**COURSE DESCRIPTION**

**Course Title:** Algebra Concepts

**Course Number:** 00206

**Course Prerequisites:** Completion of Grade 8 with a grade less than 60%; teacher recommendation is required to enroll in this course.

**Course Description:** This course reviews computational, problem solving, graphing, and algebraic concepts previously learned in mathematics. Algebra Concepts 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. Teacher recommendation is required to enroll in the class. District marking period assessments and final exam are required.

**Suggested Grade Level**: Grades 9-12

**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)

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 [ ]  GPAML-GPA for Middle Level [x]  NHS-National Honor Society

[x]  UGPA-Non-Weighted Grade Point Average [x]  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, pdesas.org

**Curriculum Document**

**WCSD Board Approval:**

**Date Finalized:** 5/23/2022

**Date Approved:**  6/13/2022

**Implementation Year:** 2022-2023

**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
* Evaluation of Square Roots and Cube Roots
* Equations Involving Square Roots and Cube Roots
* Properties of Integer Exponents
* Estimation of Quantities Using Powers of 10
* Scientific Notation: Conversions, Operations
* Combination of Like Terms: Decimal, Fraction, Negative
* Equations: Variables on Both Sides, Multi-Step
* Equation Solutions: One, No, Infinitely Many
* Marking Period 1 Review and Assessment

**Marking Period 2: Linear Equations and Functions to Model Relationships**

* Comparison of Proportional Relationships
* Connection of Proportional Relationships and Slope
* Analysis of Linear Equations: y = mx (Slope), y = mx + b (Slope and Intercept)
* Comparison and Interpretation of Relations and Functions
* Representations 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
* Mid-Term Review and Assessment

**Marking Period 3: Bivariate Data, Systems of Linear Equations, and Congruence**

* 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 - Estimations of Solutions: One, No, Infinitely Many
* Systems of Linear Equations: Graphing, Substitution, Elimination
* Translations
* Reflections
* Rotations
* Marking Period 3 Review and Assessment

**Marking Period 4: Congruence and Similarity, Pythagorean Theorem, Surface Area and Volume**

* Composition of Transformations
* Congruent Figures
* Dilations
* Similar Figures
* Pythagorean Theorem and It’s Converse
* Application of the Pythagorean Theorem
* Distance in the Coordinate Plane
* Surface Area of Three-Dimensional Figures
* Volume of Three-Dimensional Figures
* Final Exam 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 perfect squares and perfect cubes | M08.B-E.1.1.2CC.2.2.8.B.1 | MP1 |
| Evaluate square roots and cube roots to solve problems | M08.B-E.1.1.2CC.2.2.8.B.1 | MP1 |
| Solve equations involving perfect squares and 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: 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 and 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.3.1.2 | MP1 |
| **Marking Period 1 Review and Assessment** |  | MP1 |
| * Review and extend knowledge of Real Numbers
 |  | MP1 |
| * Review and extend knowledge of Linear Equations
 |  | MP1 |
| Compare proportional relationships represented by tables and graphs | M08.B-E.2.1.1 | MP2 |
| Compare proportional relationships represented by graphs and equations | M08.B-E.2.1.1 | MP2 |
| Compare proportional relationships represented by graphs and verbal descriptions | M08.B-E.2.1.1 | MP2 |
| Understand slope | M08.B-E.2.1.1 | MP2 |
| Find the slope from two points | M08.B-E.2.1.2 | MP2 |
| Interpret slope | M08.B-E.2.1.1 | MP2 |
| Relate the constant of proportionality to slope | M08.B-E.2.1.1 | MP2 |
| Write a linear equation from two points | M08.B-E.2.1.2 | MP2 |
| Graph an equation of the forms: y = mx, y = mx + b | M08.B-E.2.1.3 | MP2 |
| Determine the y-intercept of a relationship | M08.B-E.2.1.3 | MP2 |
| Understand the y-intercept of a proportional relationship | M08.B-E.2.1.3 | MP2 |
| Identify the y-intercept | M08.B-E.2.1.3 | MP2 |
| Write the equation of a line | M08.B-E.2.1.3 | MP2 |
| Write a linear equation given a graph | M08.B-E.2.1.3 | MP2 |
| Graph a linear equation | M08.B-E.2.1.3 | MP2 |
| 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 |
| **Mid-Term Review and Assessment** |  | MP2 |
| * Review and extend knowledge of Real Numbers
 |  | MP2 |
| * Review and extend knowledge of Linear Equations
 |  | MP2 |
| * Review and extend knowledge of Functions to Model Relationships
 |  | MP2 |
| Construct a scatter plot | M08.D-S.1.1.1 | MP3 |
| Interpret a scatter plot: Positive Correlation, Negative Correlation, No Correlation | M08.D-S.1.1.1 | MP3 |
| Analyze linear associations with a line of best fit, clustering, and outliers | M08.D-S.1.1.1M08.D-S.1.1.2 | MP3 |
| Analyze the strength of linear associations: Weak, Strong | M08.D-S.1.1.1 | MP3 |
| Recognize nonlinear associations | M08.D-S.1.1.1 | MP3 |
| Use the slope to make a prediction | M08.D-S.1.1.3 | MP3 |
| Use scatter plots to make a prediction | M08.D-S.1.1.3 | MP3 |
| Interpret the slope and y-intercept | M08.D-S.1.1.3 | MP3 |
| Construct and interpret a two-way frequency table | M08.D-S.1.2M08.D-S.1.2.1CC.2.4.8.B.2 | MP3 |
| Construct a two-way relative frequency table | M08.D-S.1.2M08.D-S.1.2.1CC.2.4.8.B.2 | MP3 |
| Compare relative frequency by rows and columns | M08.D-S.1.2M08.D-S.1.2.1CC.2.4.8.B.2 | MP3 |
| Relate solutions of linear systems | M08.B-E.3.1.3 | MP3 |
| Estimate solutions of systems of linear equations by inspection | M08.B-E.3.1.3M08.B-E.3.1.4 | MP3 |
| Graph a system of linear equations: One Solution, No Solution, Infinitely Many Solutions | M08.B-E.3.1.3M08.B-E.3.1.4 | MP3 |
| Solve a system of linear equations by substitution: One Solution, No Solution, Infinitely Many Solutions | M08.B-E.3.1.4 | MP3 |
| Solve a system of linear equations by elimination: Addition, Subtraction, Multiplication | M08.B-E.3.1.4 | MP3 |
| Solve real-world and mathematical problems leading to two linear 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 |
| **Marking Period 3 Review and Assessment** |  | MP3 |
| * Review and extend knowledge of Bivariate Data
 |  | MP3 |
| * Review and extend knowledge of Systems of Linear Equations
 |  | MP3 |
| * Review and extend knowledge of Congruence
 |  | MP3 |
| Understand a sequence of transformations on a coordinate plane | M08.C-G.1.1.1 | MP4 |
| Perform a sequence of transformations on a coordinate plane | M08.C-G.1.1.1 | MP4 |
| Describe the effect of a sequence of transformations of a two-dimensional figure using coordinates | M08.C-G.1.1.2 | MP4 |
| Understand congruence | M08.C-G.1.1.2CC.2.3.8.A.2 | MP4 |
| Identify congruent figures | M08.C-G.1.1.2CC.2.3.8.A.2 | MP4 |
| Understand dilations | M08.C-G.1.1.3 | MP4 |
| Dilate a figure on a coordinate plane | M08.C-G.1.1.3 | MP4 |
| Describe the effect of a dilation of a two-dimensional figure using coordinates | M08.C-G.1.1.3 | MP4 |
| Understand similarity | M08.C-G.1.1.4 | MP4 |
| Identify similar figures | M08.C-G.1.1.4 | MP4 |
| Perform a similarity transformation on a coordinate plane | M08.C-G.1.1.4 | MP4 |
| Understand and apply congruence, similarity, and geometric transformations using various tools | CC.2.3.8.A.2 | MP4 |
| Understand the Pythagorean Theorem | CC.2.3.8.A.3 | MP4 |
| Use the Pythagorean Theorem to find missing angles in a right triangle | M08.C-G.2.1M08.C-G.2.1.2 | MP4 |
| Understand the converse of the Pythagorean Theorem | M08.C-G.2.1.1 | MP4 |
| Apply the converse of the Pythagorean Theorem to show a triangle is a right triangle | M08.C-G.2.1.1 | MP4 |
| Solve real-world and mathematical problems applying the Pythagorean Theorem | M08.C-G.2.1M08.C-G.2.1.2CC.2.3.8.A.3 | MP4 |
| Solve real-world and mathematical problems applying the converse of the Pythagorean Theorem | M08.C-G.2.1.1 | MP4 |
| Apply the Pythagorean Theorem to find lengths of triangles in three dimensions | M08.C-G.2.1.2CC.2.3.8.A.3 | MP4 |
| Apply the Pythagorean Theorem to find the perimeter of a triangle in a coordinate plane | M08.C-G.2.1.2M08.C-G.2.1.3CC.2.3.8.A.3 | MP4 |
| Apply the Pythagorean Theorem to problem solve on a coordinate plane | M08.C-G.2.1.2M08.C-G.2.1.3CC.2.3.8.A.3 | MP4 |
| Find the surface area: Cylinders, Cones, Spheres | M08.C-G.3.1.1 | MP4 |
| Solve real-world and mathematical problems involving surface area | M08.C-G.3.1.1 | MP4 |
| Relate the volumes of rectangular prisms and cylinders | M08.C-G.3.1.1 | MP4 |
| Find the unknown measure of a cylinder | M08.C-G.3.1.1 | MP4 |
| Solve real-world and mathematical problems involving the volume of a cylinder | M08.C-G.3.1.1CC.2.3.8.A.1 | MP4 |
| Relate the volumes of cones and spheres | M08.C-G.3.1.1 | MP4 |
| Find the volume: Cones, Spheres, Composite Figures | M08.C-G.3.1.1 | MP4 |
| Apply the concepts of volume of cylinders, cones, and spheres to solve real-world and mathematical problems | CC.2.3.8.A.1 | MP4 |
| **Final Exam Review and Assessment** |  | MP4 |
| * Review and extend knowledge of Bivariate Data
 |  | MP4 |
| * Review and extend knowledge of Systems of Linear Equations
 |  | MP4 |
| * Review and extend knowledge of Congruence and Similarity
 |  | MP4 |
| * Review and extend knowledge of Pythagorean Theorem
 |  | MP4 |
| * Review and extend knowledge of Surface Area and Volume
 |  | 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
* Mid-Term exam
* Final exam
* Projects
* Student presentations