| **SUBJECT: Keystone Algebra** | **GRADE: 9 - 12** |
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| **Unit Title:** UNIT 1: OPERATIONS WITH REAL NUMBERS & EXPRESSIONS | **Time Frame:** 25 Days |

| **UNIT OVERVIEW** |
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| In this unit students will learn how to Compare and Order Numbers, Simplify Square Roots, Use Estimation, Representing Numbers in Equivalent Forms, and Simplify Expressions. |

| **LRG SKILLS AND DISPOSITIONS** | **PA STANDARDS** |
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| Critical Thinking and Problem Solving: Use Keystone Exam questions to practice critical thinking and problem solving skills. (S4C) | CC.2.1.HS.F.1<br>CC.2.1.HS.F.2<br>CC.2.2.HS.D.1<br>CC.2.2.HS.D.2<br>CC.2.2.HS.D.3<br>CC.2.2.HS.D.5<br>CC.2.2.HS.D.6<br>CC.2.2.HS.D.9 |
| **COMPETENCIES** | **LEARNING TARGETS** |
| Numbers and Operations – Fractions:<br>I can find common factors and multiples to represent, compare, and calculate quantities using fractions. | • Compare and Order Numbers - I can compare and order any real numbers. (K1MAB2L1)<br>• Simplify Square Roots - I can simplify square roots. (K1MAB2L2) |
| Operations and Expressions:<br>I can generate equivalent expressions using operations and mathematical properties. | • GCF - I can find the greatest common factor (GCF). (K1MAB4L1)<br>• LCM - I can find the least common multiple (LCM) for sets of monomials. (K1MAB4L2)<br>• Using Order of Operations - I can simplify and evaluate expressions using the order of operations. (K1MAV4L3)<br>• Estimate to Solve Problems - I can use estimation to solve problems. (K1MAB4L4) |

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| | • Add/Subtract Polynomials - I can add and subtract polynomial expressions. (K1MAB4L5)<br>• Multiply Polynomials - I can multiply polynomial expressions. (K1MAB4L6)<br>• Factor Trinomials - I can factor trinomials. (K1MAB4L7)<br>• Rational Expressions - I can simplify rational expressions. (K1MAB4L8) |

| **SUBJECT: Keystone Algebra** | **GRADE: 9 - 12** |
|---|---|
| **Unit Title:** UNIT 2: LINEAR EQUATIONS AND INEQUALITIES | **Time Frame:** 20 Days |
| **UNIT OVERVIEW** | |
| In this unit students will learn to solve linear equations and linear inequalities. Students will also learn how to solve systems of equations and systems of inequalities. | |
| **LRG SKILLS AND DISPOSITIONS** | **PA STANDARDS** |
| Critical Thinking and Problem Solving: Use Keystone Exam questions to practice critical thinking and problem solving skills. (S4C) | CC.2.1.HS.F.3<br>CC.2.1.HS.F.5<br>CC.2.2.HS.D.7<br>CC.2.2.HS.D.8<br>CC.2.2.HS.D.9<br>CC.2.2.HS.D.10<br>CC.2.2.HS.C.3 |
| **COMPETENCIES** | **LEARNING TARGETS** |
| Equations and Inequalities**:**<br>I can create and solve equations and inequalities that represent mathematical situations. | • Solve Linear Equations - I can solve linear equations. (K1MAB5L1)<br>• Write Linear Equations - I can write linear equations. (K1MAB5L2) |

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| | • Use Algebraic Properties - I can use and/or identify an algebraic property to justify any step in an equation-solving process. (K1MAB5L3)<br>• Interpret Solutions (Linear Equations) - I can interpret solutions to problems in the context of the problem situation. (K1MAB5L4)<br>• Solving Systems Algebraically - I can solve a system of equation using algebra (substitution and elimination). (K1MAB5L5)<br>• Interpret Solutions (Systems) - I can interpret real-life solutions using systems of equations. (K1MAB5L6)<br>• Write and Solve Linear Inequalities - I can write and solve linear inequalities. (K1MAB5L7)<br>• Solve Abs. Value Equations - I can solve absolute value equations. (K1MAB5L8)<br>• Solve Compound Inequalities - I can write and solve compound inequalities. (K1MAB5L9)<br>• Solve Abs. Value Inequalities - I can solve absolute value inequalities. (K1MAB5L10)<br>• Interpret Solutions (Systems of Inequalities) - I can interpret real-life solutions using systems of inequalities. (K1MAB5L11) |
| Graphing:<br>I can create and interpret graphs as visual representations of the relationship between quantities. | • Solving Systems Graphically - I can solve a system of equations by using graphing. (K1MAB7L1)<br>• Graphing Inequalities on a Number Line - I can identify or graph the solution set to a linear inequality on a number line. (K1MAB7L2)<br>• Graphing Compound Inequalities - I can graph compound inequalities. (K1MAB7L3)<br>• Graphing Inequalities on a Coordinate Plane - I can graph inequalities on a coordinate plane. (K1MAB7L4)<br>• Graphing Systems of Inequalities - I can graph systems of inequalities. (K1MAB7L5) |

| **SUBJECT: Keystone Algebra** | **GRADE: 9 - 12** |
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| **Unit Title:** UNIT 3: FUNCTIONS | **Time Frame:** 10 Days |

| **UNIT OVERVIEW** |
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| In this unit students will learn about patterns, relations, and functions. Students will also identify the domain and range of relations. Lastly, students will translate between different representations of functions. |

| **LRG SKILLS AND DISPOSITIONS** | **PA STANDARDS** |
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| Critical Thinking and Problem Solving: Use Keystone Exam questions to practice critical thinking and problem solving skills. (S4C) | CC.2.1.HS.F.3<br>CC.2.1.HS.F.4<br>CC.2.2.HS.C.1<br>CC.2.2.HS.C.2<br>CC.2.2.HS.C.3<br>CC.2.2.HS.C.4<br>CC.2.2.HS.C.6<br>CC.2.4.HS.B.2 |
| **COMPETENCIES** | **LEARNING TARGETS** |
| Patterns, Functions, Multiple Representations:<br>I can identify, create, and evaluate functions using multiple representations. | • Analyze Patterns - I can analyze a set of data for the existence of a pattern and represent the pattern algebraically and/or graphically. (K1MAB6L1)<br>• Determine Functions - I can determine whether a relation is a function, given a set of points or a graph. (K1MAB6L2)<br>• Identify Domain and Range - I can identify the domain and range of a relation. (K1MAB6L3) |

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| | • Using Linear Functions - I can create, interpret, and/or use the equation, graph, or table of a linear function. (K1MAB6L4)<br>• Translate Representations of Functions - I can translate from one representation of a linear function to another. (K1MAB6L5) |

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| **SUBJECT: Keystone Algebra** | **GRADE: 9 - 12** |
| **Unit Title:** UNIT 4: COORDINATE GEOMETRY | **Time Frame:** 12 Days |
| **UNIT OVERVIEW** | |
| In this unit students will learn how to calculate the rate of change of a linear function. Additionally, students will learn how to graph a line using the slope and the y-intercept. | |
| **LRG SKILLS AND DISPOSITIONS** | **PA STANDARDS** |
| Critical Thinking and Problem Solving: Use Keystone Exam questions to practice critical thinking and problem solving skills. (S4C) | CC.2.2.HS.C.1<br>CC.2.2.HS.C.2<br>CC.2.2.HS.C.3<br>CC.2.2.HS.C.5<br>CC.2.2.HS.C.6<br>CC.2.4.HS.B.1<br>CC.2.4.HS.B.2<br>CC.2.4.HS.B.3 |
| **COMPETENCIES** | **LEARNING TARGETS** |
| Equations and Inequalities**:** | • Write a Linear Equation Given 2 Points - I can write or identify a linear equation when given two points on a line. (K1MAB5L12) |

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| I can create and solve equations and inequalities that represent mathematical situations. | • Write a Linear Equation Given Slope and a Point - I can write or identify a linear equation when given the slope and point on the line. (K1MAB5L13)<br>• Equations for a Line of Best Fit - I can write an equation for a line of best fit for a scatter plot. (K1MAB5L14) |
| Patterns, Functions, Multiple Representations:<br>I can identify, create, and evaluate functions using multiple representations. | • Constant Rates of Change - I can identify, describe, and/or use constant rates of change. (K1MAB6L6)<br>• Using Slope to Solve Problems - I can apply the concept of linear rate of change (slope) to solve problems. (K1MAB6L7) |
| Graphing:<br>I can create and interpret graphs as visual representations of the relationship between quantities. | • Find Slope & Y-Intercept from a Graph - I can determine the slope and/or y-intercept represented by a linear equation or graph. (K1MAB7L6)<br>• Write a Linear Equation from a Graph - I can write or identify a linear equation when given the graph of the line. (K1MAB7L7)<br>• Drawing a Line of Best Fit - I can draw a line of best fit for a given scatter plot. (K1MAB7L8) |

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| **SUBJECT: Keystone Algebra** | **GRADE: 9 - 12** |
| **Unit Title:** UNIT 5: DATA ANALYSIS | **Time Frame:** 13 Days |
| **UNIT OVERVIEW** | |
| In this unit, students will learn how to make predictions using data displays in problem-solving situations. Students will also be asked to describe a set of data using the measures of dispersion. Lastly, students will apply probability to practical situations. | |
| **LRG SKILLS AND DISPOSITIONS** | **PA STANDARDS** |

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| Critical Thinking and Problem Solving: Use Keystone Exam questions to practice critical thinking and problem solving skills. (S4C) | CC.2.4.HS.B.1<br>CC.2.4.HS.B.3<br>CC.2.4.HS.B.4<br>CC.2.4.HS.B.5<br>CC.2.4.HS.B.7 |
| **COMPETENCIES** | **LEARNING TARGETS** |
| Graphing:<br>I can create and interpret graphs as visual representations of the relationship between quantities. | • Make a Scatter Plot - I can make a scatter plot for a given set of data. (K1MAB7L9) |
| Measurement, Data, and Statistics:<br>I can collect, represent, analyze, and interpret data. | • Using a Line of Best Fit - I can use a line of best fit to make predictions about data. (K1MAB10L1)<br>• Analyze Circle and Bar Graphs - I can analyze and make predictions using circle graphs and bar graphs. (K1MAB10L2)<br>• Measures of Central Tendency and Dispersion - I can calculate the mean, median, mode, upper quartile, lower quartile, interquartile range, and range for a set of data. (K1MAB10L3)<br>• Analyze Box-and-Whisker and Stem-and-Leaf Plots - I can analyze and make predictions using box-and-whisker plots and stem-and-leaf plots. (K1MAB10L4)<br>• Analyze Line Graphs and Scatter Plots - I can analyze and make predictions using line graphs and scatter plots. (K1MAB10L5) |
| Probability:<br>I can use counting strategies and calculate the probability of events. | • Probability of Compound Events - I can find the probability of compound events and represent them as a fraction, decimal, or percent. (K1MAB11L1) |

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| **SUBJECT: Keystone Algebra** | **GRADE: 9 - 12** |
| **Unit Title:** UNIT 6: EXPONENTS | **Time Frame:** 15 Days |
| **UNIT OVERVIEW** | |

| In this unit students will be using the properties of exponents to simplify expressions. | |
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| **LRG SKILLS AND DISPOSITIONS** | **PA STANDARDS** |
| Honesty, Integrity and Responsibility 9-12: Student conference regarding assignments (D3C)<br><br>Resilience and Grit 9-12: Student conference regarding taking advantage of opportunities for improvement (D4C) | CC.2.1.HS.B<br>CC.2.1.HS.C<br>CC.2.1.HS.D<br>CC.2.1.HS.E |
| **COMPETENCIES** | **LEARNING TARGETS** |
| Operations and Expressions:<br>I can generate equivalent expressions using operations and mathematical properties. | ● Zero and Negative Exponents - I can simplify expressions using the zero and negative properties of exponents. (K1MAB4L9)<br>● Multiplication Properties of Exponents - I can simplify expressions using the multiplication properties of exponents. (K1MAB4L10)<br>● Division Property of Exponents - I can simplify expressions using the division property of exponents. (K1MAB4L11)<br>● Power Rule - I can simplify expressions using the power rule. (K1MAB4L12)<br>● Rational Exponents - I can simplify expressions using rational exponents. (K1MAB4L13) |

| **SUBJECT: Keystone Algebra** | **GRADE: 9 - 12** |
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| **Unit Title:** UNIT 7: LINEAR INEQUALITIES | **Time Frame:** 20 Days |
| **UNIT OVERVIEW** | |

In this unit students will learn how to solve and graph linear inequalities. Students will also learn how to solve absolute value equations and inequalities.

| LRG SKILLS AND DISPOSITIONS | PA STANDARDS |
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| | CC.2.2.HS.D.7<br>CC.2.2.HS.D.10 |
| **COMPETENCIES** | **LEARNING TARGETS** |
| Equations and Inequalities**:**<br>I can create and solve equations and inequalities that represent mathematical situations. | ● Write and Solve Linear Inequalities - I can write and solve linear inequalities. (K1MAB5L2)<br>● Solve Abs. Value Equations - I can solve absolute value equations. (K1MAB5L8)<br>● Solve Compound Inequalities - I can write and solve compound inequalities. (K1MAB5L9)<br>● Solve Abs. Value Inequalities - I can solve absolute value inequalities. (K1MAB5L10)<br>● Interpret Solutions (Systems of Inequalities) - I can interpret real-life solutions using systems of inequalities. (K1MAB5L11) |
| Graphing:<br>I can create and interpret graphs as visual representations of the relationship between quantities. | ● Solving Systems Graphically - I can solve a system of equations by using graphing. (K1MAB7L1)<br>● Graphing Inequalities on a Number Line - I can identify or graph the solution set to a linear inequality on a number line. (K1MAB7L2)<br>● Graphing Compound Inequalities - I can graph compound inequalities. (K1MAB7L3)<br>● Graphing Inequalities on a Coordinate Plane - I can graph inequalities on a coordinate plane. (K1MAB7L4) |

| **SUBJECT: Keystone Algebra** | **GRADE: 9 - 12** |
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| **Unit Title:** UNIT 8: FUNCTION APPLICATIONS | **Time Frame:** 15 Days |

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| **UNIT OVERVIEW** | |
| In this unit students will learn to identify relations that are also functions. Additionally, students will perform operations with functions including function composition. | |
| **LRG SKILLS AND DISPOSITIONS** | **PA STANDARDS** |
| | CC.2.1.HS.F.3<br>CC.2.2.HS.C.1<br>CC.2.2.HS.C.2<br>CC.2.2.HS.C.3<br>CC.2.2.HS.C.6<br>CC.2.4.HS.B.2 |
| **COMPETENCIES** | **LEARNING TARGETS** |
| Patterns, Functions, Multiple Representations:<br>I can identify, create, and evaluate functions using multiple representations. | ● Min. and Max. of a Function - I can find the maximum and the minimum of a function. (K1MAB6L8)<br>● Function Composition - I can compose functions. (K1MAB6L9)<br>● Modeling with Functions - I can create a function to model a problem situation. (K1MAB6L10)<br>● Make Predictions using Functions - I can make predictions using a function. (K1MAB6L11) |

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| **SUBJECT: Keystone Algebra** | **GRADE: 9 - 12** |
| **Unit Title:** UNIT 9: LINEAR SYSTEMS AND APPLICATIONS | **Time Frame:** 15 Days |

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| **UNIT OVERVIEW** | |
| In this student students will learn to solve systems of equations using graphing, substitution, and elimination. We will also be covering systems of inequalities. | |
| **LRG SKILLS AND DISPOSITIONS** | **PA STANDARDS** |
| Collaboration and Teamwork: Use whiteboard to solve system of equations problems and application problems. (S1A) | CC.2.1.HS.F.5<br>CC.2.2.HS.D.7<br>CC.2.2.HS.D.8<br>CC.2.2.HS.D.9<br>CC.2.2.HS.D.10 |
| **COMPETENCIES** | **LEARNING TARGETS** |
| Equations and Inequalities**:**<br>I can create and solve equations and inequalities that represent mathematical situations. | ● Interpret Solutions (Linear Equations) - I can interpret solutions to problems in the context of the problem situation. (K1MAB5L4)<br>● Solving Systems Algebraically - I can solve a system of equations using algebra (substitution and elimination). (K1MAB5L5)<br>● Interpret Solutions (Systems) - I can interpret real-life solutions using systems of equations. (K1MAB5L6)<br>● Interpret Solutions (Systems of Inequalities) - I can interpret real-life solutions using systems of inequalities. (K1MAB5L11) |
| Graphing:<br>I can create and interpret graphs as visual representations of the relationship between quantities. | ● Solving Systems Graphically - I can solve a system of equations by using graphing. (K1MAB7L1)<br>● Graphing Systems of Inequalities - I can graph systems of inequalities. (K1MAB7L5) |

| **SUBJECT: Keystone Algebra** | **GRADE: 9 - 12** |
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| **Unit Title:** UNIT 10: QUADRATIC EQUATIONS | **Time Frame:** 15 Days |

| **UNIT OVERVIEW** |
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| In this unit students will be exploring the properties and graphs and quadratic functions. |

| **LRG SKILLS AND DISPOSITIONS** | **PA STANDARDS** |
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| | CC.2.1.HS.B<br>CC.2.1.HS.C<br>CC.2.1.HS.E<br>CC.2.1.HS.F<br>CC.2.2.HS.A<br>CC.2.2.HS.B<br>CC.2.2.HS.C<br>CC.2.2.HS.D |

| **COMPETENCIES** | **LEARNING TARGETS** |
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| Operations and Expressions:<br>I can generate equivalent expressions using operations and mathematical properties. | • Imaginary Numbers - I can simplify expressions involving imaginary numbers. (K1MAB4L14)<br>• Operations with Complex Numbers - I can perform operations involving complex numbers. (K1MAB4L15) |
| Equations and Inequalities**:**<br>I can create and solve equations and inequalities that represent mathematical situations. | • Zeros of Polynomials - I can find zeros of polynomials. (K1MAB5L15)<br>• Solve Quadratic Equations using Square Roots - I can solve a quadratic equations using square roots. (K1MAB5L16)<br>• Solve Quadratics with Complex Numbers - I can solve a quadratic equation involving complex solutions. (K1MAB5L17) |
| Graphing:<br>I can create and interpret graphs as visual representations of the relationship between quantities. | • Find Vertex of a Parabola - I can find the vertex of a parabola. (K1MAB7L10)<br>• Find the Axis of Symmetry - I can find the axis of symmetry of a parabola. (K1MAB7L11) |

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| | • Standard Form of a Quadratic - I can graph a quadratic equation in standard form. (K1MAB7L12)<br>• Vertex Form of a Quadratic - I can graph a quadratic equation in vertex form. (K1MAB7L13) |