MIDDLE SCHOOL MATHEMATICS

PRE-ALGEBRA

FOCUS OF MIDDLE SCHOOL MATHEMATICS LEARNING

- To build on students' concrete reasoning experiences developed in the elementary grades
- To construct through active learning experiences a more advanced understanding of mathematics
- To develop deep mathematical understandings required for success in abstract learning experiences
- To apply mathematics as a tool in solving real-world problems

Counselors are available to assist parents and students with course selections and career planning. Parents may arrange to meet with the counselor by calling the school's guidance department.

COURSE DESCRIPTION
Pre-Algebra is a mathematics course for sixth grade students who exhibit high mathematical ability and achievement. The course is designed to prepare students for Algebra I Honors in grade 7. The course focuses on the development of problem-solving skills and the acquisition of mathematical vocabulary and symbols. The active engagement of students along with the use of manipulatives and technology, such as calculators, computers, and spreadsheets, will allow students to develop an understanding of the mathematical principles they are learning. Facility in the use of technology will not be a substitute for students' understanding of quantitative concepts and proficiency in basic computations. Topics include: operations with rational numbers; solving practical problems involving rational numbers; percents, ratios and proportions; operations with integers; concepts involving exponents and square roots; identifying and representing sequences and relationships; solving multi-step linear equations and inequalities; graphing and identifying linear equations in two variables; applying order of operations to evaluate algebraic expressions; measurement concepts and applications in the U.S. Customary and metric systems including perimeter, area, volume, and surface area; basic geometric concepts in the coordinate plane; three-dimensional models; Pythagorean Theorem, and probability and statistics.

PREREQUISITE
Mathematics 5

OPTION FOR NEXT COURSE
Algebra I Honors

REQUIRED STUDENT TEXTBOOK
Glencoe Pre-Algebra (Virginia Edition*).* John A. Carter, Ph.D., Gilbert J. Cuevas, Ph.D., Roger Day, Ph.D., and Carol Malloy, Ph.D. Glencoe McGraw-Hill, 2012

RECOMMENDED CALCULATOR
TI-30Xa SEVA

VBO #	Objective
	Unit 1: Number and Number Sense
MA.6.NS.6PA.3	The student will describe orally and in writing the relationships between the subsets of the real number systems. **(SOL 8.2)**
MA.6.NS.6PA.7	The student will identify, represent, compare, and order integers. **(SOL 6.3a, b)**
MA.6.NS.6PA.8	The student will identify and describe absolute value for rational numbers. **(SOL 6.3c, 7.1e)**
MA.6.NS.6PA.10	The student will investigate and describe concepts of positive exponents, perfect squares, and square roots. **(SOL 6.5, 7.1d)**
MA.6.NS.6PA.11	The student will find the two consecutive whole numbers between which a square root lies. **(SOL 8.5b)**
MA.6.NS.6PA.12	The student will investigate and describe the concept of positive and negative exponents for powers of ten. **(SOL 7.1a)**
MA.6.NS.6PA.13	The student will determine scientific notation for numbers greater than zero. **(SOL 7.1b)**
MA.6.CE.6PA.7	The student will model and solve problems involving addition, subtraction, multiplication, and division of integers. **(SOL 7.3)**
MA.6.GE.6PA.1	The student will identify the coordinates of a point in a coordinate plane and graph ordered pairs in a coordinate plane. **(SOL 6.11)**
	Unit 2: Rational Numbers
MA.6.NS.6PA.4	The student will investigate and describe fractions, decimals, and percents as ratios and demonstrate equivalent relationships. **(SOL 6.2a, c)**
MA.6.NS.6PA.5	The student will identify a given decimal, fraction, and/or percent from a representation. **(SOL 6.2b)**
MA.6.NS.6PA.6	The student will compare and order fractions, decimals, percents, and scientific notation using manipulatives, pictorial representations, number lines, and the symbols $>, <, \leq, \geq, =$. **(SOL 6.2c, d, 7.1c)**
MA.6.NS.6PA.9	The student will demonstrate multiple representations of multiplication and division of fractions. **(SOL 6.4)**
MA.6.CE.6PA.1	The student will determine the greatest common factor of two or more numbers using prime factorization.
MA.6.CE.6PA.2	The student will multiply and divide fractions and mixed numbers. **(SOL 6.6a)**
MA.6.CE.6PA.3	The student will estimate solutions and then solve single-step and multistep practical problems involving addition, subtraction, multiplication, and division of fractions, and decimals. **(SOL 6.6b, 6.7)**
MA.6.CE.6PA.4	The student will solve single-step and multistep practical problems involving rational numbers, percents, ratios, and proportions. **(SOL 7.4, 8.3a)**
MA.6.CE.6PA.8	The student will find the quotient, given a dividend expressed as a decimal through thousandths and a divisor expressed as a decimal to thousandths with exactly one non-zero digit (no calculator).
	Unit 3: Algebra
MA.6.CE.6PA.6	The student will simplify and evaluate numerical expressions involving positive exponents, using rational numbers, order of operations, and properties of operations with real numbers. **(SOL 6.8, 8.1a)**
MA.6.PF.6PA.1	The student will investigate, recognize, and apply the following properties of operations with real numbers: a) the commutative and associative properties for addition and multiplication; b) the distributive property; c) the additive and multiplicative identity properties; d) the additive and multiplicative inverse properties; and e) the multiplicative property of zero. **(SOL 6.19, 7.16, 8.15c)**

MA.6.PF.6PA.4	The student will write verbal expressions as algebraic expressions and sentences as equations and vice versa. **(SOL 7.13a)**
MA.6.PF.6PA.5	The student will evaluate algebraic expressions for the given replacement values of variables using order of operations. **(SOL 7.13b, 8.4)**
MA.6.PF.6PA.6	The student will solve one- and two-step linear equations in one variable involving whole number coefficients and positive rational solutions. **(SOL 6.18, 7.14a)**
MA.6.PF.6PA.7	The student will solve multistep linear equations in one variable with the variable on one and two sides of the equation. **(SOL 8.15 a)**
MA.6.PF.6PA.8	The student will solve practical problems requiring the solution of one- and two-step linear equations. **(SOL 7.14b)**
MA.6.PF.6PA.9	The student will solve and graph solutions to one and two-step inequalities on a number line involving one variable. **(SOL 6.20, 7.15, 8.15b)**
Unit 4: Ratios and Proportions	
MA.6.NS.6PA.1	The student will describe and compare data, using ratios, and will use appropriate notations, such as $\frac{a}{b}$, a to b, and $a{:}b$. **(SOL 6.1)**
MA.6.NSPA.6.2	The student will create a relationship in words for a given ratio expressed symbolically. **(SOL 6.1)**
MA.6.NS.6PA.4	The student will investigate and describe fractions, decimals, and percents as ratios and demonstrate equivalent relationships. **(SOL 6.2a, c)**
MA.6.CE.6PA.4	The student will solve single-step and multistep practical problems involving rational numbers, percents, ratios, and proportions. **(SOL 7.4, 8.3a)**
MA.6.CE.6PA.5	The student will determine the percent increase or decrease for a given situation. **(SOL8.3b)**
MA.6.GE.6PA.6	The student will determine whether plane figures—quadrilaterals and triangles—are similar and write proportions to express the relationships between corresponding sides of similar figures. **(SOL 7.6)**
Unit 5: Statistics	
MA.6.SP6PA.1	The student, given a problem situation, will construct circle graphs, draw conclusions, and make predictions using those graphs. **(SOL 6.14a, b)**
MA.6.SP.6PA.2	The student, given a problem situation, will construct, analyze, compare, and contrast graphs, including histograms and scatter plots, that present information from the same data set. **(SOL 6.14c, 7.11, 8.13b)**
MA.6.SP.6PA.3	The student will make comparisons, predictions, and inferences using information displayed in graphs. **(SOL 8.13 a)**
MA.6.SP.6PA.4	The student will describe mean as balance point and decide which measure of center (mean, median, or mode) is appropriate for a given purpose. **(SOL 6.15)**
Unit 6: Probability	
MA.6.SP.6PA.5	The student will compare, contrast, and determine probabilities for dependent and independent events with and without replacement. **(SOL 6.16, 8.12)**
MA.6.SP.6PA.6	The student will investigate and describe the difference between the experimental probability and theoretical probability of an event. **(SOL 7.9)**
MA.6.SP.6PA.7	The student will determine the probability of compound events using the Fundamental (Basic) Counting Principle. **(SOL 7.10)**
Unit 7: Geometry	
MA.6.GE.6PA.1	The student will identify the coordinates of a point in a coordinate plane and graph ordered pairs in a coordinate plane. **(SOL 6.11)**
MA.6.GE.6PA.2	The student will determine congruence of segments, angles, and polygons. **(SOL 6.12)**
MA.6.GE.6PA.3	The student will verify by measuring and describe the relationships among vertical angles, adjacent angles, supplementary angles, and complementary angles. **(SOL 8.6a)**
MA.6.GE.6PA.4	The student will measure angles of less than 360°. **(SOL 8.6 b)**
MA.6.GE.6PA.5	The student will describe, identify, compare, and contrast properties of quadrilaterals including parallelogram, rectangle, square, rhombus, and trapezoid. **(SOL 6.13, 7.7)**

MA.6.GE.6PA.6	The student will determine whether plane figures—quadrilaterals and triangles—are similar and write proportions to express the relationships between corresponding sides of similar figures. **(SOL 7.6)**
MA.6.GE.6PA.7	The student will construct a three-dimensional model, given the top or bottom, side, and front views. **(SOL 8.9)**
MA.6.GE.6PA.8	The student will verify and apply the Pythagorean Theorem. **(SOL 8.10)**
MA.6.GE.6PA.9	The student, given a polygon in the coordinate plane, will represent, apply, and identify applications of transformations (reflections, dilations, rotations, and translations) by graphing in the coordinate plane. **(SOL 7.8, 8.8)**
	Unit 8: Measurement
MA.6.ME.6PA.2	The student will define π (pi) as the ratio of the circumference of a circle to its diameter. **(SOL 6.10a)**
MA.6.ME.6PA.3	The student will solve practical problems involving circumference and area of a circle, given the diameter or radius. **(SOL 6.10b)**
MA.6.ME.6PA.4	The student will solve practical problems involving area and perimeter of triangles, squares, rectangles, and parallelograms using formulas and manipulatives. **(SOL 6.10c)**
MA.6.ME.6PA.5	The student will solve practical area and perimeter problems involving composite plane figures. **(SOL 8.11)**
MA.6.ME.6PA.6	The student will describe and determine the volume and surface area of rectangular prisms, pyramids, cylinders, and cones. **(SOL 6.10d, 7.5a)**
MA.6.ME.6PA.7	The student will solve practical problems involving the volume and surface area of rectangular prisms, pyramids, cones, and cylinders. **(SOL 7.5b, 8.7a)**
MA.6.ME.6PA.8	The student will describe how changing one measured attribute of a figure affects its volume and surface area. **(SOL 7.5c, 8.7b)**
	Unit 9: Linear Equations
MA.6.PF.6PA.2	The student will describe and represent geometric and arithmetic sequences, using variable expressions. **(SOL 6.17, 7.2)**
MA.6.PF.6PA.3	The student will represent and make connections between any two representations (tables, graphs, rules, and words) of a given relationship. **(SOL 7.12, 8.14)**
MA.6.PF.6PA.10	The student will graph a linear equation in two variables. **(SOL 8.16)**
MA.6.PF.6PA.11	The student will identify the domain, range, independent variable, or dependent variable in a given situation. **(SOL 8.17)**
	Unit 10: Post-SOL Topics
MA.6.ME.6PA.1	The student will make ballpark comparisons between measurements in the U.S. Customary System of measurement and measurements in the metric system. **(SOL 6.9)**