

Planned Course of Study

Algebra I Middle School



NORTHWESTERN LEHIGH SCHOOL DISTRICT
6493 ROUTE 309
NEW TRIPOLI, PA 18066

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2020

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INTRODUCTION

The Algebra 1 Mathematics curriculum guide contains planned course formats for the Northwestern Lehigh School District. The content of this document describes the objectives, activities, assessments, content, time frame, and standard alignment that serve as a guide to the specific units of study offered in Algebra 1 at the middle school.

The Algebra 1 curriculum guide is the product of much diligent work on the part of the following staff members of the Task Force:

Mary Giannelli

This document reflects their efforts to establish a well-defined and organized approach to teaching Mathematics in the Northwestern Lehigh School District.

*Approved by Northwestern Lehigh School District Board of Education
May 2020*

ALGEBRA 1 – MIDDLE SCHOOL

Unit 1 - Relationships between Quantities

Section A	Expressions, Equations, and Functions
PA Core Standards CC.2.1.8.E.1 CC.2.1.8.E.4 CC.2.1.HS.F.1 CC.2.1.HS.F.2 CC.2.1.6.E.3 CC.2.2.8.B.1 CC.2.2.7.B.3 CC.2.2.HS.D.9 CC.2.2.8.C.1 CC.2.2.8.C.2 CC.2.2.HS.C.1 CC.2.2.HS.C.2 CC.2.2.HS.C.3 CC.2.4.HB.2	Students will: • Distinguish between rational and irrational numbers using their properties. • Estimate irrational numbers by comparing them to rational numbers. • Apply and extend the properties of exponents to solve problems with rational exponents. • Apply properties of rational and irrational numbers to solve real world or mathematical problems. • Develop and/or apply number theory concepts to find common factors and multiples. • Apply concepts of radicals and integer exponents to generate equivalent expressions. • Model and solve real-world and mathematical problems by using and connecting numerical, algebraic, and/or graphical representations. • Use reasoning to solve equations and justify the solution method. • Define, evaluate, and compare functions. • Use concepts of functions to model relationships between quantities. • Use the concept and notation of functions to interpret and apply them in terms of their context. • Graph and analyze functions and use their properties to make connections between the different representations. • Write functions or sequences that model relationships between two quantities. • Summarize, represent, and interpret data on two categorical and quantitative variables. Anchor Descriptor: ▪ <u>A1.1.1.1</u>: Represent and/or use numbers in equivalent forms (e.g., integers, fractions, decimals, percents, square roots, and exponents). ▪ <u>A1.1.1.2</u>: Apply number theory concepts to show relationships between real numbers in problem solving settings. ▪ <u>A1.1.1.3</u>: Use exponents, roots, and/or absolute values to solve problems. ▪ <u>A1.1.1.4</u>: Use estimation strategies in problem-solving situations. ▪ <u>A1.2.1.1</u>: Analyze and/or use patterns or relations.
Curriculum Framing Questions:	Essential Questions: ▪ How can algebraic expressions be transformed? ▪ How can mathematical ideas be represented?

	Unit Questions: ▪ How can you write algebraic expressions? ▪ How would you use the order of operations? ▪ How do you solve equations? ▪ How would you represent and interpret relations and functions? ▪ How do you use function notation? ▪ How do you interpret the graphs of functions? Content Questions: ▪ How do you write a verbal expression as an algebraic expression and an algebraic expression as a verbal expression? ▪ How do you evaluate numerical and algebraic expressions using the order of operations? ▪ How do you recognize the properties of algebraic expressions? ▪ How can you use the distributive property to evaluate and simplify expressions? ▪ How do you solve equations with one variable? With two variables? ▪ How do you represent and interpret relations using graphs? ▪ How do you determine whether a relation is a function? ▪ How can you find function values?
Materials:	• Textbook resources • Kuta Software • Study Island • www.interactmath.com • Khan Academy Instructional Resources • Teacher Tube • You Tube EDU • Teacher Created Materials • Chromebook with Internet access
Assessments	▪ Quizzes ▪ Tests
Mathematical Practice Standards	• Make sense of problems and persevere in solving them • Reason abstractly and quantitatively • Construct viable arguments and critique the reasoning • Modeling with Mathematics • Use appropriate tools strategically • Attend to precision • Look for and make use of structure • Look for and express regularity in repeated reasoning
Predicted 2 - 3 weeks	

Unit 1 Section B	Linear Equations
<u>PA Core Standards</u> CC.2.1.HS.F.1 CC.2.1.HS.F.2 CC.2.1.HS.F.3 CC.2.1.HS.F.4 CC.2.1.HS.F.5 CC.2.2.8.B.1 CC.2.2.7.B.3 CC.2.2.8.B.3 CC.2.2.8.C.1 CC.2.2.8.C.2 CC.2.2.HS.C.3 CC.2.2.HS.D.7 CC.2.2.HS.D.8 CC.2.2.HS.D.9 CC.2.2.HS.D.10	Students will: • Apply and extend the properties of exponents to solve problems with rational exponents. • Apply properties of rational and irrational numbers to solve real world or mathematical problems. • Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays. • Use units as a way to understand problems and to guide the solution of multi-step problems. • Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. • Apply concepts of radicals and integer exponents to generate equivalent expressions. • Model and solve real-world and mathematical problems by using and connecting numerical, algebraic, and/or graphical representations. • Analyze and solve linear equations and pairs of simultaneous linear equations. • Define, evaluate, and compare functions. • Use concepts of functions to model relationships between quantities. • Write functions or sequences that model relationships between two quantities. • Create and graph equations or inequalities to describe numbers or relationships. • Apply inverse operations to solve equations or formulas for a given variable. • Use reasoning to solve equations and justify the solution method. • Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically. <u>Anchor Descriptor:</u> ▪ <u>A1.1.1.3:</u> Use exponents, roots, and/or absolute values to solve problems. ▪ <u>A1.1.1.4:</u> Use estimation strategies in problem-solving situations. ▪ <u>A1.1.2.1:</u> Write, solve, and/or graph linear equations using various methods.
Curriculum Framing Questions	<u>Essential Questions:</u> ▪ Why are equations and inequalities useful? ▪ Why is it helpful to represent the same mathematical idea in different ways? <u>Unit Questions:</u> ▪ How can variables be represented as an unknown amount when writing equations from a verbal sentence? ▪ How do you solve an equation by finding the value of the variable in an equation to make the equation true? ▪ How do you create equations that describe relationships? ▪ How do you solve multi-step equations that involve more than one operation? ▪ How do you use formulas and solve real-world problems?

	<u>Content Questions:</u> ▪ How can you translate sentences into equations? ▪ How can you translate equations into sentences? ▪ How do you solve equations by using addition and subtraction? Multiplication and division? ▪ How do you solve equations involving more than one operation? ▪ How do you solve equations involving consecutive integers? ▪ How do you solve equations with variables on each side? ▪ How do you solve equations involving grouping symbols? ▪ How do you evaluate absolute value expression? ▪ How do you solve absolute value equations? ▪ How do you compare ratios? ▪ How do you solve proportions? ▪ How do you find the percent of change? ▪ How do you solve problems involving the percent of change? ▪ How do you solve equations for given variables? ▪ How can you use formulas to solve real world problems? ▪ How can you solve mixture problems? ▪ How can you solve uniform motion problems?
Materials:	▪ Textbook resources ▪ Kuta Software ▪ Study Island ▪ Khan Academy Instructional Resources ▪ Teacher Tube ▪ You Tube EDU ▪ Teacher Created Materials ▪ www.interactmath.com ▪ Chromebook with Internet access
Assessments:	▪ Quizzes ▪ Tests
Mathematical Practice Standards	▪ Make sense of problems and persevere in solving them ▪ Reason abstractly and quantitatively ▪ Construct viable arguments and critique the reasoning ▪ Modeling with Mathematics ▪ Use appropriate tools strategically ▪ Attend to precision ▪ Look for and make use of structure ▪ Look for and express regularity in repeated reasoning
Predicted 6 - 7 weeks	

Unit 2 Section A	Linear Functions
PA Core Standards CC.2.1.HS.F.3 CC.2.1.HS.F.4 CC.2.1.HS.F.5 CC.2.2.7.B.3 CC.2.2.8.B.2 CC.2.2.8.B.3 CC.2.2.8.C.1 CC.2.2.8.C.2 CC.2.2.HS.C.1 CC.2.2.HS.C.2 CC.2.2.HS.C.3 CC.2.2.HS.C.4 CC.2.2.HS.C.5 CC.2.2.HS.C.6 CC.2.2.HS.D.7 CC.2.2.HS.D.8 CC.2.2.HS.D.9 CC.2.2.HS.D.10 CC.2.4.HS.B.1 CC.2.4.HS.B.2	Students will: • Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays. • Use units as a way to understand problems and to guide the solution of multi-step problems. • Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. • Model and solve real-world and mathematical problems by using and connecting numerical, algebraic, and/or graphical representations. • Understand the connections between proportional relationships, lines, and linear equations. • Analyze and solve linear equations and pairs of simultaneous linear equations. • Define, evaluate, and compare functions. • Use concepts of functions to model relationships between quantities. • Use the concept and notation of functions to interpret and apply them in terms of their context. • Graph and analyze functions and use their properties to make connections between the different representations. • Write functions or sequences that model relationships between two quantities. • Interpret the effects transformations have on functions and find the inverses of functions. • Construct and compare linear, quadratic, and exponential models to solve problems. • Interpret functions in terms of the situations they model. • Create and graph equations or inequalities to describe numbers or relationships. • Apply inverse operations to solve equations or formulas for a given variable. • Use reasoning to solve equations and justify the solution method. • Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically. • Summarize, represent, and interpret data on a single count or measurement variable. • Summarize, represent, and interpret data on two categorical and quantitative variables. Anchor Descriptor: ▪ <u>A1.1.1.4:</u> Use estimation strategies in problem-solving situations. ▪ <u>A1.1.2.1:</u> Write, solve, and/or graph linear equations using various methods. ▪ <u>A1.2.1.1:</u> Analyze and/or use patterns or relations. ▪ <u>A1.2.1.2:</u> Interpret and/or use linear functions and their equations, graphs, or tables. ▪ <u>A1.2.2.1:</u> Describe, compute, and/or use the rate of change (slope) of a line.

Curriculum Framing Questions	Essential Questions: ▪ Why are graphs useful? ▪ Why are linear functions useful? ▪ How do linear functions model the real world? Unit Questions: ▪ How do you identify linear equations, intercepts, and zeros? ▪ How do you graph and write linear equations? ▪ What is rate of change and how do you use it to solve problems? Content Questions: ▪ How do you identify linear equations, intercepts, and zeroes? ▪ How do you graph linear equations? ▪ How do you solve linear equations by graphing? ▪ How do you estimate solutions to a linear equation by graphing? ▪ How do you use rate of change to solve problems? ▪ How do you find the slope of a line? ▪ How do you write and graph direct variation equations? ▪ How do you solve problems involving direct variation? ▪ How do you recognize arithmetic sequences? ▪ How do you relate arithmetic sequences to linear functions? ▪ How do you recognize arithmetic sequences? ▪ How do you relate arithmetic sequences to linear functions?
Materials (including technology)	▪ Textbook resources ▪ Kuta Software ▪ Study Island ▪ Khan Academy Instructional Resources ▪ Teacher Tube ▪ You Tube EDU ▪ Teacher Created Materials ▪ www.interactmath.com ▪ Chromebook with Internet access ▪ Graphing calculator
Assessments:	▪ Quizzes ▪ Tests
Mathematical Practice Standards	▪ Make sense of problems and persevere in solving them ▪ Reason abstractly and quantitatively ▪ Construct viable arguments and critique the reasoning ▪ Modeling with Mathematics ▪ Use appropriate tools strategically ▪ Attend to precision ▪ Look for and make use of structure ▪ Look for and express regularity in repeated reasoning
Predicted 3 - 4 weeks	

Unit 2 Section B	Equations of Linear Functions
PA Core Standards CC.2.1.HS.F.3 CC.2.1.HS.F.4 CC.2.2.8.B.2 CC.2.2.8.C.1 CC.2.2.8.C.2 CC.2.2.HS.C.1 CC.2.2.HS.C.2 CC.2.2.HS.C.3 CC.2.2.HS.C.4 CC.2.2.HS.C.5 CC.2.2.HS.C.6 CC.2.2.HS.D.9 CC.2.4.8.B.1 CC.2.4.HS.B.1 CC.2.4.HS.B.2 CC.2.4.HS.B.3	Students will: • Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays. • Use units as a way to understand problems and to guide the solution of multi-step problems. • Understand the connections between proportional relationships, lines, and linear equations. • Define, evaluate, and compare functions. • Use concepts of functions to model relationships between quantities. • Use the concept and notation of functions to interpret and apply them in terms of their context. • Graph and analyze functions and use their properties to make connections between the different representations. • Write functions or sequences that model relationships between two quantities. • Interpret the effects transformations have on functions and find the inverses of functions. • Construct and compare linear, quadratic, and exponential models to solve problems. • Interpret functions in terms of the situations they model. • Use reasoning to solve equations and justify the solution method. • Analyze and/or interpret bivariate data displayed in multiple representations. • Summarize, represent, and interpret data on a single count or measurement variable. • Summarize, represent, and interpret data on two categorical and quantitative variables. • Analyze linear models to make interpretations based on the data. Anchor Descriptor: ▪ <u>A1.1.1.4:</u> Use estimation strategies in problem-solving situations ▪ <u>A1.2.1.2:</u> Interpret and/or use linear functions and their equations, graphs, or tables. ▪ <u>A1.2.2.1:</u> Describe, compute, and/or use the rate of change (slope) of a line. ▪ <u>A1.2.2.2:</u> Analyze and/or interpret data on a scatter plot.
Curriculum Framing Questions	Essential Questions: ▪ Why is math used to model real-world situations? ▪ How are patterns of change represented in functions? Unit Questions: ▪ How do you write and graph linear equations in various forms? ▪ How do you use scatter plots and linear of fit, and write equations of best-fit lines using linear regression? ▪ How do you find inverse linear functions?

	Content Questions: ▪ How do you write and graph linear equations in slope-intercept form? ▪ How do you model real world data with equations and slope-intercept form? ▪ How can you write an equation of a line in slope-intercept form given the slope and one point or given two points? ▪ How can you write equations of lines in point-slope form? ▪ How can you write linear equations in different forms? ▪ How can you write an equation of the line that passes through a given point parallel or perpendicular to a given line? ▪ How would you investigate relationships between quantities by using points on a scatter plot? ▪ How could you use lines of fit to make and evaluate predictions? ▪ How do you write equations of best-fit lines using linear regression? ▪ How do you find the inverse of a relation? ▪ How do you find the inverse of a linear function?
Materials:	▪ Textbook resources ▪ Kuta Software ▪ Study Island ▪ Khan Academy Instructional Resources ▪ Teacher Tube ▪ You Tube EDU ▪ Teacher Created Materials ▪ www.interactmath.com ▪ Chromebook with Internet access ▪ Graphing Calculator
Assessments:	• Quizzes • Tests • Scatter Plot Activity (Hot Wheels)
Mathematical Practice Standards	• Make sense of problems and persevere in solving them • Reason abstractly and quantitatively • Construct viable arguments and critique the reasoning • Modeling with Mathematics • Use appropriate tools strategically • Attend to precision • Look for and make use of structure • Look for and express regularity in repeated reasoning
Predicted 3 - 4 weeks	

Unit 2 Section C	Linear Inequalities
<u>PA Core Standards</u> CC.2.1.8.E.1 CC.2.1.8.E.4 CC.2.1.HS.F.1 CC.2.1.HS.F.2 CC.2.1.HS.F.5 CC.2.2.7.B.3 CC.2.2.8.B.1 CC.2.2.HS.D.7 CC.2.2.HS.D.9 CC.2.2.HS.D.10	Students will: • Distinguish between rational and irrational numbers using their properties. • Estimate irrational numbers by comparing them to rational numbers. • Apply and extend the properties of exponents to solve problems with rational exponents. • Apply properties of rational and irrational numbers to solve real world or mathematical problems. • Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. • Model and solve real-world and mathematical problems by using and connecting numerical, algebraic, and/or graphical representations. • Apply concepts of radicals and integer exponents to generate equivalent expressions. • Create and graph equations or inequalities to describe numbers or relationships. • Use reasoning to solve equations and justify the solution method. • Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically. Anchor Descriptor: ▪ <u>A1.1.1.1:</u> Represent and/or use numbers in equivalent forms (e.g., integers, fractions, decimals, percents, square roots, and exponents). ▪ <u>A1.1.1.4:</u> Use estimation strategies in problem-solving situations. ▪ <u>A1.1.3.1:</u> Write, solve, and/or graph linear inequalities using various methods. ▪ <u>A1.1.1.3:</u> Use exponents, roots, and/or absolute values to solve problems.
Curriculum Framing Questions	Essential Questions: ▪ How are symbols useful in mathematics? ▪ What mathematical symbols do you know? ▪ Why are equations and inequalities useful? Unit Questions: ▪ How do you solve one-step and multi-step inequalities? ▪ How do you solve compound inequalities and inequalities involving absolute value? ▪ How do you graph inequalities in two variables? Content Questions: ▪ How do you solve linear inequalities by using addition and subtraction? ▪ How do you solve linear inequalities by using multiplication and division? ▪ How do you solve linear inequalities involving more than one operation or the Distributive Property? ▪ How do you solve compound inequalities containing the word AND, and graph their solution set? ▪ How do you solve compound inequalities containing the word OR, and graph their solution set?

	▪ How do you solve and graph absolute value inequalities (less than)? ▪ How do you solve and graph absolute value inequalities (greater than)? ▪ How do you graph linear equalities on a coordinate plane? ▪ How do you solve linear inequalities by graphing?
Materials:	▪ Textbook resources ▪ Kuta Software ▪ Study Island ▪ Khan Academy Instructional Resources ▪ Teacher Tube ▪ You Tube EDU ▪ Teacher Created Materials ▪ www.interactmath.com ▪ Chromebook with Internet access ▪ Graphing Calculator
Assessments	▪ Quizzes ▪ Tests
Mathematical Practice Standards	▪ Make sense of problems and persevere in solving them ▪ Reason abstractly and quantitatively ▪ Construct viable arguments and critique the reasoning ▪ Modeling with Mathematics ▪ Use appropriate tools strategically ▪ Attend to precision ▪ Look for and make use of structure ▪ Look for and express regularity in repeated reasoning
Predicted 2 - 3 weeks	

Unit 2 Section D	Systems of Linear Equations and Inequalities
PA Core Standards CC.2.1.HS.F.5 CC.2.2.8.B.3 CC.2.2.HS.D.7 CC.2.2.HS.D.9 CC.2.2.HS.D.10	Students will: - Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. - Analyze and solve linear equations and pairs of simultaneous linear equations. - Create and graph equations or inequalities to describe numbers or relationships. - Use reasoning to solve equations and justify the solution method. - Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically. Anchor Descriptor: A1.1.2.2: Write, solve, and/or graph systems of linear equations using various methods.
Curriculum Framing Questions	Essential Questions: - What methods can be used to solve systems of equations and inequalities? - How are systems of linear equations and inequalities useful? Unit Questions: - How do you write and/or solve a system of linear equations (including problem situations) using graphing, substitution, and/or elimination? - How do you interpret solutions to problems in the context of the problem situation? Content Questions: - How do you determine the number of solutions a system of linear equations has? - How do you solve systems of linear systems by graphing? - How do you solve systems of equations using substitution? - How do you solve real-world problems using systems of equations using substitution? - How do you solve systems of equations using elimination with both addition and subtraction? - How do you solve systems of equations using elimination with multiplication? - How do you solve real-world problems using systems of equations? - How do you determine the best method for solving a system of equations? - How can you apply systems of equations? - How can you solve systems of linear inequalities by graphing? - How can you apply systems of linear inequalities?
Materials:	- Textbook resources - Kuta Software - Study Island - Khan Academy Instructional Resources - Teacher Tube - You Tube EDU

	▪ Teacher Created Materials ▪ www.interactmath.com ▪ Chromebook with Internet access ▪ Graphing Calculator
Assessments:	▪ Quizzes ▪ Tests
Mathematical Practice Standards	▪ Make sense of problems and persevere in solving them ▪ Reason abstractly and quantitatively ▪ Construct viable arguments and critique the reasoning ▪ Modeling with Mathematics ▪ Use appropriate tools strategically ▪ Attend to precision ▪ Look for and make use of structure ▪ Look for and express regularity in repeated reasoning
Predicted 3 - 4 weeks	

Unit 3 Section A	Exponents and Exponential Functions
PA Core Standards CC.2.2.8.C.1 CC.2.2.8.C.2 CC.2.2.HS.C.1 CC.2.2.HS.C.2 CC.2.2.HS.C.3 CC.2.4.HS.B.2	Students will: • Define, evaluate, and compare functions. • Use concepts of functions to model relationships between quantities. • Use the concept and notation of functions to interpret and apply them in terms of their context. • Graph and analyze functions and use their properties to make connections between the different representations. • Write functions or sequences that model relationships between two quantities. • Summarize, represent, and interpret data on two categorical and quantitative variables. Anchor Descriptor: ▪ <u>A1.2.1.1</u>: Analyze and/or use patterns or relations.
Curriculum Framing Questions	Essential Questions: • How can algebraic expressions be transformed? • How do linear and non-linear functions compare? • How are functions and relations useful? • How are patterns of change represented in functions? Unit Questions: • How do you analyze a set of data for the existence of a pattern and represent the pattern algebraically and/or graphically? • How do you determine whether a relation is a function, given a set of points or a graph? • How do you identify the domain or range of a relation? Content Questions: • How do you multiply monomials using the properties of exponents? • How do you simplify expressions using the multiplication properties of exponents? • How do you divide monomials using the properties of exponents? • How do you simplify expressions containing negative and zero exponents? • How do you evaluate and rewrite expressions involving rational exponents? • How do you solve equations involving expressions with rational exponents? • How do you express numbers in scientific notation? • How can you find products and quotients of numbers expressed in scientific notation? • How do you graph exponential functions? • How do you identify data that displays exponential behavior? • How do you solve problems exponential growth and decay? • How can you identify and generate geometric sequences? • How can you relate geometric sequences to exponential functions? • How can you use a recursive formula to list terms in a sequence? • How do you write a recursive formula for algebraic and geometric sequences?
Materials	▪ Textbook resources

	▪ Kuta Software ▪ Study Island Khan Academy Instructional Resources ▪ Teacher Tube ▪ You Tube EDU ▪ Teacher Created Materials ▪ www.interactmath.com ▪ Chromebook with internet access ▪ Graphing Calculator
Assessments	▪ Quizzes ▪ Tests
Mathematical Practice Standards	▪ Make sense of problems and persevere in solving them ▪ Reason abstractly and quantitatively ▪ Construct viable arguments and critique the reasoning ▪ Modeling with Mathematics ▪ Use appropriate tools strategically ▪ Attend to precision ▪ Look for and make use of structure ▪ Look for and express regularity in repeated reasoning
Predicted 2 – 3 weeks	

Unit 3 Section B	Quadratic Expressions and Equations
PA Core Standards CC.2.2.HS.C.1 CC.2.2.HS.C.2 CC.2.2.HS.C.3 CC.2.4.HS.B.2	Students will: • Use the concept and notation of functions to interpret and apply them in terms of their context. • Graph and analyze functions and use their properties to make connections between the different representations. • Write functions or sequences that model relationships between two quantities. • Summarize, represent, and interpret data on two categorical and quantitative variables. Anchor Descriptor: ▪ A1.2.1.1: Analyze and/or use patterns or relations.
Curriculum Framing Questions	Essential Questions: ▪ How can algebraic expressions be transformed? ▪ How do linear and non-linear functions compare? ▪ How are functions and relations useful? ▪ How are patterns of change represented in functions? ▪ How do quadratic functions model real-world problems and their solutions? Unit Questions: ▪ How do you analyze a set of data for the existence of a pattern and represent the pattern algebraically and/or graphically? ▪ How do you determine whether a relation is a function, given a set of points or a graph? ▪ How do you identify the domain or range of a relation? Content Questions: ▪ How do you write polynomials in standard form? ▪ How do you add and subtract polynomials? ▪ How do you multiply a polynomial by a monomial? ▪ How do you solve equations involving the products of monomials and polynomials? ▪ How do you multiply binomials using the FOIL method? ▪ How do you multiply polynomials using the distributive property? ▪ How do you find the squares of sums and differences? ▪ How do you find the product of sums and differences? ▪ How do you use the distributive property to factor polynomials? ▪ How do you solve equations of the form $ax^2 + bx = 0$? ▪ How do you factor trinomials of the form $x^2 + bx + c$? ▪ How do you solve equations of the form $x^2 + bx + c = 0$? ▪ How do you factor trinomials of the form $ax^2 + bx + c$? ▪ How do you solve equations of the form $ax^2 + bx + c = 0$? ▪ How do you factor binomials that are the difference of squares? ▪ How do you use the difference of squares to solve equations? ▪ How do you factor perfect square trinomials? ▪ How do you solve equations that are perfect square trinomials?

Materials	▪ Textbook resources ▪ Kuta Software ▪ Study Island ▪ Khan Academy Instructional Resources ▪ Teacher Tube ▪ You Tube EDU ▪ Teacher Created Materials ▪ www.interactmath.com ▪ Chromebook with Internet access
Assessments	▪ Section Quizzes ▪ Tests
Mathematical Practice Standards	▪ Make sense of problems and persevere in solving them ▪ Reason abstractly and quantitatively ▪ Construct viable arguments and critique the reasoning ▪ Modeling with Mathematics ▪ Use appropriate tools strategically ▪ Attend to precision ▪ Look for and make use of structure ▪ Look for and express regularity in repeated reasoning
Predicted 2 – 3 weeks	

Unit 3 Section C	Quadratic Functions and Equations
PA Core Standards CC.2.2.HS.D.1 CC.2.2.HS.D.2 CC.2.2.HS.D.3 CC.2.2.HS.D.5 CC.2.2.HS.D.6	Students will: • Interpret the structure of expressions to represent a quantity in terms of its context. • Write expressions in equivalent forms to solve problems. • Extend the knowledge of arithmetic operations and apply to polynomials. • Use polynomial identities to solve problems. • Extend the knowledge of rational functions to rewrite in equivalent forms. Anchor Descriptor: • <u>A1.1.1.5</u>: Simplify expressions involving polynomials.
Curriculum Framing Questions	Essential Questions: ▪ How can algebraic expressions be transformed? ▪ How do linear and non-linear functions compare? ▪ How are functions and relations useful? ▪ How are patterns of change represented in functions? ▪ How do quadratic functions model real-world problems and their solutions? Unit Questions: ▪ How do you add, subtract, and/or multiply polynomial expressions? ▪ How do you Factor algebraic expressions, including difference of squares and trinomials? Content Questions: ▪ How do you analyze the characteristics of graphs of quadratic functions? ▪ How do you graph quadratic functions? ▪ How do you solve quadratic equations by graphing? ▪ How can you estimate solutions of quadratic equations by graphing? ▪ How do you apply transformations to quadratic functions? ▪ How do you apply dilations and reflections to quadratic functions? ▪ How do you complete the square to write perfect square trinomials? ▪ How do you solve quadratic equations by completing the square?
Materials	▪ Textbook resources ▪ Kuta Software ▪ Study Island ▪ Khan Academy Instructional Resources ▪ Teacher Tube ▪ You Tube EDU ▪ Teacher Created Materials ▪ www.interactmath.com ▪ Chromebook with Internet access
Assessments	▪ Quizzes ▪ Tests ▪ Absolute Value Functions & Quadratic Functions Flip Grid Project

Mathematical Practice Standards	• Make sense of problems and persevere in solving them. • Reason abstractly and quantitatively • Construct viable arguments and critique the reasoning • Modeling with Mathematics • Use appropriate tools strategically • Attend to precision • Look for and make use of structure • Look for and express regularity in repeated reasoning
Predicted 2 – 3 weeks	

Unit 4 Section A	Simplifying Rational Expressions
PA Core Standards CC.2.2.HS.D.1 CC.2.2.HS.D.2 CC.2.2.HS.D.3 CC.2.2.HS.D.5 CC.2.2.HS.D.6	Students will: • Interpret the structure of expressions to represent a quantity in terms of its context. • Write expressions in equivalent forms to solve problems. • Extend the knowledge of arithmetic operations and apply to polynomials. • Use polynomial identities to solve problems. • Extend the knowledge of rational functions to rewrite in equivalent forms. Anchor Descriptor: ▪ A1.1.1.5: Simplify expressions involving polynomials.
Curriculum Framing Questions	Essential Questions: ▪ How can algebraic expressions be transformed? ▪ How do linear and non-linear functions compare? Unit Questions: ▪ How do you add, subtract, and/or multiply polynomial expressions? ▪ How do you factor algebraic expressions, including difference of squares and trinomials? Content Questions: ▪ How do you simplify radical expressions using the Product Property of Square Roots? ▪ How do you simplify radical expressions using the Quotient Property of Square Roots?
Materials	▪ Textbook resources ▪ Kuta Software ▪ Study Island ▪ Khan Academy Instructional Resources ▪ Teacher Tube ▪ You Tube EDU ▪ Teacher Created Materials ▪ www.interactmath.com ▪ Chromebook with Internet access
Assessments	▪ Quizzes ▪ Tests
Mathematical Practice Standards	▪ Make sense of problems and persevere in solving them ▪ Reason abstractly and quantitatively ▪ Construct viable arguments and critique the reasoning ▪ Modeling with Mathematics ▪ Use appropriate tools strategically ▪ Attend to precision ▪ Look for and make use of structure ▪ Look for and express regularity in repeated reasoning
Predicted 1 – 2 weeks	

Unit 4 Section B	Data and Statistics
PA Core Standards CC.2.2.HS.C.6 CC.2.4.HS.B.1 CC.2.4.HS.B.2 CC.2.4.HS.B.3 CC.2.4.HS.B.4 CC.2.4.HS.B.5 CC.2.4.HS.B.7	Students will: • Interpret functions in terms of the situations they model. • Summarize, represent, and interpret data on a single count or measurement variable. • Summarize, represent, and interpret data on two categorical and quantitative variables. • Analyze linear models to make interpretations based on the data. • Recognize and evaluate random processes underlying statistical experiments. • Make inferences and justify conclusions based on sample surveys, experiments, and observational studies. • Apply the rules of probability to compute probabilities of compound events in a uniform probability model. Anchor Descriptor: ▪ <u>A1.2.2.2:</u> Analyze and/or interpret data on a scatter plot. ▪ <u>A1.2.3.1:</u> Use measures of dispersion to describe a set of data. ▪ <u>A1.2.3.2:</u> Use data displays in problem-solving settings and/or to make predictions. ▪ <u>A1.2.3.3:</u> Apply probability to practical situations.
Curriculum Framing Questions	Essential Questions: • How can the results of a statistical investigation be used to support an argument in the real world? Unit Questions: ▪ How do you draw, identify, find, and/or write an equation for a line of best fit for a scatter plot? ▪ How do you calculate and/or interpret the range, quartiles, and interquartile range of data? ▪ How do you estimate or calculate to make predictions based on a circle, line, bar graph, measures of central tendency, or other representations. ▪ How do you analyze data, make predictions, and/or answer questions based on displayed data (box-and-whisker plots, stem-and-leaf plots, scatter plots, measures of central tendency, or other representations). ▪ How do you make predictions using the equations or graphs of best-fit lines of scatter plots. ▪ How do you find probabilities for compound events (e.g., find probability of red and blue, find probability of red or blue) and represent as a fraction, decimal, or percent? Content Questions: ▪ How do you identify sample statistics and population parameters? ▪ How do you analyze data sets using statistics? ▪ How would you describe the shape of a distribution? ▪ How could you use the shapes of distributions to select appropriate statistics?

	▪ How do you determine the effect that transformations of data have on measures of central tendency and variation? ▪ How do you compare data using measures of central tendency and variation? ▪ What is probability and how is the real world interpreted through it?
Materials	▪ Textbook resources ▪ Kuta Software ▪ Study Island ▪ Khan Academy Instructional Resources ▪ Teacher Tube ▪ You Tube EDU ▪ Teacher Created Materials ▪ www.interactmath.com ▪ Chromebook with Internet access ▪ Graphing Calculator
Assessments	▪ Quizzes ▪ Tests ▪ Scatter Plot Activity (Hot Wheels)
Mathematical Practice Standards	▪ Make sense of problems and persevere in solving them ▪ Reason abstractly and quantitatively ▪ Construct viable arguments and critique the reasoning ▪ Modeling with Mathematics ▪ Use appropriate tools strategically ▪ Attend to precision ▪ Look for and make use of structure ▪ Look for and express regularity in repeated reasoning
Predicted 1 – 2 weeks	