CARLISLE AREA SCHOOL DISTRICT

Carlisle, PA 17013

ALGEBRA I

GRADES 7-12

Date of Board Approval: September 19, 2013

CARLISLE AREA SCHOOL DISTRICT
PLANNED INSTRUCTION COVER PAGE

TITLE OF COURSE:	Algebra I	SUBJECT:	Mathematics	GRADE LEVEL:	8-12
COURSE LENGTH:	1 year	DURATION:	50 minutes	FREQUENCY:	5/week
PREREQUISITES:	Elementary Algebra or Pre-Algebra	CREDIT:	1	LEVEL:	NA

Course Description/Objectives: The set of concepts and skills in this Algebra I course enables students to generalize, model and analyze mathematical situations. Students will use algebraic skills to solve a wide range of problem situations which are modeled by algebraic expressions or equations. The Pennsylvania Common Core Algebra I assessment anchors are covered in this course.

Text: Algebra I, McDougal Littell (2004) by Ron Larson, Laurie Boswell, Timothy D. Kanold, Lee Stiff

Curriculum Writing Committee: John Campbell   Jeff McMahon   Penny Rouvalis

COURSE TIMELINE

Unit 1: *Introduction to Algebra*
- *Expressions*   8 days
- *Order of Operations*
- *Equations, Inequalities & Models*

Unit 2: *Statistics*
- *Measures of Central Tendency*   14 days
- *Displaying Data*
- *Probability*

Unit 3: *Properties of Real Numbers*
- *Classifying Sets of Real Numbers*   8 days
- *Rational Number Operations*

Unit 4: *Solving Linear Equations*
- *Solving One-Step Linear Equations*   17 days
- *Solving Multi-Step Linear Equations*
- *Verbal & Algebraic Models*
- *Formulas*
- *Ratios & Percents*

Unit 5: *Graphing Linear Equations & Functions*
- *Scatter Plots*   20 days
- *Graphing Using a Table of Values*
- *Graphing Using Slope-Intercept Form*
- *Graphing Using X- and Y-intercepts*
- *Functions & Relations*

Unit 6: Writing Linear Equations

- *Slope-Intercept Form*   16 days
- *Writing Equations of Lines given Different Information*
- *Point Slope Form*
- *Parallel & Perpendicular Lines*
- *Standard Form*
- *Lines of Best Fit*

Unit 7: Solve and Graph Inequalities

- *Solve One-Step Inequalities*   21 days
- *Solve Multi-Step Inequalities*
- *Compound Inequalities*
- *Absolute-Value Inequalities*
- *Two-Variable Inequalities*

Unit 8: Systems of Linear Equations & Inequalities

- *Graphing Method*   20 days
- *Substitution*
- *Elimination*
- *Determining Number of Solutions*
- *Graphing Systems of Inequalities*

Unit 9: Exponents & Radicals

- *Multiplication & Division*   10 days
- *Zero & Negative Exponents*
- *Scientific Notation*
- *Simplifying Radicals*

Unit 10: Polynomials and Factoring

- *Add & Subtract Polynomials*   18 days
- *Multiplying Polynomials*
- *Greatest Common Factor*
- *Factoring Trinomials*
- *Solve Quadratic Equations by Factoring*

Unit 11: Rational Expressions

- *Simplify Rational Expressions*   12 days

COURSE:	Algebra I	**TIME FRAME:**	8 days
UNIT #1:	Introduction to Algebra (Important)	**GRADE:**	8-12

STANDARDS:

PA Common Core

CC.2.2.HS.D1	• Interpret the structure of expressions to represent a quantity in terms of its context.
CC.2.2.HS.D.9	• Use reasoning to solve equations and justify the solution method.
CC.2.1.HS.F.2	• Apply properties of rational and irrational numbers to solve real world or mathematical problems.
CC.2.2.7.B.3	• Model and solve real world and mathematical problems by using and connecting numerical, algebraic, and/or graphical representations.

Keystone Algebra I Eligible Content

A1.1.1.3.1	• Simplify/evaluate expressions involving properties/laws of exponents, roots, and/or absolute values to solve problems. Note: Exponents should be integers from -10 to 10.
A1.1.1.4.1	• Use estimation to solve problems.
A1.1.2.1.3	• Interpret solutions to problems in the context of the problem situation. Note: Linear equations only.

Mathematical Practices

1	• Make sense of problems and persevere in solving them.
2	• Reason abstractly and quantitatively.
5	• Use appropriate tools strategically.
6	• Attend to precision.

KNOW, UNDERSTAND, DO

COURSE:	Algebra I	**TIME FRAME:**	8 days
UNIT #1:	Introduction to Algebra (Important)	**GRADE:**	8-12

UNDERSTANDINGS

There are established rules and procedures for performing mathematical operations to ensure that the values obtained are consistent.

Variables are used in Algebra to represent unknown quantities.

Solutions to equations are the numerical values that will make the equation true.

COMMON ASSESSMENTS/CULMINATING ACTIVITY

KNOW

Use the order of operations to evaluate expressions.

Recognize real-life situations that use expressions.

Recognize real-life situations that use equation.

DO

Substitute given numbers into expressions for given variables.

Evaluate expressions using the order of operations.

Use mental math to solve equations and inequalities.

COURSE:	Algebra I	**TIME FRAME:**	14 days
UNIT #2:	Statistics (Essential)	**GRADE:**	8-12

STANDARDS:

PA Common Core

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.3	• Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays.
CC.2.2.HS.D.2	• Write expressions in equivalent forms to solve problems.
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.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.

Keystone Algebra I Eligible Content

A1.2.3.1.1	• Calculate and/or interpret the range, quartiles, and inter-quartile range of data.
A1.2.3.2.1	• Estimate or calculate to make predictions based on a circle, line, bar graph, measure of central tendency, or other representation.
A1.2.3.2.2	• 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).
	• 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.

COURSE:	Algebra I	TIME FRAME:	14 days
UNIT #2:	Statistics (Essential)	GRADE:	8-12

STANDARDS, cont:	
Mathematical Practices	
1	• Make sense of problems and persevere in solving them.
2	• Reason abstractly and quantitatively.
3	• Construct viable arguments and critique the reasoning of others.
4	• Model with mathematics.
5	• Use appropriate tools strategically.
6	• Attend to precision.
7	• Look for and make use of structure.
8	• Look for and express regularity in repeated reasoning.

KNOW, UNDERSTAND, DO

COURSE:	Algebra I	**TIME FRAME:**	14 days
UNIT #2:	Statistics (Essential)	**GRADE:**	8-12

UNDERSTANDINGS
The ways in which data are collected and displayed influence interpretation.   Measures of central tendency are used to make predictions.   The probability of an event is the likelihood that it will occur.

COMMON ASSESSMENTS/CULMINATING ACTIVITY   **M&M Statistics Project**

KNOW	**DO**
Define mean, median, mode and range. Identify parts of histograms, bar graphs, pie graphs, stem-and-leaf and box-and-whisker plots. Recognize different types of probability (independent, dependent, disjoint, overlapping, theoretical and experimental).	Calculate mean, median, mode and range of a data set. Construct histograms, bar graphs, pie graphs, stem-and-leaf and box-and-whisker plots. Interpret histograms, bar graphs, pie graphs, stem-and-leaf and box-and-whisker plots. Calculate probability for various types of events.

COURSE:	Algebra I	**TIME FRAME:**	8 days
UNIT #3:	Properties of Real Numbers (Important)	**GRADE:**	8-12

STANDARDS:

PA Common Core

CC.2.1.HS.F.2 • Apply properties of rational and irrational numbers to solve real world or mathematical problems.

Keystone Algebra I Eligible Content

A1.1.1.1.1 • Compare and/or order any real numbers. Note: Rational and irrational may be mixed.

A1.1.1.1.2 • Simplify square roots (e.g., $\sqrt{24} = 2\sqrt{6}$).

A1.1.1.3.1 • Simplify/evaluate expressions involving properties/laws of exponents, roots, and/or absolute values to solve problems. Note: Exponents should be integers from -10 to 10.

Mathematical Practices

1 • Make sense of problems and persevere in solving them.

2 • Reason abstractly and quantitatively.

3 • Construct viable arguments and critique the reasoning of others.

4 • Model with mathematics.

5 • Use appropriate tools strategically.

7 • Look for and make use of structure.

KNOW, UNDERSTAND, DO

COURSE:	Algebra I	**TIME FRAME:**	8 days
UNIT #3:	Properties of Real Numbers (Important)	**GRADE:**	8-12

UNDERSTANDINGS

The properties we used on rational numbers apply to all real numbers.

When performing operations with irrational numbers you can round and interpret the answer within the context of the problem.

COMMON ASSESSMENTS/CULMINATING ACTIVITY

KNOW	**DO**
Recognize natural numbers, whole numbers, integers, rational numbers, irrational numbers and real numbers.	Classify sets of real numbers.
Define opposites.	Graph real numbers on a number line.
Define absolute value.	Compare and order real numbers.
Recognize like terms in an algebraic expression.	Add, subtract, multiply and divide rational numbers.
Recognize constant terms in an algebraic expression.	Use the distributive property to rewrite and evaluate expressions.
Recognize coefficients of terms in an algebraic expression.	Combine like terms.
Recognize properties of addition and multiplication.	Rewrite square roots as rational approximations.
	Evaluate expressions involving absolute value.
	Justify which property is illustrated when simplifying expressions.

COURSE:	Algebra I	**TIME FRAME:**	17 days
UNIT #4:	Solving Linear Equations (Essential)	**GRADE:**	8-12

STANDARDS:

PA Common Core

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.

Keystone Algebra I Eligible Content

A1.1.2.1.1 • Write, solve, and/or apply a linear equation (including problem situations).

A1.1.2.1.2 • Use and/or identify an algebraic property to justify any step in an equation-solving process. Note: Linear equations only.

A1.1.2.1.3 • Interpret solutions to problems in the context of the problem situation. Note: Linear equations only.

A1.1.2.2.2 • Interpret solutions to problems in the context of the problem situation. Note: Limit systems to two linear equations.

Mathematical Practices

1 • Make sense of problems and persevere in solving them.

2 • Reason abstractly and quantitatively.

3 • Construct viable arguments and critique the reasoning of others.

4 • Model with mathematics.

5 • Use appropriate tools strategically.

6 • Attend to precision.

7 • Look for and make use of structure.

8 • Look for and express regularity in repeated reasoning.

KNOW, UNDERSTAND, DO

COURSE:	Algebra I	TIME FRAME:	17 days
UNIT #4:	Solving Linear Equations (Essential)	GRADE:	8-12

UNDERSTANDINGS

Equations are essential to model and solve real-world problems

Inverse operations are used to isolate the variable in an equation and solve the equation..

If the variable terms are eliminated after using inverse operations to solve an equation, the equation either has no solution or infinitely many solutions.

COMMON ASSESSMENTS/CULMINATING ACTIVITY

KNOW	DO
State the inverse operation for a given operation.	Explain that solving for a variable means to isolate that particular variable.
Recognize the distance formula ($d = r\,t$).	Solve one-step, two-step and multi-step equations using inverse operations.
Define ratio and proportion.	Solve a formula for a given variable.
Recognize that, for example, $0 = 0$ as the result of solving an equation means there are infinitely many solutions (i.e. all real numbers).	Solve proportions using cross multiplication.
	Justify each step when solving an equation.
Recognize that, for example, $0 \neq 4$ as the result of solving an equation means there is no solution.	Create a verbal model from a real world situation to write and solve an equation.

COURSE:	Algebra I	**TIME FRAME:**	20 days
UNIT #5:	Graphing Linear Equations and Functions (Essential)	**GRADE:**	8-12

STANDARDS:

PA Common Core

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.

CC.2.4.HS.B.2   • Summarize, represent, and interpret data on two categorical and quantitative variables.

CC.2.2.HS.C.2   • Graph and analyze functions and use their properties to make connections between the different representations.

Keystone Algebra I Eligible Content

A1.2.1.1.1   • Analyze a set of data for the existence of a pattern and represent the pattern algebraically and/or graphically.

A1.2.1.1.2   • Determine whether a relation is a function, given a set of points or a graph.

A1.2.1.1.3   • Identify the domain or range of a relation (may be presented as ordered pairs, a graph, or a table).

A1.2.2.1.1   • Identify, describe, and/or use constant rates of change.

A1.2.2.1.2   • Apply the concept of linear rate of change (slope) to solve problems.

A1.2.2.1.4   • Determine the slope and/or y-intercept represented by a linear equation or graph.

A1.2.1.2.1   • Create, interpret, and/or use the equation, graph, or table of a linear function.

COURSE:	Algebra I	TIME FRAME:	20 days
UNIT #5:	Graphing Linear Equations and Functions (Essential)	GRADE:	8-12

STANDARDS, cont:

Mathematical Practices

1	• Make sense of problems and persevere in solving them.
2	• Reason abstractly and quantitatively.
3	• Construct viable arguments and critique the reasoning of others.
4	• Model with mathematics.
5	• Use appropriate tools strategically.
6	• Attend to precision.
7	• Look for and make use of structure.
8	• Look for and express regularity in repeated reasoning.

KNOW, UNDERSTAND, DO

COURSE:	Algebra I	TIME FRAME:	20 days
UNIT #5:	Graphing Linear Equations and Functions (Essential)	GRADE:	8-12

UNDERSTANDINGS

A graph is a visual representation of the infinite number of solutions to an equation in two variables.

Relationships between variables may be expressed in algebraic form as an equation or in geometric form as a graph.

A function is a relation where for each input there is exactly one output.

COMMON ASSESSMENTS/CULMINATING ACTIVITY

KNOW	DO
Recognize the parts of a coordinate plane.	Plot and identify ordered pairs on a coordinate plane.
Recognize slope as rise over run.	Calculate the slope of a line (by graph or by two points).
Recognize the formula for slope.	Classify lines by their slope.
Recognize that the slope is a rate of change.	Calculate x- and y-intercepts given equation or graph.
Recognize x- and y-intercepts on a graph and in an equation.	Interpret the meaning of slope and intercepts in a real-world situation.
Recognize slope-intercept form.	Re-write equations into slope-intercept form.
Distinguish between a relation and function.	Graph lines using a table, finding intercepts, and by slope-intercept form.
Recognize parallel lines have the same slope.	Analyze how a change in the slope or y-intercept affects the graph.
	Evaluate a function.

COURSE:	Algebra I	**TIME FRAME:**	16 days
UNIT #6:	Writing Linear Equations (Essential)	**GRADE:**	8-12

STANDARDS:

PA Common Core

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.10
- Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.

Keystone Algebra I Eligible Content

A1.1.2.1.1
- Write, solve, and/or apply a linear equation (including problem situations.

A1.1.2.1.3
- Interpret solutions to problems in the context of the problem situation. Note: linear equations only.

A1.2.2.1.3
- Write or identify a linear equation when given: a) the graph of the line, b) two points on the line, or c) the slope and a point on the line. Note: linear equation may be in point-slope, standard, and/or slope-intercept form.

A1.2.2.1.4
- Determine the slope and/or y-intercept represented by a linear equation or graph.

A1.2.2.2.1
- Draw, identify, find, and/or write an equation for a line of best fit for a scatter plot.

A1.2.3.2.3
- Make predictions using the equations or graphs of best-fit lines of scatter plots.

A1.2.1.2.2
- Translate from one representation of a linear function to another (i.e., graph, table, and equation).

COURSE:	Algebra I	TIME FRAME:	16 days
UNIT #6:	Writing Linear Equations (Essential)	GRADE:	8-12

STANDARDS, cont:	
Mathematical Practices	
1	• Make sense of problems and persevere in solving them.
2	• Reason abstractly and quantitatively.
3	• Construct viable arguments and critique the reasoning of others.
4	• Model with mathematics.
5	• Use appropriate tools strategically.
6	• Attend to precision.
7	• Look for and make use of structure.
8	• Look for and express regularity in repeated reasoning.

KNOW, UNDERSTAND, DO

COURSE:	Algebra I	TIME FRAME:	16 days
UNIT #6:	Writing Linear Equations (Essential)	GRADE:	8-12

UNDERSTANDINGS

Writing linear equations is necessary in order to develop linear models that solve real-life situations.

Linear equations can be written in different forms, based on information given.

Linear models can be used to make predictions.

COMMON ASSESSMENTS/CULMINATING ACTIVITY

KNOW	DO
Recognize the different forms of an equation of a line: slope-intercept, point-slope, standard form.	Identify the slope and y-intercept given an equation or graph.
Recognize the slope and y-intercept given any linear equation.	Given a real-life situation, determine the form and write an equation of the line.
Distinguish between the graphs and properties of parallel and perpendicular lines.	Write an equation of a line given a slope and y-intercept; given point and a slope; given two points on the line; given the graph of a line.
Distinguish between horizontal and vertical lines.	Write an equation of a line parallel or perpendicular to a given line.
Recognize types of correlation.	Write equations of horizontal and vertical lines.
	Convert between different forms of an equation.
	Distinguish which form of an equation should be used depending on the information given.
	Create and write a line of best fit given a set of data.
	Make predictions from a line of best fit or from the equation created from the line of best fit.

COURSE:	Algebra I	**TIME FRAME:**	21 days
UNIT #7:	Solve and Graph Inequalities (Essential)	**GRADE:**	8-12

STANDARDS

PA Common Core

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.

Keystone Algebra I Eligible Content

A1.1.3.1.1 • Write or solve compound inequalities and/or graph their solution sets on a number line (may include absolute value inequalities).

A1.1.3.1.2 • Identify or graph the solution set to a linear inequality on a number line.

A1.1.3.1.3 • Interpret solutions to problems in the context of the problem situation. Note: linear inequalities only.

Mathematical Practices

1 • Make sense of problems and persevere in solving them.

2 • Reason abstractly and quantitatively.

3 • Construct viable arguments and critique the reasoning of others.

4 • Model with mathematics.

5 • Use appropriate tools strategically.

6 • Attend to precision.

7 • Look for and make use of structure.

8 • Look for and express regularity in repeated reasoning.

KNOW, UNDERSTAND, DO

COURSE:	Algebra I	TIME FRAME:	21 days
UNIT #7:	Solve and Graph Inequalities (Essential)	GRADE:	8-12

UNDERSTANDINGS

Real-life situations can be modeled using inequalities.

There are many similarities between solving linear equations and linear inequalities.

COMMON ASSESSMENTS/CULMINATING ACTIVITY

KNOW	DO
Recognize the similarities and differences between solving equations and inequalities.	Interpret and write linear inequalities that model real-life situations.
Distinguish between "AND" and "OR" compound inequalities.	Write, solve and graph an inequality in one or two variables.
Recognize an absolute-value equations or inequality as the distance away from a certain value.	State the similarities and differences between graphing an inequality in one variable and two variables.
	Write, solve and graph a compound inequality in one variable.
	Write, solve and graph absolute-value equations and inequalities in one variable.
	Determine for an absolute-value inequality when to use an "AND" statement and when to use an "OR" statement.
	Determine when graphing inequalities in two variables whether to graph a solid or dotted line, and determine which side to shade.
	Determine if an ordered pair is a solution to an inequality in two variables both algebraically and graphically.

COURSE:	Algebra I	TIME FRAME:	20 days
UNIT #8:	Systems of Linear Equations and Inequalities (Essential)	GRADE:	8-12

STANDARDS:

PA Common Core

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.

Keystone Algebra I Eligible Content

A1.1.2.2.1
- Write and/or solve a system of linear equations (including problem situations) using graphing, substitution, and/or elimination. Note: limit systems to two linear equations.

A1.1.2.2.2
- Interpret solutions to problems in the context of the problem situation. Note: limit systems to two linear equations.

A1.1.3.2.1
- Write and/or solve a system of linear inequalities using graphing. Note: limit systems to two linear inequalities.

A1.1.3.2.2
- Interpret solutions to problems in the context of the problem situation. Note: limit systems to two linear inequalities.

Mathematical Practices

1
- Make sense of problems and persevere in solving them.

2
- Reason abstractly and quantitatively.

3
- Construct viable arguments and critique the reasoning of others.

4
- Model with mathematics.

5
- Use appropriate tools strategically.

6
- Attend to precision.

7
- Look for and make use of structure.

8
- Look for and express regularity in repeated reasoning.

KNOW, UNDERSTAND, DO

COURSE:	Algebra I	TIME FRAME:	20 days
UNIT #8:	Systems of Linear Equations and Inequalities (Essential)	GRADE:	8-12

UNDERSTANDINGS

Studying systems that model real-life problems help in analyzing situations and making decisions.

Systems can be solved by various methods, depending on the format of the equations.

Knowing the advantages and disadvantages of each method can help solve a system more efficiently.

COMMON ASSESSMENTS/CULMINATING ACTIVITY

KNOW

Recognize when a system does not have exactly one solution both graphically and algebraically.

Recognize that the solution of a system of equations is an ordered pair that makes both equations true.

Recognize if an ordered pair is a solution to a system of inequalities both graphically and algebraically.

DO

Solve linear systems of equations by graphing, substitution and elimination.

Write and solve a linear system of equations that model a real-life situation.

Justify the method used in solving a system of equations.

Graph a system of linear inequalities and interpret the solution both graphically and algebraically.

COURSE:	Algebra I	TIME FRAME:	10 days
UNIT #9:	Exponents and Radicals (Important)	GRADE:	8-12

STANDARDS:

PA Common Core

CC.2.2.8.B.1

- Apply concepts of radicals and integer exponents to generate equivalent expressions.

Keystone Algebra I Eligible Content

A1.1.1.3.1

- Simplify/evaluate expressions involving properties/laws of exponents, roots, and/or absolute values to solve problems. Note: Exponents should be integers from -10 to 10.

Mathematical Practices

1
- Make sense of problems and persevere in solving them.

3
- Construct viable arguments and critique the reasoning of others.

6
- Attend to precision.

7
- Look for and make use of structure.

8
- Look for and express regularity in repeated reasoning.

KNOW, UNDERSTAND, DO

COURSE:	Algebra I	TIME FRAME:	10 days
UNIT #9:	Exponents and Radicals (Important)	GRADE:	8-12

UNDERSTANDINGS

Understanding the properties of exponents is necessary in order to evaluate exponential expressions.

Simplifying radical expressions is important in that it provides an exact answer rather than an approximation.

COMMON ASSESSMENTS/CULMINATING ACTIVITY

KNOW	DO Skills
Recognize multiplication, division, negative and zero properties of exponents. Recognize the proper form of a number in scientific notation. Recognize when a radical is completely simplified.	Simplify and evaluate exponential expressions using the properties of exponents. Convert between decimal form and scientific notation. Simplify a radical expression.

COURSE:	Algebra I		**TIME FRAME:**	18 days
UNIT #10:	Polynomials and Factoring (Important)		**GRADE:**	8-12

STANDARDS:

PA Common Core

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.

Keystone Algebra I Eligible Content

A1.1.1.5.1 • Add, subtract, and/or multiply polynomial expressions (express answers in simplest form). Note: Nothing larger than a binomial multiplied by a trinomial.

A1.1.1.5.2 • Factor algebraic expressions, including difference of squares and trinomials. Note: trinomials are limited to the form $ax^2 + bx + c$ where 'a' is equal to 1 after factoring out all monomial factors.

A1.1.1.2.1 • Find the greatest common factor (GCF) and/or the least common multiple (LCM) for sets of monomials.

Mathematical Practices

1 • Make sense of problems and persevere in solving them.

2 • Reason abstractly and quantitatively.

3 • Construct viable arguments and critique the reasoning of others.

4 • Model with mathematics.

5 • Use appropriate tools strategically.

6 • Attend to precision.

7 • Look for and make use of structure.

8 • Look for and express regularity in repeated reasoning.

KNOW, UNDERSTAND, DO

COURSE:	Algebra I	**TIME FRAME:**	18 days
UNIT #10:	Polynomials and Factoring (Important)	**GRADE:**	8-12

UNDERSTANDINGS

Operations can be performed on polynomials and each operation has similarities and differences to operations on real numbers.

Factoring a polynomial is re-writing it as a product of two or more lesser-degree polynomials.

Factoring and using the Zero Product Property are necessary in solving some polynomial equations.

COMMON ASSESSMENTS/CULMINATING ACTIVITY

KNOW

Recognize a polynomial vs. an algebraic expression.

Categorize polynomials by degree and by number of terms.

Recognize the degree and leading coefficient of a polynomial.

Recognize that a polynomial equation must be set equal to zero in order to solve it by factoring.

Recognize if there is a GCF to be factored out first.

Recognize special factoring patterns (Difference of Two Squares, Perfect Square Trinomials).

DO

Add, subtract, multiply polynomials.

Find GCF's and LCM's of whole numbers and monomials.

Factor trinomials (a = 1).

Factor polynomials that have a GCF (numerical and/or variable).

Factor polynomials that have a special factoring pattern .

Solve polynomial equations using the Zero Product Property.

Set up expressions and/or solve equations involving factoring to model a real-life situation.

Determine if a solution to a real-life situation works in the context of the problem.

COURSE:	Algebra I	TIME FRAME:	12 days
UNIT #11:	Rational Expressions (Compact)	GRADE:	8-12

STANDARDS:

PA Common Core

CC.2.2.HS.D.6   • Extend the knowledge of rational functions to rewrite in equivalent forms.

Keystone Algebra I Eligible Content

A1.1.1.5.3   • Simplify/reduce a rational algebraic expression.

Mathematical Practices

1   • Make sense of problems and persevere in solving them.

6   • Attend to precision.

7   • Look for and make use of structure.

KNOW, UNDERSTAND, DO

COURSE:	Algebra I	TIME FRAME:	12 days
UNIT #11:	Rational Expressions (Compact)	GRADE:	8-12

UNDERSTANDINGS

Simplifying and using operations with rational expressions are similar to simplifying and using operations with rational numbers.

COMMON ASSESSMENTS/CULMINATING ACTIVITY

KNOW	DO
Recognize when to simplify and when not to simplify a rational expression.	Simplify rational expressions.
Recognize that a rational expression is the quotient of two polynomials.	State the excluded value(s) of a rational expression.
Recognize the rules for multiplying and dividing fractions.	Multiply and divide rational expressions.

Adaptations/Modifications for Students with I.E.P.s

Adaptations or modifications to this planned course will allow exceptional students to earn credits toward graduation or develop skills necessary to make a transition from the school environment to community life and employment. The I.E.P. team has determined that modifications to this planned course will meet the student's I.E.P. needs.

Adaptations/Modifications may include but are not limited to:

INSTRUCTION CONTENT

- Modification of instructional content and/or instructional approaches
- Modification or deletion of some of the essential elements

SETTING

- Preferential seating

METHODS

- Additional clarification of content
- Occasional need for one to one instruction
- Minor adjustments or pacing according to the student's rate of mastery
- Written work is difficult, use verbal/oral approaches
- Modifications of assignments/testing
- Reasonable extensions of time for task/project completion
- Assignment sheet/notebook
- Modified/adjusted mastery rates
- Modified/adjusted grading criteria
- Retesting opportunities

MATERIALS

- Supplemental texts and materials
- Large print materials for visually impaired students
- Outlines and/or study sheets
- Carbonless notebook paper
- Manipulative learning materials
- Alternatives to writing (tape recorder/calculator)