Course Title: Algebra 1 Concepts	**Length of Course:** 30 cycles
Grade Level(s): 9	**Periods Per Cycle:** 9
Units of Credit: 1.5	**Length of Period:** 43 minutes/86 minutes (every other day)
Classification: Required	**Total Instructional Time:** 193.5 hours

Course Description

Topics covered in this course are similar to the traditional Algebra 1 course. Algebra 1 Concepts is designed to help students do the following: understand the basic structure of algebra; perceive the role of deductive reasoning in algebra; and appreciate the need for precision language. This course is recommended for students who scored below proficient on the 8th grade PSSA.

Instructional Strategies, Learning Practices, Activities, and Experiences

Anchor Charts	Graphic Organizers	Review (Games, Study Guides)
Assessments (Quizzes, Unit, Teacher-Created)	Guided Practice	Standardized Test Preparation
Bell Ringers	Higher-Level Questioning	Teacher Demonstrations
Computer Websites and/or Software	Homework	Teacher Observations
Cooperative Learning	Notes (Templates, Teacher or Student Generated)	Technology Integration (iPods, iPads, Clickers, Computer Labs)
Critical Thinking	Practice Exercises and Tests	
Cross Curricular Connections	Presentations	Vocabulary (Cards, Strategies, and Lists)
Drill and Practice	Projects	Constructed Response

Assessments

Assessments (Quizzes, Unit, Teacher-Created)	Evaluation (Summative and Formative)	Presentations
Bell Ringers	Higher-Level Questioning	State Standardized Assessments
Closure	Homework Review	Teacher Observations
Classroom Diagnostic Tools (CDT)	Interaction Sequence	

Materials/Resources

Anchor Charts	Internet Resources	Resource Books
Calculators	Journals	Technology Integration (iPad Applications)
Graphic Organizers	Literature	Videos/DVDs
Big Ideas Math: A Bridge to Success Algebra I Larson, 1st Edition	Manipulatives	Vocabulary (Cards, Strategies, and Lists)

Adopted: 9/17/03
Revised: 11/21/05; 8/17/09; 5/19/14; 5/20/2019

Expressions, Equations, and Functions

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
Expressions, Equations, and Functions • Evaluate expressions • Apply the Order of Operations • Write expressions, equations, and inequalities • Represent functions as rules and tables • Use a problem-solving plan • Represent functions as graphs	**CC.2.1.HS.F.1** - Apply and extend the properties of exponents to solve problems with rational exponents. **CC.2.1.HS.F.2** - Apply properties of rational and irrational numbers to solve real-world or mathematical problems. **CC.2.2.8.B.1** - Apply concepts of radicals and integer exponents to generate equivalent expressions.

Properties of Real Numbers	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Properties of Real Numbers • Classify real numbers • Use integers and rational numbers • Add real numbers • Subtract real numbers • Multiply real numbers • Perform matrix addition, subtraction and scalar multiplication • Apply the distributive property • Divide real numbers • Find square roots and compare real numbers	**CC.2.1.8.E.1** - Distinguish between rational and irrational numbers using their properties. **CC.2.1.6.E.3** - Develop and/or apply number theory concepts to find common factors and multiples. **CC.2.1.8.E.4** - Estimate irrational numbers by comparing them to rational numbers. **CC.2.1.HS.F.1** - Apply and extend the properties of exponents to solve problems with rational exponents. **CC.2.1.HS.F.2** - Apply properties of rational and irrational numbers to solve real-world or mathematical problems.

Solving Linear Equations

CONTENT/KEY CONCEPTS	OBJECTIVES/STANDARDS
Solving Linear Equations • Solve one-step equations • Solve two-step equations • Solve multi-step equations • Solve equations with variables on both sides • Write ratios and proportions • Solve proportions using cross products • Solve percent problems • Rewrite formulas (limitations) • Radicals	**CC.2.1.HS.F.3** - Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays. **CC.2.1.HS.F.4** - Use units as a way to understand problems and to guide the solution of multi-step problems. **CC.2.1.HS.F.5** - Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. **CC.2.2.8.B.3** - Analyze and solve linear equations and pairs of simultaneous linear equations. **CC.2.2.8.C.1** - Define, evaluate, and compare functions. **CC.2.2.8.C.2** - Use concepts of functions to model relationships between quantities. **CC.2.2.HS.C.3** - Write functions or sequences that model relationships between two quantities. **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. **CC.2.4.HS.B.1** - Summarize, represent, and interpret data on a single count or measurement variable. **CC.2.4.HS.B.3** - Analyze linear models to make interpretations based on the data.

Graphing Linear Equations and Functions	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Graphing Linear Equations and Functions • Plot points on a coordinate plane • Graph linear equations • Graph using intercepts • Find the slope and rate of change • Graph using slope intercept form • Define a function and find the domain and range of a function • Graph linear functions	**CC.2.2.8.C.1** - Define, evaluate, and compare functions. **CC.2.2.8.C.2** - Use concepts of functions to model relationships between quantities. **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.2.4.HS.B.2** - Summarize, represent, and interpret data on two categorical and quantitative variables. **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.2.4.HS.B.1** - Summarize, represent, and interpret data on a single count or measurement variable.

Writing Linear Equations

CONTENT/KEY CONCEPTS	OBJECTIVES/STANDARDS
Writing Linear Equations • Write equations in slope intercept form • Write linear equations in Point-Slope form • Write linear equations in standard form • Write equations of parallel and perpendicular lines • Scatterplots (trend lines/line of best fit) • Make predictions using best fit lines	**CC.2.2.8.C.2** - Use concepts of functions to model relationships between quantities. **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.2.4.HS.B.2** - Summarize, represent, and interpret data on two categorical and quantitative variables. **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.2.4.HS.B.1** - Summarize, represent, and interpret data on a single count or measurement variable.

Solving and Graphing Inequalities	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Solving and Graphing Inequalities • Solve inequalities using inverse operations • Solve multi-step inequalities • Solve compound inequalities • Solve absolute value equations • Solve absolute value inequalities • Graph linear inequalities in two variables	**CC.2.1.HS.F.5** - Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. **CC.2.2.HS.D.7** - Create and graph equations or inequalities to describe numbers or relationships. **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.

Systems of Equations and Inequalities	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Systems of Equations and Inequalities • Graph systems of linear equations • Solve systems by substitution • Solve systems by elimination • Solve systems of linear inequalities by graphing	**CC.2.2.7.B.3** - Model and solve real-world and mathematical problems by using and connecting numerical, algebraic, and/or graphical representations. **CC.2.2.HS.D.9** - Use reasoning to solve equations and justify the solution method. **CC.2.1.HS.F.5** - Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. **CC.2.2.8.B.3** - Analyze and solve linear equations and pairs of simultaneous linear equations. **CC.2.2.HS.D.7** - Create and graph equations or inequalities to describe numbers or relationships. **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.5** - Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. **CC.2.2.HS.D.7** - Create and graph equations or inequalities to describe numbers or relationships. **CC.2.2.HS.D.10** - Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.

Exponents and Exponential Functions	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**

Exponents and Exponential Functions
   • Laws of exponents
   • Use scientific notation
	CC.2.1.HS.F.1 - Apply and extend the properties of exponents to solve problems with rational exponents.
	CC.2.1.HS.F.2 - Apply properties of rational and irrational numbers to solve real-world or mathematical problems.
	
	CC.2.2.8.B.1 - Apply concepts of radicals and integer exponents to generate equivalent expressions.

Probability and Data Analysis

CONTENT/KEY CONCEPTS	OBJECTIVES/STANDARDS
Probability and Data Analysis • Probability and odds • Permutations and combinations • Probability of compound events • Measures of central tendency (measures of dispersions…range) • Accurately display and interpret data using tables and graphs-bar, line, and circle graphs • Histograms • Stem-and-leaf plots • Box-and-whisker plots	**CC.2.4.HS.B.1** - Summarize, represent, and interpret data on a single count or measurement variable. **CC.2.4.HS.B.3** - Analyze linear models to make interpretations based on the data. **CC.2.4.HS.B.5** - Make inferences and justify conclusions based on sample surveys, experiments, and observational studies. **CC.2.4.7.B.3** - Investigate chance processes and develop, use, and evaluate probability models. **CC.2.4.HS.B.4** - Recognize and evaluate random processes underlying statistical experiments. **CC.2.4.HS.B.7** - Apply the rules of probability to compute probabilities of compound events in a uniform probability model.

Polynomials and Factoring/Quadratic Equations and Functions	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Polynomials and Factoring/Quadratic Equations and Functions • Add and subtract polynomials • Multiply polynomials • Special products of polynomials • Factor $x^2 + bx + c$ • Factor $ax^2 + bx + c$ • Factor special products • Factor polynomials completely • Solve polynomial equations by factoring (zero product property) • Use square roots to solve quadratic equations • Simplify rational expressions	**CC.2.2.7.B.3** - Model and solve real-world and mathematical problems by using and connecting numerical, algebraic, and/or graphical representations. **CC.2.2.HS.D.9** - Use reasoning to solve equations and justify the solution method. **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.5** - Use polynomial identities to solve problems. **CC.2.2.HS.D.6** - Extend the knowledge of rational functions to rewrite in equivalent forms.