploration of absolute value • exploration and comparison of the three forms of linear functions • extension of solving systems of equations by various methods including graphing, elimination, and substitution <p>Operations</p> <ul style="list-style-type: none"> • extension of +, −, x, ÷ of real numbers and algebraic expressions • use of positive and negative exponents • introduction to various roots • introduction to the properties that govern exponents • extension of ratios and proportions • exploration of simple and compound interest, percent increase and percent decrease • perform operations with terms involving radicals <p>Geometry</p> <ul style="list-style-type: none"> • extension of geometric vocabulary • explore the link between geometry and algebra • special right triangles • the Pythagorean theorem • introduction to sine, cosine, and tangent <p>Measurement and Graphing</p> <ul style="list-style-type: none"> • collect, organize and display data graphically • construction and interpretation of box and whisker plots and scatter plots • application and interpretation of Cartesian graphs • graphs of equalities and inequalities • introduction to linear graphs • introduction to solving systems of equations graphically <p>Technology</p> <ul style="list-style-type: none"> • extension of spreadsheet usage • expanded use of the different keys on the scientific calculator • use of Geometer Sketchpad software to explore graphs of functions • use of the calculator to explore more involved problems and to search for number patterns • use of Lab Gear manipulatives to convey mathematical concepts <p>Estimation, Statistics, and Probability</p> <ul style="list-style-type: none"> • extension of estimation and mental math when using the four basic operations • introduction to the measures of central tendency • exploration of permutations and combinations • exploration of independent and dependent events

GRADE EIGHT Algebra I & Honors Algebra	NOTE	TEXTS
<p>Numbers</p> <ul style="list-style-type: none"> • introduction to polynomials • learn to identify various types of trinomials • extension of solving equalities and inequalities • develop an understanding of quadratic equations and the quadratic formula • extension of solving systems of equations by various methods including graphing, elimination, and substitution • introduction to functions, and the concepts domain and range <p>Operations</p> <ul style="list-style-type: none"> • +, −, \times and \div of polynomials • application of exponents • direct and inverse variation • simplifying rational expressions • perform operations with terms involving radicals • extension of ratios and proportions • understand how to factor polynomials • using factoring, graphing, completing the square, and the quadratic formula to solve quadratic equations • study the structure of parabolas and learn how the graph relates to its equation <p>Measurement and Graphing</p> <ul style="list-style-type: none"> • Cartesian graphing • interpreting graphs of 1st, 2nd, and 3rd degree equations • introduction to lines of regression • graphs of equalities and inequalities • introduction to graphing parabolic and exponential equations <p>Technology</p> <ul style="list-style-type: none"> • extension of spreadsheet usage • use of Lab Gear manipulatives to help convey mathematical concepts • introduction to graphing calculators <p>Estimation, Statistics, and Probability</p> <ul style="list-style-type: none"> • introduction of combinations and permutations • exploration of Pascal’s triangles • exploration of the Fibonacci sequence • exploration of the golden ratio 	<p>In an effort to meet the needs of the middle school students, the Math Department may, on occasion, create additional sections. While following the basic elements of their respective grade-level curriculum, these classes will concentrate primarily on developing competency in core areas.</p>	<p>Grade 6</p> <ul style="list-style-type: none"> • Dolciani, M., Sorgenfrey, R., and Graham, J. (1992). Mathematics Structure and Method Course 1. Houghton Mifflin. Boston <p>Grade 7</p> <ul style="list-style-type: none"> • Dolciani, M., Sorgenfrey, R., and Graham, J. (1992). Mathematics Structure and Method Course 2. McDougal Littell. Boston <p>Grade 8 Self-Paced Texts</p> <ul style="list-style-type: none"> • Larson, R., Boswell, L., Kanold, T., and Stiff, L. (2004). Algebra 1. McDougal Littell. Boston. • Wah, A. and Picciotto, H. (1994). Algebra. Creative Publications. California <p>Grade 8 and Grade 8 Honors Texts</p> <ul style="list-style-type: none"> • Larson, R., Boswell, L., Kanold, T., and Stiff, L. (2004). Algebra 1. McDougal Littell. Boston. • Wah, A. and Picciotto, H. (1994). Algebra. Creative Publications. California • *Benson J., Dodge, S., Dodge, W., Hamberg, C., Milauskas, G., and Rukin, R. (1991). Algebra 1 An Integrated Approach. McDougal Littell. Illinois <p><i>*Apply to the Honors section only</i></p>