

Middle School Math at Da Vinci Academy

Overall Program Goals:

1. To the extent possible, teach our students at their ability level.
2. To encourage and inspire mathematical thinkers who can solve problems.
3. To demonstrate the relevance of our math instruction by using extensions and connections to the real world and other subjects such as art, music, science.

Da Vinci seeks to balance our commitment to small class sizes and allowing each child to work to his/her potential with a structure that allows for an adequate amount of direct instruction and teacher-student interaction. We offer a sequence of six mathematics courses in middle school: Course 1, Course 2, PreAlgebra, High School Algebra I, High School Algebra II, and High School Geometry. All of our middle school students are expected to complete at least one year of high school math at Da Vinci. Students taking high school level classes will not earn high school credit; however, students who perform satisfactorily at Da Vinci should receive placement into the next level in high school.

Generally, students in a particular grade may be working in three different math courses. To facilitate effective instruction, we will have cross-grade level (5 & 6) and (7 & 8) math classes beginning with the 2009-10 school year. No more than two courses will meet at during the same period with the middle school math teacher and math assistant (who is a licensed teacher).

Classes are intended to be completed in a year and taken sequentially; however, we constantly evaluate student progress, especially prior to Algebra I. Some students may complete the Course 1, Course 2, PreAlgebra sequence in two years.

Course offerings and grade levels:

5-6 Group 1	Pre-Algebra and Course 2
5-6 Group 2	Algebra and Course 1
7-8 Group 1	Pre-Algebra and Algebra
7-8 Group 2	Algebra II or Geometry

Algebra II and Geometry will be offered in alternate years. We use Prentice-Hall textbooks in middle school courses and Scott Foresman, Addison Wesley Books 4 & 5 in third and fourth grade. ALEKS software is employed to supplement our 3-8 math program. Most fifth graders will begin their middle school math sequence in Course 1 or 2.

Middle School Math Courses

Math Course 1 – This class covers material typically covered in Sixth Grade mathematics textbooks. Course One instruction introduces division with decimals. By the end of the year, each student must demonstrate mastery of all four operations with decimals. After reviewing basic fraction concepts, these fractions are used to add, subtract, multiply, and divide with an emphasis on understanding divisibility rules and factoring. Problem solving with percents is introduced. Higher level thinking is pursued, introducing strategies for solving multi-step problems and working backwards.

Math Course 2 – Course Two instruction initially reviews the use of decimals and fractions, focusing on mixed numbers. By the end of the year, each student must demonstrate mastery of all four operations with fractions. Students will progress to doing computations with integers without depending upon the use of manipulatives. Formulas are used in the study of geometric shapes. Solving problems with percents is accomplished using algebraic equations. A unit on probability and statistics will be included

in this class. Enrichment activities will broaden the students' mathematical foundation. Again the level of thinking is challenged and enhanced.

Pre-Algebra – The number of Fifth Grade students taking Pre-Algebra will always be very small. During the study of Pre-Algebra, students must develop their mathematical reasoning, their algebraic thinking skills, and their computational accuracy for future work in mathematics. To this end, some major goals for students in Pre-Algebra are: to develop the idea of a variable and evaluate and simplify algebraic expressions, to skillfully perform operations on integers and then all rational numbers, to solve equations, to understand and use the exponent rules, to perform operations on polynomials, to graph linear equations and inequalities on a coordinate plane by the slope-intercept method, to discuss basic probability and statistics concepts, to expand the ideas of percent, ratio and proportion, to connect math to history and science, to discuss and write about mathematical ideas, to solve problems requiring different strategies, and to relate math to today's life and careers.

Algebra I – A comprehensive course in high school-level Algebra is completed by all Da Vinci students. The required areas of study include: 1) Variables, Function Patterns and Graphs 2) Rational Numbers 3) Solving Equations & Inequalities 4) Linear Equations & Functions & their graphs 5) Systems of Equations & Inequalities 6) Exponents & Exponential Functions 7) Polynomials & Factoring 8) Quadratic Equations & Functions 9) Radical Expressions and Equations 10) Rational Expressions and Functions.

Algebra II – Algebra II at DaVinci is offered to students who have successfully completed a year of high-school level Algebra. Geometry completion is not always a prerequisite for Algebra II. The text used is Algebra and Trigonometry, Functions & Applications by Paul A Foerster. Required areas of study include the following: 1) Functions and relations, 2) Linear functions, 3) Systems of Linear Equations and Inequalities, 4) Quadratic functions and complex numbers, 5) Exponential and Logarithmic Functions, 6) Rational algebraic Functions and Irrational Algebraic Functions, 7) Quadratic Relations and Systems (Circles, Ellipses, Hyperbolas, etc...), 8) Higher Degree Functions and Complex numbers, 9) Sequences and Series and 10) Probability, data analysis and random variables. Our text also includes Trigonometry. These chapters are currently optional areas of study.

Geometry – The study of Geometry at Da Vinci deals with two and three dimensional figures and their properties. Polygons and solids, visualization and diagrams are emphasized as well as the use of some technology via Cabri (all students are required to have a TI-84). Development of logical thinking processes through deductive and inductive reasoning is used as well. Algebra is integrated where appropriate, such as simplifying radicals and solving using quadratic equations. Topics include tools of geometry, reasoning and proof, parallel and perpendicular lines. The course also covers congruent triangles, relationships in triangles, quadrilaterals, proportions and similarity. In the second half of the year we study right triangles and trigonometry, transformations, area surface area and volume, and circles.