Algebra

Course Description:

The curriculum from this course is developed from the Wisconsin Standards for Mathematics. This is a required course. The information in this course overview outlines what students should understand and be able to do by the end of the semester/year.

Core Connections Algebra is the first course in a five-year sequence of college preparatory mathematics courses that starts with Algebra I and continues through Calculus. It aims to deepen and extend student understanding built in previous courses by focusing on developing fluency with solving linear equations, inequalities, and systems. These skills are extended to solving quadratic equations, exploring linear, quadratic, and exponential functions graphically, numerically, symbolically, and as sequences, and by using regression techniques to analyze the fit of models to distributions of data. On a daily basis, students in *Core Connections Algebra* use problem-solving strategies, questioning, investigating, analyzing critically, gathering and constructing evidence, and communicating rigorous arguments justifying their thinking. Under teacher guidance, students learn in collaboration with others while sharing information, expertise, and ideas.
The course is well balanced among procedural fluency (algorithms and basic skills), deep conceptual understanding, strategic competence (problem solving), and adaptive reasoning (extension and application). The lessons in the course meet all of the content standards, of Appendix A of the *Common Core State Standards for Mathematics*. The course embeds the CCSS Standards for Mathematical Practice as an integral part of the lessons in the course.

Mastery Standards:

Factor a quadratic expression to reveal the zeros of the function it defines. (CCSS.MATH.CONTENT.HSA.SSE.B.3.A)

Create equations and inequalities in one variable and use them to solve problems.
(CCSS.MATH.CONTENT.HSA.CED.A.1)

Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. (CCSS.MATH.CONTENT.HSA.REI.B.3)

Solve quadratic equations in one variable. (CCSS.MATH.CONTENT.HSA.REI.B.4)

Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables. (CCSS.MATH.CONTENT.HSA.REI.C.6)

Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table). (CCSS.MATH.CONTENT.HSF.LE.A.2)

Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials. (CCSS.MATH.CONTENT.HSA.APR.A.1)

Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. (CCSS.MATH.CONTENT.HSA.CED.A.2)

For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. (CCSS.MATH.CONTENT.HSF.IF.B.4)

Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.* (CCSS.MATH.CONTENT.HSF.IF.B.6)

Unit	Description of Unit and Learning Targets
Unit Title: Function Essential Questions: ● Can I identify quantities in situations and describe their relationships using graphs?	Students will… Learning Targets: ● I can create a table and a graph of a quadratic function ● I can identify important points and features of a graph and describe the increasing and decreasing behavior of a graph ● I can evaluate a function using function notation ● I can find the domain and range of a function
Unit Title: Linear Relationships Essential Questions: ● Can I create a representation of a problem, consider the units involved, and understand the meaning of the quantities using tables, graphs and equations?	Students will… Learning Targets: ● I can solve equations with variables on both sides ● I can describe a pattern and find the equation for a pattern ● I can find the slope of a line given a graph ● I can find the slope through two points ● I can interpret the slope and y-intercept in the context of a problem ● I can find the equation of a line given the point and a slope ● I can complete diamond problems
Unit Title: Simplifying and Solving Essential Questions: ● Why do using algebra tiles and area models help me better understand multiplication?	Students will… Learning Targets: ● I can find the equation of a line given two points ● I can simplify expressions using positive exponents ● I can simplify expressions involving negative exponents ● I can multiply polynomials ● I can solve equations involving multiplying polynomials or absolute value ● I can solve an equation for a given variable
Unit Title:Systems of Equations Essential Questions: ● Why is it important to be able to represent situations using systems of equations?	Students will… Learning Targets: ● I can apply multiple representations of a linear relationship ● I can write a system of equations from a situation ● I can solve a system of equations using the Equal Values Method or substitution ● I can identify a solution to a system of equations on a graph ● I can solve a system of equations using elimination
Unit Title: Sequences Essential Questions: ● Why is it important to find shortcuts that lead to equations when patterns are repeated?	Students will... Learning Targets: ● I can identify and use a pattern to continue a sequence ● I can write a recursive equation for a sequence ● I can write an explicit equation for a sequence ● I can recognize connections between arithmetic and geometric sequences and linear and exponential functions ● I can tell the difference between arithmetic and geometric sequences
Unit Title: Modeling Two Variable Data Essential Questions: ● How is modeling relationships	Students will... Learning Targets: ● I can interpret the association of a scatter plot

mathematically in order to describe, analyze, make predictions, and draw conclusions useful?	● I can calculate and interpret the residual of a given data point
Unit Title: Exponential Functions Essential Questions: ● Are making connections between exponential functions and other relationships beneficial?	Students will... Learning Targets: ● I can write exponential equations from y-intercept and a point ● I can model situations involving exponential growth or decay ● I can tell the difference between a linear and exponential relationship
Unit Title: Quadratic Functions Essential Questions: ● Can I explain my understanding of Quadratic Functions accurately to others?	Students will... Learning Targets: ● I can factor using a generic rectangle ● I can factor completely, including needing to factor out a common factor and special cases ● I can use the zero product property to find the x-intercepts of a parabola ● I can complete the square and use the equation to identify the vertex and x-intercepts of a parabola ● I can use the Quadratic Formula to solve quadratic equations
Unit Title:Solving Quadratics and Inequalities Essential Questions: ● How would we use quadratics to represent patterns or structure in functions?	Students will... Learning Targets: ● I can solve a one-variable inequality and represent the solution on a number line ● I can graph a linear inequality and represent the solutions by shading ● I can graph a system of inequalities and represent the solutions by shading
Unit Title: Solving Complex Equations Essential Questions: ● Are there multiple methods of solving complex equations using different representations?	Students will... Learning Targets: ● I can determine association of categorical data that is represented in a two-way table ● I can complete problems that include imaginary solutions ● I can solve quadratic and absolute value inequalities