SPRING GROVE AREA SCHOOL DISTRICT

PLANNED COURSE OVERVIEW

Course Title: Algebra 2 Concepts	**Length of Course:** 30 cycles
Grade Level(s): 10 - 11	**Periods Per Cycle:** 6
Units of Credit: 1	**Length of Period:** 40 minutes
Classification: Required	**Total Instructional Time:** 120 hours

Course Description

This course will cover the second course in modern algebra, which stresses the structure of the real number system and complex numbers. The course is also designed to help students to do the following: recognize the techniques of algebra; acquire facility in applying deductive reasoning in algebra; and appreciate the need for precision of language as well as review helpful approaches and strategies for success on the math portion of the Keystone Exams. Additionally, the class will devote time to review mathematical concepts similar to those found on the Keystone Exams. This course is recommended for students who scored below proficient on the 9th grade Algebra I Keystone Exams.

Instructional Strategies, Learning Practices, Activities, and Experiences

Anticipatory Sets	Flexible Groups	Projects
Assessments	Graphic Organizers	Teacher Demonstrations
Bell Ringers	Guided Practice	Technology Integration
Class Discussions	High-Level Questioning	Videos/DVD's
Closure	Homework	Wait Time
Critical Thinking	Posted Objectives	

Assessments

Assessments (Quizzes, Unit, Teacher-Created)	Projects	Classwork
Higher-Level Questioning		

Materials/Resources

Big Ideas Math: A Bridge to Success Algebra 2	Internet Resources	Teacher-Made Materials
Larson, 1st Edition		

Adopted: 9/17/03
Revised: 11/21/05; 8/17/09; 5/21/12; 5/19/14; 5/20/19; 5/23/22

Preparing For Advanced Algebra	
The Standards of Mathematical Practices	
Make sense of problems and persevere in solving them. **Construct viable arguments and critique the reasoning of others.** **Use appropriate tools strategically.** **Look for and make use of structure.**	**Reason abstractly and quantitatively.** **Model with mathematics.** **Attend to precision.** **Look for and express regularity in repeated reasoning.**
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**

Preparing for Advanced Algebra
• Representing Functions
• Multiplying Binomials
• Factoring Polynomials
  ○ Greatest Common Factor (GCF)
  ○ Sum/product
  ○ Difference of two squares
	CC.2.2.HS.C.1 - Use the concept and notation of functions to interpret and apply them in terms of their context.
	CC.2.2.HS.C.6 - Interpret functions in terms of the situations they model.
	CC.2.2.HS.D.1 - Interpret the structure of expressions to represent a quantity in terms of its context.
	CC.2.2.HS.D.2 - Write expressions in equivalent forms to solve problems.
	CC.2.2.HS.D.4 - Understand the relationship between zeros and factors of polynomials to make generalizations about functions and their graphs.
	CC.2.2.HS.D.5 - Use polynomial identities to solve problems.

Equations and Inequalities	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Equations and Inequalities • Expressions and Inequalities • Properties of Real Numbers • Solve Linear Equations • Solve Absolute Value Equations • Solve Inequalities • Solve Compound and Absolute Value Inequalities	**CC.2.2.HS.D.1** - Interpret the structure of expressions to represent a quantity in terms of its context. **CC.2.2.HS.D.2** - Write expressions in equivalent forms to solve problems. **CC.2.2.HS.D.8** - Apply inverse operations to solve equations or formulas for a given variable. **CC.2.2.HS.D.9** - Use reasoning to solve equations and justify the solution method. **CC.2.2.HS.D.10** - Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically. **CC.2.1.HS.F.2** - Apply properties of rational and irrational numbers to solve real world or mathematical problems. **CC.2.1.HS.F.6** - Extend the knowledge of arithmetic operations and apply to complex numbers.

Linear Relations and Functions	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Linear Relations and Functions • Relations and Functions • Linear Relations and Functions • Rate of Change and Slope • Write Linear Equations • Scatter Plots and Lines of Regressions • Graph Linear Inequalities	**CC.2.4.HS.B.3** - Analyze linear models to make interpretations based on the data. **CC.2.2.HS.C.1** - Use the concept and notation of functions to interpret and apply them in terms of their context. **CC.2.2.HS.C.2** - Graph and analyze functions and use their properties to make connections between the different representations. **CC.2.2.HS.C.3** - Write functions or sequences that model relationships between two quantities. **CC.2.2.HS.C.5** - Construct and compare linear, quadratic, and exponential models to solve problems. **CC.2.2.HS.C.6** - Interpret functions in terms of the situations they model. **CC.2.2.HS.D.7** - Create and graph equations or inequalities to describe numbers or relationships. **CC.2.2.HS.D.8** - Apply inverse operations to solve equations or formulas for a given variable. **CC.2.2.HS.D.10** - Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.

Probability	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Probability • Counting Techniques • Adding Probabilities • Multiplying Probabilities	**CC.2.4.HS.B.1** - Summarize, represent, and interpret data on a single count or measurement variable. **CC.2.4.HS.B.2** - Summarize, represent, and interpret data on two categorical and quantitative variables. **CC.2.4.HS.B.4** - Recognize and evaluate random processes underlying statistical experiments. **CC.2.4.HS.B.5** - Make inferences and justify conclusions based on sample surveys, experiments, and observational studies. **CC.2.4.HS.B.6** - Use the concepts of independence and conditional probability to interpret data. **CC.2.4.HS.B.7** - Apply the rules of probability to compute probabilities of compound events in a uniform probability model.

Systems of Equations and Inequalities	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Systems of Equations and Inequalities • Solve Systems of Linear Equations by Graphing • Solve Systems of Linear Equations by Elimination • Solve Systems of Linear Inequalities by Graphing	**CC.2.2.HS.D.7** - Create and graph equations or inequalities to describe numbers or relationships. **CC.2.2.HS.D.8** - Apply inverse operations to solve equations or formulas for a given variable. **CC.2.2.HS.D.9** - Use reasoning to solve equations and justify the solution method. **CC.2.2.HS.D.10** - Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.

Factoring	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Factoring • Review Factoring Methods ○ GCF, sum/product, difference of two squares • Factor Binomial GCFs • Factor Trinomials with a Lead Coefficient (Rainbow Method) • Factor by Grouping	**CC.2.2.HS.D.1** - Interpret the structure of expressions to represent a quantity in terms of its context. **CC.2.2.HS.D.2** - Write expressions in equivalent forms to solve problems. **CC.2.2.HS.D.4** - Understand the relationship between zeros and factors of polynomials to make generalizations about functions and their graphs. **CC.2.2.HS.D.5** - Use polynomial identities to solve problems.

Radicals	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Radicals • Simplify Radicals • Rationalize the Denominator • Higher Roots • Multiply Radicals	**CC.2.2.HS.D.2** - Write expressions in equivalent forms to solve problems. **CC.2.2.HS.D.6** - Extend the knowledge of rational functions to rewrite in equivalent forms. **CC.2.1.HS.F.2** - Apply properties of rational and irrational numbers to solve real world or mathematical problems.

Quadratic Functions and Relations	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Quadratic Functions and Relations • Graph Quadratics • Solve Quadratic Equations by Graphing • Solve Quadratic Equations by Factoring • Solve Quadratic Equations with the Quadratic Formula • Complex Numbers	**CC.2.1.HS.F.6** - Extend the knowledge of arithmetic operations and apply to complex numbers. **CC.2.1.HS.F.7** - Apply concepts of complex numbers in polynomial identities and quadratic equations to solve problems. **CC.2.2.HS.C.5** - Construct and compare linear, quadratic, and exponential models to solve problems. **CC.2.2.HS.C.6** - Interpret functions in terms of the situations they model. **CC.2.2.HS.D.2** - Write expressions in equivalent forms to solve problems. **CC.2.2.HS.D.4** - Understand the relationship between zeros and factors of polynomials to make generalizations about functions and their graphs. **CC.2.2.HS.D.5** - Use polynomial identities to solve problems. **CC.2.2.HS.D.7** - Create and graph equations or inequalities to describe numbers or relationships.

Polynomials and Polynomial Functions	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Polynomials and Polynomial Functions • Operations with Polynomials ○ Combinations and compositions • Divide Polynomials • Multiply and Divide Rational Expressions	**CC.2.2.HS.D.1** - Interpret the structure of expressions to represent a quantity in terms of its context. **CC.2.2.HS.D.2** - Write expressions in equivalent forms to solve problems. **CC.2.2.HS.D.3** - Extend the knowledge of arithmetic operations and apply to polynomials. **CC.2.2.HS.D.4** - Understand the relationship between zeros and factors of polynomials to make generalizations about functions and their graphs. **CC.2.2.HS.D.5** - Use polynomial identities to solve problems. **CC.2.2.HS.D.6** - Extend the knowledge of rational functions to rewrite in equivalent forms.

Inverse and Radical Functions and Relations	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Inverse and Radical Functions and Relations • Operations of Functions • Inverse Functions • Square Root Functions and Inequalities • Operations with Radical Functions • Rational Exponents • Solve Radical Equations and Inequalities	**CC.2.2.HS.C.4** - Interpret the effects transformations have on functions and find the inverses of functions. **CC.2.2.HS.C.5** - Construct and compare linear, quadratic, and exponential models to solve problems. **CC.2.2.HS.C.6** - Interpret functions in terms of the situations they model. **CC.2.2.HS.D.2** - Write expressions in equivalent forms to solve problems. **CC.2.2.HS.D.6** - Extend the knowledge of rational functions to rewrite in equivalent forms.

Exponential and Logarithmic Functions	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Exponential and Logarithmic Functions • Graph Exponential Functions • Solve Exponential Functions • Logarithms and Logarithmic Functions • Solve Logarithmic Equations • Properties of Logarithm • Common Logarithms • Base *e* and Natural Logarithms • Use Exponential and Logarithmic Functions	**CC.2.2.HS.C.1** - Use the concept and notation of functions to interpret and apply them in terms of their context. **CC.2.2.HS.C.2** - Graph and analyze functions and use their properties to make connections between the different representations. **CC.2.2.HS.C.5** - Construct and compare linear, quadratic, and exponential models to solve problems. **CC.2.2.HS.C.6** - Interpret functions in terms of the situations they model. **CC.2.2.HS.D.2** - Write expressions in equivalent forms to solve problems. **CC.2.1.HS.F.1** - Apply and extend the properties of exponents to solve problems with rational exponents.