

Algebra I

Scope and Sequence

The Learning Targets in Chapters 1 - 4 will be assessed at the end of the first semester. The Learning Targets in Chapter 5 may be taught in either the first or second semester but will be assessed at the end of the second semester.

The Learning Targets in Chapters 5 – 8, and 12 will be assessed at the end of the second semester. Chapters 9 and 10 will not be assessed since they will be assessed in other classes but should be taught if time permits.

Teachers should consider using the Get Ready pages before beginning each chapter. They are good diagnostic tools. Many of the Extend sections are good technology enhancement labs.

Teachers need to insert precision, error, and tolerance somewhere in the course. These topics are covered on the HSPE.	3.12.2 Justify, communicate, and differentiate between precision, error, and tolerance in practical problems.	A1: a, b A2: a, b A3: a
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UNIT 1 – Foundations of Functions

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Chapter 1 – Language and Tools of Algebra		
1-1 Variables and Expressions - Write mathematical expressions for verbal expressions. - Write verbal expressions for mathematical expressions.	2.8.4 Translate among verbal descriptions, graphic, tabular, and algebraic representations.	A1: e A3: e
1-2 Order of operations - Evaluate numerical expressions using order of operations. - Evaluate algebraic expressions using order of operations.	1.12.7 Solve mathematical problems involving exponents and roots.	A1: a, b, c, f A2: a - d A3: a, c
1-3 Open Sentences - Solve open sentence equations. - Solve open sentence inequalities.	2.12.2 Isolate any variable in given equations, inequalities, proportions, and formulas.	A1: a, b, c A2: a, b A3: a, b
1-4 Identity and Equality Properties - Recognize the properties of identity and equality. - Use the properties of identity and equality.	1.12.8 Identify and apply real number properties.	A1: a, b A2: a A3: a, b
1-5 Distributive Property - Use the distributive property to evaluate expressions. - Use the distributive property to simplify algebraic expressions.	1.12.8 Identify and apply real number properties.	A1: a, b, c A2: a, b
1-6 Commutative and Associative Properties - Recognize the Commutative and Associative Properties. - Use the Commutative and Associative Properties to simplify algebraic expressions.	2.12.3 Simplify algebraic expressions.	A1b A2 g A3 a

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Chapter 1 – Language and Tools of Algebra		
1-7 Logical Reasoning and Counterexamples - Identify the hypothesis and conclusion in a conditional statement. - Use a counterexample to show that an assertion is false.	4.8.9 Represent logical relationships using conditional statements.	A1: a, b, c A2: a, b, c A3: a, b, c
1-8 Number Systems - Classify and graph real numbers. - Find square roots and order real numbers.	1.8.3 Compare and order real numbers. 1.8.2 Translate among fractions, decimals, and percents, including percents greater than 100 and percents less than 1. Explain and use the relationship among equivalent representations of rational numbers in mathematical and practical situations.	A1: a - e A2: a A1: a, b, c A2: a A3: a
1-9 Functions and Graphs - Interpret graphs of functions. - Draw graphs of functions.	2.12.4 Determine the domain and range of functions.	A1: a - e A2: a, b A3: a, b

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Chapter 2 – Solving Linear Equations		
2-1 Writing Equations - Translate verbal sentences into equations. - Translate equations into verbal sentences. If students need a review of basic geometric formulas, pgs 704 – 708 cover perimeter, circumference, area, and volume formulas.	2.12.4 Translate among verbal descriptions, graphic, tabular, and algebraic representations. 3.12.3 Select and use appropriate measurement tools, techniques, and formulas to solve problems in mathematical and practical situations. 3.12.5 Determine the measure of unknown dimensions, angles, areas, and volumes using relationships and formulas to solve problems.	A1: e A3: e A1: a – d A2: a, b, c A3: a A1: a A2: a
2-2 Solving Equations by Using Addition and Subtraction - Solve equations by using addition. - Solve equations by using subtraction. 2-3 Solving Equations by Using Multiplication and Division - Solve equations by using multiplication. - Solve equations by using division. 2-4 Solving Multi-Step Equations - Solve equations involving more than one operation. - Solve consecutive integer problems. 2-5 Solving Equations with the Variable on Each Side - Solve equations with the variable on each side. - Solve equations involving grouping symbols.	2.12.6 Solve mathematical and practical problems involving linear and quadratic equations with a variety of methods. Teachers might consider combining some of these sections, such as Section 2-2, Section 2-3, and Section 2-4, if students have a good background from Prealgebra.	A1: b A2: a A3: a
2-6 Ratios and Proportions - Determine whether two ratios form a proportion. - Solve proportions.	3.8.5 Apply ratios and proportions to calculate ratios and solve mathematical and practical problems. 2.12.2 Isolate variables in proportions.	Look under Prealgebra 3.8.5 for learning target. A2: a A3: a A1: b, c A2: c A3: c
2-7 Percent of Change - Find percents of increase and decrease. - Solve problems involving percents of change.	3.8.4 Calculate percents in monetary problems.	Look under Prealgebra for Learning Target. A1: c, d A2: c, d A3: c, d
2-8 Solving for a Specific Variable - Solve equations for given variables. - Use formulas to solve real-world problems.	2.12.2 Isolate any variable in given equations, inequalities, proportions, and formulas.	A1: a, b, c A2: a, d A3: a, d
2-9 Weighted Averages - Solve mixture problems - Solve uniform motion problems.	This topic is more appropriate for a class of advanced students if time permits. This type of problem won't be included on the 8th grade CRT or HSPE; it will be covered in Algebra II.	

UNIT 2 – Linear Functions

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Chapter 3 – Functions and Patterns		
3-1 Representing Relations - Represent relations as sets of ordered pairs, tables, mappings, and graphs. - Find the inverse of a relation.	2.8.4 Identify, model, describe, and evaluate functions.	Look under Prealgebra for Learning Targets. A1: $a - f$ A2: a, b A3: a
3-2 Representing Functions - Determine whether a relation is a function. - Find functional values.	2.12.4 Determine the domain and range of functions, algebraically and graphically.	A1: a, b, c, d, e A2: a, b A3: a, b
3-3 Linear Functions - Identify linear equations, intercepts, and zeros. - Graph linear equations. <i>Chapter 4 deals with linear equations; therefore, this section might be used as the last section in Chapter 3 to introduce the first section in Chapter 4 which deals with linear equations instead of using it here.</i>	2.12.4 Determine the domain and range of functions, algebraically and graphically.	A1: e A2: a, b A3: a, b
3-4 Arithmetic Sequences. - Recognize arithmetic sequences. - Extend and write formulas for arithmetic sequences.	2.12.1 Use algebraic expressions to identify and describe the nth term of a sequence.	A1: a, b, c A2: a, b A3: a
3-5 Proportional and Nonproportional Relationships - Write an equation for a proportional relationship. - Write an equation for a nonproportional relationship.	4.12.9 Formulate, evaluate, and justify arguments using inductive and deductive reasoning in mathematical and practical situations.	A1: a, b, c A2: a, b, c A3: a, b, c

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Chapter 4 – Analyzing Linear Equations		
4-1 Rate of Change and Slope • Use rate of change to solve problems. • Find the slope of a line. 4-2 Slope and Direct Variation • Write and graph direct variation equations. • Solve problems involving direct variation. 4-3 Graphing Equations in Slope-Intercept Form • Write and graph linear equations in slope-intercept form. • Model real-world data with an equation in slope-intercept form. 4-4 Writing Equations in Slope-Intercept Form • Write an equation of a line given the slope and one point on a line. • Write an equation of a line given two points on a line. 4-5 Writing Equations in Point-Slope Form • Write the equation of a line in point-slope form. • Write linear equations in different forms.	4.12.5 Determine the slope of lines using coordinate geometry and algebraic techniques. Graph linear equations and find possible solutions to those equations using coordinate geometry.	A1: a - e, g A2: a - e A3: a - g
Student Handbook (Pages 714 - 715): Representing Data. This is a good review before starting this section. 4-6 Statistics: Scatter Plots and Lines of Fit • Interpret points on a scatter plot. • Use lines of fit to make and evaluate predictions.	5.12.1 Organize statistical data through the use of tables, graphs, and matrices. 4.12.5 Graph linear equations and find possible solutions to those equations using coordinate geometry.	A1: a, b A2: a - d A3: a, b, c A1 g A3: c, d, g
4-7 Geometry: Parallel and Perpendicular Lines • Write an equation of the line that passes through a given point, parallel to a given line. • Write an equation of the line that passes through a given point, perpendicular to a given line.	4.12.5 Graph linear equations and find possible solutions to those equations using coordinate geometry. Find possible solution sets of systems of equations whose slopes indicate parallel, perpendicular, or intersecting lines.	A1: f, g A3: h

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Chapter 5 – Solving Systems of Linear Equations		
5-1 Graphing Systems of Equations • Determine whether a system of linear equations has no, one, or infinitely many solutions. • Solve systems of equations by graphing. 5-2 Substitution • Solve systems of equations algebraically by using substitution. • Solve real-world problems involving systems of equations. 5-3 Elimination Using Addition and Subtraction • Solve systems of equations algebraically by using elimination with addition. • Solve systems of equations algebraically by using elimination with subtraction. 5-4 Elimination Using Multiplication • Solve systems of equations algebraically by using elimination with multiplication. • Solve real-world problems involving systems of equations. 5-5 Applying Systems of Linear Equations • Determine the best method for solving systems of equations. • Apply systems of linear equations.	2.12.5 Solve systems of two linear equations algebraically and graphically and verify solutions.	A1: a, b, c A2: a, b
Matrices: Use supplementary materials from Algebra 2 book, Section 4-2. <i>Since this topic is on the HSPE, this additional topic is not needed in 8th grade Algebra I, but does need to be taught in HS Algebra I. 8th graders will be taught topic in Algebra II.</i>	1.12.7 Perform addition, subtraction, and scalar multiplication on matrices.	A1 d, e, f A2 g

UNIT 3 – Polynomials and Nonlinear Functions

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Chapter 7 – Polynomials		
7-1 Multiplying Monomials • Multiply monomials. • Simplify expressions involving powers of monomials. 7-2 Dividing Monomials • Simplify expressions involving the quotient of monomials. • Simplify expressions containing negative exponents. 7-3 Polynomials • Find the degree of a polynomial. • Arrange the terms of a polynomial in ascending or descending order. 7-4 Adding and Subtracting Polynomials • Add polynomials. • Subtract polynomials. 7-5 Multiplying a Polynomial by a Monomial • Find the product of a monomial and a polynomial. • Solve equations involving polynomials. 7-6 Multiplying Polynomials • Multiply two binomials by using the FOIL method. • Multiply two polynomials by using the Distributive Property. 7-7 Special Products • Find squares of sums and differences. • Find the product of a sum and a difference.	2.12.3 Add, subtract, multiply, and factor 1st and 2nd degree polynomials. Simplify algebraic expressions, including exponents and radicals.	A1: a, b A2: a, b, c, g A3: a

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Chapter 8 – Factoring		
8-1 Monomials and Factoring - Find prime factorizations of monomials. - Find the greatest common factors of monomials. 8-2 Factoring Using the Distributive Property - Factor polynomials by using the Distributive Property. - Solve quadratic equations of the form $ax^2 + bx = 0$. 8-3 Factoring Trinomials: $x^2 + bx + c$ - Factor trinomials of the form $x^2 + bx + c$. - Solve equations of the form $x^2 + bx + c = 0$. 8-4 Factoring Trinomials: $ax^2 + bx + c$ - Factor trinomials of the form $ax^2 + bx + c$. - Solve equations of the form $ax^2 + bx + c = 0$. 8-5 Factoring Differences of Squares - Factor binomials that are the differences of squares. - Solve equations involving the differences of squares. 8-6 Perfect Squares and Factoring - Factor perfect square trinomials. - Solve equations involving perfect squares.	2.12.3 Add, subtract, multiply, and factor 1st and 2nd degree polynomials.	A1: a, b A2: d, e, f A3: a

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Chapter 9 – Quadratic and Exponential Functions		
9-1 Graphing Quadratic Functions - Graph quadratic functions. - Find the equation of the axis of symmetry and the coordinates of the vertex of a parabola. 9-2 Solving Quadratic Equations by Graphing - Solve quadratic equations by graphing. - Estimate solutions of quadratic equations by graphing.	2.12.4 Determine the domain and range of functions, including linear, quadratic, and absolute value, algebraically and graphically. 2.12.6 Solve problems involving linear and quadratic equations with a variety of methods. <i>There should probably not be too much emphasis on solving by graphing at this point except in classes of advanced students.</i>	A1: e A2: a, b A3: a, b A1: a, b A2: b A3: b
9-3 Solving Quadratic Equations by Completing the Square - Solve quadratic equations by finding the square root. - Solve quadratic equations by completing the square. 9-4 Solving Quadratic Equations by Using the Quadratic Function - Solve quadratic equations by using the Quadratic Formula. - Use the discriminant to determine the number of solutions for a quadratic equation.	2.12.6 Solve problems involving linear and quadratic equations with a variety of methods. 1.12.6 Determine an approximate value of radical and exponential expressions using a variety of methods. <i>There should probably not be too much emphasis on solving by solving quadratic equations by completing the square at this point except in classes of advanced students.</i>	A1: b A2: b A3: b A1: a, b, c A2: a, b A3: a
9-5 Exponential Functions Graph exponential functions. Identify data that displays exponential behavior. 9-6 Growth and Decay Solve problems involving exponential growth. Solve problems involving exponential decay.	<i>Sections 9-5 and 9-6 are not included on the HSPE. They will be covered in Algebra II in depth.</i>	

UNIT 4 – ADVANCED EXPRESSIONS AND DATA ANALYSIS

It is suggested that Chapter 10 and Chapter 12 are taught in reverse order since the material from Chapter 12 is needed on the HSPE.

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Chapter 10 – Radical Expressions and Triangles It is suggested that Chapter 10 be taught after Chapter 12 since the material from Chapter 12 is needed on the HSPE.		
10-1 Simplifying Radical Expressions - Simplify radical expressions using the Product Property of Square Roots. - Simplify radical expressions using the Quotient Property of Square Roots. 10-2 Operations with Radical Expressions - Add and subtract radical expressions. - Multiply radical expressions. 10-3 Radical Equations - Solve radical equations. - Solve radical equations with extraneous solutions.	1.12.7 Solve mathematical problems involving exponents and roots. 2.12.3 Simplify algebraic expressions, including exponents and radicals. 1.12.6 Determine an approximate value of radical and exponential expressions using a variety of methods.	A1: f A2: e, f, g A3: b A1: b A2: g A3: a A1: a – c A2: a A3: a
10-4 The Pythagorean Theorem - Solve problems by using the Pythagorean Theorem. - Determine whether a triangle is a right triangle. 10-5 The Distance Formula - Find the distance between two points on the coordinate plane. - Find a point that is a given distance from a second point on a plane.	4.12.7 Apply the Pythagorean Theorem and its converse.	A1: a – e A2: a – d A3: a, b
10-6 Similar Triangles - Determine whether two triangles are similar. - Find the unknown measures of sides of two similar triangles.	<i>This section is not part of the ECSD Learning Targets for Algebra ; it will be covered in Geometry.</i>	

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Chapter 11 – Rational Expressions and Equations		
11-1 Inverse Variation • Graph inverse variations. • Solve problems involving inverse variation. 11-2 Rational Expressions • Identify values excluded from the domain of a rational expression. • Simplify rational expressions. 11-3 Multiply Rational Expressions • Multiply rational expressions. • Use dimensional analysis with multiplication. 11-4 Dividing Rational Expressions • Divide rational expressions. • Use dimensional analysis with division. 11-5 Dividing Polynomials • Divide a polynomial by a monomial. • Divide a polynomial by a binomial. 11-6 Rational Expressions with Like Denominators • Add rational expressions with like denominators. • Subtract rational expressions with like denominators. 11-7 Rational Expressions with Unlike Denominators • Add rational expressions with unlike denominators. • Subtract rational expressions with unlike denominators. 11-8 Mixed Expressions and Complex Fractions • Simplify mixed expressions. • Simplify complex fractions. 11-9 Rational Equations and Functions • Solve rational equations. • Eliminate extraneous solutions.	<i>Chapter 11 is not part of the ECSD Algebra I Learning Targets and therefore will not be tested on the second semester final exam. It is thoroughly covered in the ECSD Algebra II Learning Targets and is not on the HSPE. It is suggested that this chapter be used last and only if time permits in a class of advanced students.</i>	

