**COURSE DESCRIPTION**

**Course Title:** Pre-Algebra Grade 8

**Course Number:** 00201

**Course Prerequisites:** Completion of Mathematics Grade7

**Course Description:** Pre-Algebra Grade 8 builds upon computational, problem solving, graphing, and algebraic concepts previously learned in mathematics. Pre-Algebra Grade 8 provides learning experiences required for Algebra I such as linear equations, functions, graphing, geometry, systems of equations, and bivariate data. It will provide students with problem-solving, reasoning skills, and mathematical concepts necessary to be successful learners in future mathematics courses. Students will take the Grade 8 PSSA Math Exam. District marking period assessments are required.

**Suggested Grade Level**: Grade 8

**Length of Course:** Two Semesters

**Units of Credit:** 1

**PDE Certification and Staffing Policies and Guidelines (CSPG) Required Teacher Certifications:**

CSPG #50 Mathematics (7-12), CSPG #53 Middle Level Mathematics,
CSPG #70 Grades 4-8 (All subjects 4- 6, Mathematics 7-8)

To find the CSPG information, go to [CSPG](https://www.education.pa.gov/Educators/Certification/Staffing%20Guidelines/Pages/default.aspx)

**Certification verified by the WCSD Human Resources Department:** [x] Yes [ ] No

**WCSD STUDENT DATA SYSTEM INFORMATION**

**Course Level:** Academic

**Mark Types:** Check all that apply.

[x] F – Final Average [x] MP – Marking Period [x] EXM – Final Exam

**GPA Type**: [ ]  GPAEL-GPA Elementary [x]  GPAML-GPA for Middle Level [ ]  NHS-National Honor Society

[ ]  UGPA-Non-Weighted Grade Point Average [ ]  GPA-Weighted Grade Point Average

**State Course Code**: 02051

To find the State Course Code, go to [State Course Code](https://nces.ed.gov/forum/sced.asp), download the Excel file for *SCED*, click on SCED 6.0 tab, and choose the correct code that corresponds with the course.

**TEXTBOOKS AND SUPPLEMENTAL MATERIALS**

**Board Approved Textbooks, Software, and Materials:**

**Title:**  *enVisionmath 2.0 Grade 8*

**Publisher:** SAVVAS Learning Company LLC.

**ISBN #:**  978-0-32895-258-8

**Copyright Date:** 2017

**WCSD Board Approval Date:** 6/29/2020

**Supplemental Materials:** Kuta Software, Get More Math, SAS pdesas.org, Brainfuse, IXL,
 Calculator: TI-30XIIS, Online Calculator: DESMOS

**Curriculum Document**

**WCSD Board Approval:**

**Date Finalized:** 5/22/2023

**Date Approved:**  6/12/2023

**Date(s) Revised:** 6/10/2024 **Implementation Year:** 2023-2024

**SPECIAL EDUCATION, 504, and GIFTED REQUIREMENTS**

The teacher shall make appropriate modifications to instruction and assessment based on a student’s Individual Education Plan (IEP), Chapter 15 Section 504 Plan (504), and/or Gifted Individual Education Plan (GIEP).

**SCOPE AND SEQUENCE OF CONTENT AND CONCEPTS**

**Marking Period 1: Real Numbers and Linear Equations**

* Rational Numbers
* Irrational Numbers
* Comparison and Order of Real Numbers
* Square Roots and Cube Roots: Evaluate, Solve Equations
* Properties of Exponents
* Estimation of Quantities Using Powers of 10
* Scientific Notation and Standard Form:
	+ Conversions
	+ Operations
* Equations:
	+ Variables on Both Sides
	+ Multi – Step
	+ Coefficients and Constants: Decimal, Fraction, Negative
	+ Solutions: One, No, Infinitely Many
* Proportional Relationships
* Proportional Relationships and Slope
* Analysis of Linear Equations
	+ $y=mx$ (slope)
	+ $y=mx+b$ (slope, y-intercept)
* **Marking Period 1 Review and Assessment**

 **Marking Period 2: Functions, Bivariate Data, and
 Systems of Linear Equations: Estimation, Graphing**

* Relations and Functions: Understand, Interpret
* Representation of Functions through Various Models
* Comparison of Linear and Non-Linear Functions
* Construction of Functions to Model Linear Relationships
* Analysis of Qualitative Graphs: Increase, Decrease
* Linear and Non-Linear Functions
	+ Creation of Sketches
	+ Analysis of Sketches
* Scatter Plots
	+ Construction and Interpretation
	+ Analysis of Linear Associations
	+ Predictions with Linear Models
* Construction and Interpretations of Two-Way Frequency Tables
* Construction and Interpretations of Two-Way Relative Frequency Tables
* Systems of Linear Equations
	+ Estimation
	+ Graphing
* **Marking Period 2 Review and Assessment**

**Marking Period 3: Systems of Linear Equations: Substitution, Elimination, Geometry:
 Congruence and Similarity, Pythagorean Theorem, and Geometry:
 Surface Area**

* Systems of Linear Equations: Substitution, Elimination
* Translations
* Reflections
* Rotations
* Composition of Transformations
* Congruent Figures
* Dilations
* Similar Figures
* Pythagorean Theorem and Its Converse: Understanding, Application, Problem Solving
* Surface Area of Three-Dimensional Figures: Cylinder, Cone, Sphere
* **Marking Period 3 Review and Assessment**

**Marking Period 4: Volume, Grade 8 PSSA Math Preparation and Assessment,
 and Algebra I Preparation: Polynomials**

* Volume of Three-Dimensional Figures: Cylinder, Cone, Sphere
* **Grade 8 PSSA Math Preparation and Assessment**
	+ The Number System
	+ Expressions
	+ Equations
	+ Functions
	+ Geometry
	+ Statistics
* Algebra 1 Preparation: Polynomials
	+ Definition
	+ Classification
	+ Sum
	+ Difference
	+ Product: Polynomial and Monomial
	+ Product: Binomial and Binomial

**Standards/Eligible Content and Skills**

| **Performance Indicator** | **PA Core Standard and/or Eligible Content** | **Marking Period Taught**  |
| --- | --- | --- |
| Write repeating decimals as fractions. | M08.A-N.1.1.2 | MP1 |
| Write repeating decimals with non-repeating digits as fractions. | M08.A-N.1.1.2 | MP1 |
| Write repeating decimals with multiple repeating digits as fractions. | M08.A-N.1.1.2 | MP1 |
| Identify irrational numbers. | M08.A-N.1.1.1 | MP1 |
| Identify square roots and irrational numbers. | M08.A-N.1.1.1 | MP1 |
| Classify numbers as rational or irrational. | M08.A-N.1.1.1 | MP1 |
| Estimate the value of an irrational number. | M08.A-N.1.1.3 | MP1 |
| Compare and order rational and irrational numbers. | M08.A-N.1.1.4 | MP1 |
| Locate/identify rational and irrational numbers at their approximate locations on a number line. | M08.A-N.1.1.5 | MP1 |
| Evaluate cube roots to solve problems. | M08.B-E.1.1.2CC.2.2.8.B.1 | MP1 |
| Evaluate perfect squares and perfect cubes. | M08.B-E.1.1.2CC.2.2.8.B.1 | MP1 |
| Evaluate square roots to solve problems. | M08.B-E.1.1.2CC.2.2.8.B.1 | MP1 |
| Solve equations involving perfect squares. | M08.B-E.1.1.2CC.2.2.8.B.1 | MP1 |
| Solve equations involving perfect cubes. | M08.B-E.1.1.2CC.2.2.8.B.1 | MP1 |
| Solve equations involving imperfect squares and cubes. | M08.B-E.1.1CC.2.2.8.B.1 | MP1 |
| Multiply exponential expressions: same base, different base. | M08.B-E.1.1.1CC.2.2.8.B.1 | MP1 |
| Find the power of a power. | M08.B-E.1.1.1CC.2.2.8.B.1 | MP1 |
| Divide exponential expressions with the same base. | M08.B-E.1.1.1CC.2.2.8.B.1 | MP1 |
| Use the Zero Exponent Property. | M08.B-E.1.1.1CC.2.2.8.B.1 | MP1 |
| Use the Negative Exponent Property. | M08.B-E.1.1.1CC.2.2.8.B.1 | MP1 |
| Simplify expressions with negative exponents. | M08.B-E.1.1.1CC.2.2.8.B.1 | MP1 |
| Estimate very large and very small quantities. | M08.B-E.1.1.3 | MP1 |
| Express how many times larger or smaller one number is than another. | M08.B-E.1.1.3 | MP1 |
| Write large and small numbers in scientific notation. | M08.B-E.1.1.3 | MP1 |
| Convert scientific notation to standard form. | M08.B-E.1.1.4 | MP1 |
| Perform operations with numbers expressed in scientific notation: addition, subtraction, multiplication, division. | M08.B-E.1.1.4 | MP1 |
| Combine like terms to solve addition equations. | M08.B-E.3.1.2 | MP1 |
| Combine like terms to solve subtraction equations. | M08.B-E.3.1.2 | MP1 |
| Combine like terms with negative coefficients to solve equations. | M08.B-E.3.1.2 | MP1 |
| Solve equations with fractional coefficients, decimal coefficients, and negative coefficients. | M08.B-E.3.1.2 | MP1 |
| Use the Distributive Property to solve a multi-step equation. | M08.B-E.3.1.2 | MP1 |
| Distribute a negative coefficient to solve equations. | M08.B-E.3.1.2 | MP1 |
| Solve using the Distributive Property on both sides of an equation. | M08.B-E.3.1.2 | MP1 |
| Solve an equation with one solution, no solution, and infinitely many solutions. | M08.B-E.3.1.1 | MP1 |
| Determine the number of solutions by inspection. | M08.B-E.3.1.1 | MP1 |
| Solve real-world and mathematical problems of linear equations. | M08.B-E.3.1.5 | MP1 |
| Compare proportional relationships represented by tables and graphs. | M08.B-E.2.1.1 | MP1 |
| Compare proportional relationships represented by graphs and equations. | M08.B-E.2.1.1 | MP1 |
| Compare proportional relationships represented by graphs and verbal descriptions. | M08.B-E.2.1.1 | MP1 |
| Understand slope. | M08.B-E.2.1.1 | MP1 |
| Find the slope from two points. | M08.B-E.2.1.2 | MP1 |
| Interpret slope. | M08.B-E.2.1.1 | MP1 |
| Relate the constant of proportionality to slope. | M08.B-E.2.1.1 | MP1 |
| Write a linear equation from two points. | M08.B-E.2.1.2 | MP1 |
| Graph a linear equation of the forms: y = mx (slope) , y = mx + b (slope, y-intercept). | M08.B-E.2.1.3 | MP1 |
| Determine the y-intercept of a relationship. | M08.B-E.2.1.3 | MP1 |
| Understand the y-intercept of a proportional relationship. | M08.B-E.2.1.3 | MP1 |
| Identify the y-intercept. | M08.B-E.2.1.3 | MP1 |
| Write the equation of a line. | M08.B-E.2.1.3 | MP1 |
| Write a linear equation given a graph. | M08.B-E.2.1.3 | MP1 |
| Graph a linear equation. | M08.B-E.2.1.3 | MP1 |
| **Marking Period 1 Review and Assessment** |  | **MP1** |
| * Review and demonstrate knowledge of Real Numbers.
 |  | MP1 |
| * Review and demonstrate knowledge of Linear Equations.
 |  | MP1 |
| Identify functions with arrow diagrams. | M08.B-F.1.1.1 | MP2 |
| Use tables to identify functions. | M08.B-F.1.1.1 | MP2 |
| Interpret functions. | M08.B-F.1.1M08.B-F.1.1.3 | MP2 |
| Represent a linear function with an equation and a graph. | M08.B-F.2.1.1 | MP2 |
| Represent a nonlinear function with a graph. | M08.B-F.2.1.1 | MP2 |
| Identify functions from graphs. | M08.B-F.2.1.1 | MP2 |
| Compare two linear functions. | M08.B-F.1.1.2 | MP2 |
| Compare a linear and nonlinear function. | M08.B-F.1.1.2 | MP2 |
| Compare properties of linear functions. | M08.B-F.1.1.2 | MP2 |
| Write a function from a graph. | M08.B-F.2.1.1 | MP2 |
| Write a function from two values. | M08.B-F.2.1.1 | MP2 |
| Interpret a function from a graph. | M08.B-F.2.1.1 | MP2 |
| Interpret a qualitative graph. | M08.B-F.2.1.2 | MP2 |
| Interpret the graph of a nonlinear function. | M08.B-F.2.1.2 | MP2 |
| Describe the relationship of quantities. | M08.B-F.2.1.2 | MP2 |
| Sketch the graph of a linear function. | M08.B-F.2.1.2 | MP2 |
| Sketch and analyze the graph of a nonlinear function. | M08.B-F.2.1.2 | MP2 |
| Construct a scatter plot. | M08.D-S.1.1.1 | MP2 |
| Interpret a scatter plot with positive correlations, negative correlations, and no correlations. | M08.D-S.1.1.1 | MP2 |
| Analyze linear associations with a line of best fit, clustering, and outliers. | M08.D-S.1.1.1M08.D-S.1.1.2 | MP2 |
| Analyze the strength of linear associations: weak, strong. | M08.D-S.1.1.1 | MP2 |
| Recognize nonlinear associations. | M08.D-S.1.1.1 | MP2 |
| Use the slope to make a prediction. | M08.D-S.1.1.3 | MP2 |
| Use scatter plots to make a prediction. | M08.D-S.1.1.3 | MP2 |
| Interpret the slope and y-intercept. | M08.D-S.1.1.3 | MP2 |
| Construct and/or interpret a two-way frequency table. | M08.D-S.1.2.1 | MP2 |
| Construct a two-way relative frequency table. | M08.D-S.1.2.1 | MP2 |
| Compare relative frequency by rows and/or columns. | M08.D-S.1.2.1 | MP2 |
| Relate solutions of linear systems. | M08.B-E.3.1 | MP2 |
| Estimate solutions of systems of equations by inspection. | M08.B-E.3.1.3 | MP2 |
| Graph a system of equations with one solution, no solution, and infinitely many solutions. | M08.B-E.3.1.3M08.B-E.3.1.4 | MP2 |
| **Marking Period 2 Review and Assessment** |  | **MP2** |
| * Review and demonstrate knowledge of Functions.
 |  | MP2 |
| * Review and demonstrate knowledge of Bivariate Data.
 |  | MP2 |
| * Review and demonstrate knowledge of Systems of Linear Equations: Estimation, Graphing.
 |  | MP2 |
| Solve a system of equations by substitution. | M08.B-E.3.1.4 | MP3 |
| Solve a system of equations identifying problems with one solution, no solution, or infinitely many solutions. | M08.B-E.3.1.4 | MP3 |
| Solve a system of equations by elimination using addition, subtraction, and multiplication. | M08.B-E.3.1.4 | MP3 |
| Solve real-world and mathematical problems using a system of equations in two variables. | M08.B-E.3.1.5 | MP3 |
| Understand translations. | M08.C-G.1.1.1 | MP3 |
| Translate a figure on a coordinate plane. | M08.C-G.1.1.1 | MP3 |
| Describe the effect of a translation of a two-dimensional figure using coordinates. | M08.C-G.1.1.3 | MP3 |
| Understand reflections. | M08.C-G.1.1.1 | MP3 |
| Reflect a figure on a coordinate plane. | M08.C-G.1.1.1 | MP3 |
| Describe the effect of a reflection of a two-dimensional figure using coordinates. | M08.C-G.1.1.3 | MP3 |
| Understand rotations. | M08.C-G.1.1.1 | MP3 |
| Rotate a figure on a coordinate plane. | M08.C-G.1.1.1 | MP3 |
| Describe the effect of a rotation of a two-dimensional figure using coordinates. | M08.C-G.1.1.3 | MP3 |
| Understand a sequence of transformations on a coordinate plane. | M08.C-G.1.1.1 | MP3 |
| Perform a sequence of transformations on coordinate plane. | M08.C-G.1.1.1 | MP3 |
| Describe the effect of a sequence of transformations of a two-dimensional figure using coordinates. | M08.C-G.1.1.2 | MP3 |
| Understand congruence. | M08.C-G.1.1.2CC.2.3.8.A.2 | MP3 |
| Identify congruent figures. | M08.C-G.1.1.2CC.2.3.8.A.2 | MP3 |
| Understand dilations. | M08.C-G.1.1.3 | MP3 |
| Dilate a figure on a coordinate plane. | M08.C-G.1.1.3 | MP3 |
| Describe the effect of a dilation of a two-dimensional figure using coordinates. | M08.C-G.1.1.3 | MP3 |
| Understand similarity. | M08.C-G.1.1.4 | MP3 |
| Identify similar figures. | M08.C-G.1.1.4 | MP3 |
| Perform a similarity transformation on a coordinate plane. | M08.C-G.1.1.4 | MP3 |
| Understand the Pythagorean Theorem. | CC.2.3.8.A.3 | MP3 |
| Use the Pythagorean Theorem to find missing side lengths in a right triangle: hypotenuse, leg. | M08.C-G.2.1.2 | MP3 |
| Understand the Converse of the Pythagorean Theorem. | CC.2.3.8.A.3 | MP3 |
| Apply the Converse of the Pythagorean Theorem to show a triangle is a right triangle. | M08.C-G.2.1.1 | MP3 |
| Use the Converse of the Pythagorean Theorem to analyze shapes. | M08.C-G.2.1.1 | MP3 |
| Solve real-world and mathematical problems applying the Pythagorean Theorem. | M08.C-G.2.1.2 | MP3 |
| Solve real-world and mathematical problems applying the Converse of the Pythagorean Theorem. | M08.C-G.2.1.2 | MP3 |
| Apply the Pythagorean Theorem to find lengths of triangles in three dimensions. | M08.C-G.2.1.2 | MP3 |
| Apply the Pythagorean Theorem to find the distance between two points. | M08.C-G.2.1.3 | MP3 |
| Apply the Pythagorean Theorem to find the perimeter of a figure in a coordinate plane. | M08.C-G.2.1.3 | MP3 |
| Apply the Pythagorean Theorem to solve real-world and mathematical problems on a coordinate plane. | M08.C-G.2.1.2M08.C-G.2.1.3 | MP3 |
| Find the surface area of cylinders, cones, and spheres. | M08.C-G.3.1.1 | MP3 |
| Find an unknown measure of a three-dimensional figure applying surface area. | M08.C-G.3.1.1 | MP3 |
| Solve real-world and mathematical surface area problems of cylinders, cones and spheres. | M08.C-G.3.1.1 | MP3 |
| **Marking Period 3 Review and Assessment** |  | **MP3** |
| * Review and demonstrate knowledge of Systems of Linear Equations: Substitution, Elimination.
 |  | MP3 |
| * Review and demonstrate knowledge of Geometry: Congruence and Similarity.
 |  | MP3 |
| * Review and demonstrate knowledge of the Pythagorean Theorem.
 |  | MP3 |
| * Review and demonstrate knowledge of Geometry: Surface Area.
 |  | MP3 |
| Relate the volumes of rectangular prisms and cylinders. | M08.C-G.3.1M08.C-G.3.1.1 | MP4 |
| Find the unknown measure of a cylinder using the volume. | M08.C-G.3.1 | MP4 |
| Solve real-world and mathematical problems involving the volume of a cylinder. | M08.C-G.3.1.1 | MP4 |
| Find the volume of a cone. | M08.C-G.3.1 | MP4 |
| Apply the Pythagorean Theorem to solve real-world and mathematical volume problems of cones. | M08.C-G.2.1M08.C-G.2.1.2M08.C-G.3.1M08.C-G.3.1.1 | MP4 |
| Find the volume of a cone given the circumference of the base. | M08.C-G.3.1M08.C-G.3.1.1 | MP4 |
| Find the volume of a sphere. | M08.C-G.3.1 | MP4 |
| Relate the volumes of cones and spheres. | M08.C-G.3.1M08.C-G.3.1.1 | MP4 |
| Find the volume of a sphere given the surface area. | M08.C-G.3.1M08.C-G.3.1.1 | MP4 |
| Find the volume of a composite figure. | M08.C-G.3.1M08.C-G.3.1.1 | MP4 |
| Solve real-world and mathematical problems involving the volume of cylinders, cones, spheres, and composite figures. | M08.C-G.3.1.1 | MP4 |
| **Grade 8 PSSA Math Preparation and Assessment** |  | **MP4** |
| * Review and demonstrate knowledge of the Number System.
 | M08.A-N.1.1 | MP4 |
| * Review and demonstrate knowledge of Expressions.
 | M08.B-E.1.1 | MP4 |
| * Review and demonstrate knowledge of Equations.
 | M08.B-E.2.1M08.B-E.3.1 | MP4 |
| * Review and demonstrate knowledge of Functions.
 | M08.B-F.1.1M08.B-F.2.1 | MP4 |
| * Review and demonstrate knowledge of Geometry.
 | M08.C-G.1.1M08.C-G.2.1M08.C-G.3.1 | MP4 |
| * Review and demonstrate knowledge of Statistics.
 | M08.D-S.1.1M08.D-S.1.2 | MP4 |
| Define polynomials. | A1.1.3.1CC.2.2.HS.D.1 | MP4 |
| Classify polynomials. | A1.1.3.1CC.2.2.HS.D.1 | MP4 |
| Find the sum of polynomials. | A1.1.1.5.1 | MP4 |
| Find the difference of polynomials. | A1.1.1.5.1 | MP4 |
| Find the product of a polynomial and a monomial. | A1.1.1.5.1 | MP4 |
| Find the product of a binomial and a binomial. | A1.1.1.5.1 | MP4 |

**ASSESSMENTS**

**PDE Academic Standards, Assessment Anchors, and Eligible Content:** The teacher must be knowledgeable of the PDE Academic Standards, Assessment Anchors, and Eligible Content and incorporate them regularly into planned instruction.

**Formative Assessments:** The teacher will utilize a variety of assessment methods to conduct in-process evaluations of student learning.

**Effective formative assessments for this course include:
Suggested but not limited to:**

* Pre-assessments of prior knowledge (e.g., Entrance cards or KWL chart)
* Bellringers/Problems of the Day (PODs)
* Discussions
* Exit ticket
* Teacher observations/Questioning
* Graphic organizers (e.g., Venn Diagrams, word mapping, webbing, KWL chart, etc.)
* Outlining
* Cooperative learning
* Written work
* Quizzes
* Oral response
* Self-evaluation
* Homework
* Summarizing
* Note-taking

**Summative Assessments:** The teacher will utilize a variety of assessment methods to evaluate student learning at the end of an instructional task, lesson, and/or unit.

**Effective summative assessments for this course include:
Suggested but not limited to:**

* Performance assessment
* Chapter/unit tests
* Quizzes
* Marking period assessments
* Projects
* Student presentations