WARREN COUNTY SCHOOL DISTRICT

PLANNED INSTRUCTION

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
Certification verified by the WCSD Human Resources Department: ☒Yes ☐No

WCSD STUDENT DATA SYSTEM INFORMATION

Course Level: Academic
Mark Types: Check all that apply.
☒F – Final Average ☒MP – Marking Period ☒EXM – Final Exam

GPA Type: ☐ GPAEL-GPA Elementary ☒ 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, 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
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
- **Marking Period 4 Review and Assessment**

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.1.1.2 CC.2.2.8.B.1	MP1
Evaluate perfect squares and perfect cubes	M08.B-E.1.1.2 CC.2.2.8.B.1	MP1
Evaluate square roots to solve problems	M08.B-E.1.1.2 CC.2.2.8.B.1	MP1
Solve equations involving perfect squares	M08.B-E.1.1.2 CC.2.2.8.B.1	MP1
Solve equations involving perfect cubes	M08.B-E.1.1.2 CC.2.2.8.B.1	MP1
Solve equations involving imperfect squares and cubes	M08.B-E.1.1 CC.2.2.8.B.1	MP1
Multiply exponential expressions: Same Base, Different Base	M08.B-E.1.1.1 CC.2.2.8.B.1	MP1
Find the power of a power	M08.B-E.1.1.1 CC.2.2.8.B.1	MP1
Divide exponential expressions: Same Base	M08.B-E.1.1.1 CC.2.2.8.B.1	MP1
Use the Zero Exponent Property	M08.B-E.1.1.1 CC.2.2.8.B.1	MP1
Use the Negative Exponent Property	M08.B-E.1.1.1 CC.2.2.8.B.1	MP1
Simplify expressions with negative exponents	M08.B-E.1.1.1 CC.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

Performance Indicator	**PA Core Standard and/or Eligible Content**	**Marking Period Taught**
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: Fractional Coefficients, Decimal Coefficients, 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: One Solution, No Solution, 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

Performance Indicator	**PA Core Standard and/or Eligible Content**	**Marking Period Taught**
Use tables to identify functions	M08.B-F.1.1.1	MP2
Interpret functions	M08.B-F.1.1 M08.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.1.1.1 M08.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: One Solution, No Solution, Infinitely Many Solutions	M08.B-E.3.1.3 M08.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

Performance Indicator	**PA Core Standard and/or Eligible Content**	**Marking Period Taught**
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.1.1.2 CC.2.3.8.A.2	MP3
Identify congruent figures	M08.C-G.1.1.2 CC.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

Performance Indicator	**PA Core Standard and/or Eligible Content**	**Marking Period Taught**
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.2.1.2 M08.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.3.1 M08.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.2.1 M08.C-G.2.1.2 M08.C-G.3.1 M08.C-G.3.1.1	MP4

Performance Indicator	**PA Core Standard and/or Eligible Content**	**Marking Period Taught**
Find the volume of a cone given the circumference of the base	M08.C-G.3.1 M08.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.3.1 M08.C-G.3.1.1	MP4
Find the volume of a sphere given the surface area	M08.C-G.3.1 M08.C-G.3.1.1	MP4
Find the volume of a composite figure	M08.C-G.3.1 M08.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.2.1 M08.B-E.3.1	MP4
• Review and demonstrate knowledge of Functions	M08.B-F.1.1 M08.B-F.2.1	MP4
• Review and demonstrate knowledge of Geometry	M08.C-G.1.1 M08.C-G.2.1 M08.C-G.3.1	MP4
• Review and demonstrate knowledge of Statistics	M08.D-S.1.1 M08.D-S.1.2	MP4
Define polynomials	A1.1.3.1 CC.2.2.HS.D.1	MP4
Classify polynomials	A1.1.3.1 CC.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
Marking Period 4 Review and Assessment		**MP4**
• Review and demonstrate knowledge of Geometry: Volume		MP4
• Review and demonstrate knowledge of Algebra I Preparation: Polynomials		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