



# **ALGEBRA I**

## **CURRICULUM GUIDE**

### **Overview and Scope & Sequence**

**Loudoun County Public Schools**  
**2017-2018**

**(Additional curriculum information and resources for teachers can be accessed through CMS and VISION)**



<b>3<sup>rd</sup> Quarter</b>	<b>4<sup>th</sup> Quarter</b>
<p><b><u>Unit 1-Classroom Routines:</u></b>  <a href="#">A.9:</a> Measures of Dispersion  <a href="#">A.10:</a> Box-and-Whisker-Plot  <a href="#">A.2:</a> Laws of exponents and review of scientific notation  <a href="#">A.1:</a> Translating phrases and evaluating expressions</p>	<p><b><u>Unit 1-Classroom Routines:</u></b>  <a href="#">A.9:</a> Measures of Dispersion  <a href="#">A.10:</a> Box-and-Whisker-Plot  <a href="#">A.2:</a> Laws of exponents  <a href="#">A.1:</a> Translating phrases and evaluating expressions</p>
<p><b><u>Unit 4-Linear Functions</u></b>  <b><u>4C – Linear Systems</u></b>  <a href="#">A.4:</a> Systems of equations  <a href="#">A.5:</a> System of inequalities  <a href="#">A.7a EKS</a> – <i>Determine whether a relation represented by a mapping is a function (2016)</i></p> <p><b><u>Unit 5-Quadratic Functions</u></b>  <a href="#">A.7:</a> Quadratic Function Families  <a href="#">A.1:</a> Translating phrases and evaluating expressions  <a href="#">A.11:</a> Curve of best fit  <a href="#">A.3:</a> Square roots  <a href="#">A.2:</a> Operations on polynomials  <a href="#">A.4:</a> Solve quadratic equations  <a href="#">A.4:</a> Solving literal equations                      (continues into Q4)</p> <p>*Quarterly assessment will cover the quarter 3 content from: <a href="#">A.2</a>, <a href="#">A.3A.4acef</a>, <a href="#">A.5cd</a>, <a href="#">A.7</a>, <a href="#">A.11</a></p>	<p><b><u>Unit 5-Quadratic Functions (cont'd)</u></b>  <a href="#">A.3:</a> Square and cube roots  <a href="#">A.1:</a> Translating phrases and evaluating expressions</p> <p><a href="#">A.3c EKS</a> <i>Simplify cube roots using integers (2016)</i>  <a href="#">A.3c EKS</a> – <i>Simplify numerical expressions containing square or cube roots (2016)</i></p> <p><b><u>Unit 2 – Statistics Revisited</u></b>  <a href="#">A.9:</a> Measures of Dispersion</p> <p><b>Curriculum Completed by 4/27/18</b></p> <p><b><u>Review for SOL Assessment &amp; Post SOL Topics</u></b></p> <ul style="list-style-type: none"> <li>• Pythagorean theorem</li> <li>• Area, perimeter, surface area and volume with measurements represented in algebraic expressions</li> <li>• Angle relationships with algebraic expressions</li> <li>• Transformation graphing with quadratic functions</li> <li>• Solving Absolute Value and Compound Inequalities</li> <li>• Culminating Activity for Algebra I</li> </ul>
<p><b>21 blocks</b></p>	<p><b>5 blocks pre-SOL</b>  <b>18 blocks total</b></p>

## Scope & Sequence

\*The recommended pacing is based on the assumption that SOL testing will take place in early May. Time for classroom assessments is included within the suggested pacing for each unit.

### Quarter 1: 24 blocks total

*Number of blocks	Standard	Reporting Category	Topic
<b><u>Unit 1 – Classroom Routines (Process Goals: Classroom Routines)</u></b>			
The Entire Quarter	<a href="#">A.1</a>	<i>Expressions &amp; Operations</i>	<ul style="list-style-type: none"> <li>Represent verbal quantitative situations algebraically and evaluate these expressions of given replacement values of the variables.</li> <li>Include perfect squares and perfect cubes of whole numbers.</li> </ul>
	<a href="#">A.10</a>	<i>Statistics</i>	<ul style="list-style-type: none"> <li>Box-and-whisker plots *Begin statistics routines after Unit 2</li> </ul>
	<a href="#">A.9</a>	<i>Statistics</i>	<ul style="list-style-type: none"> <li>Standard deviation, mean absolute deviation, z-score *Begin statistics routines after Unit 2</li> </ul>
<b><u>Unit 2 – Statistics</u></b>			
<b>In this unit, students will begin their study of the statistics content in Algebra I. These concepts will be spiraled throughout the year during classroom routines in real-world contexts. SOL A.9 is revisited in Quarter 4.</b>			
4	<a href="#">A.10</a>	Statistics	<ul style="list-style-type: none"> <li>Box-and-whisker plots</li> </ul>
	<a href="#">A.9</a>	Statistics	<ul style="list-style-type: none"> <li>Standard deviation, mean absolute deviation, z-score</li> </ul>
<b><u>Unit 3 – Investigating Characteristics of Functions</u></b>			
<b>In this unit, students will identify characteristics of functions (all types of functions) given a graphical representation. Students will be making connections between the multiple representations of functions.</b>			
7	<a href="#">A.11</a>	Statistics	<ul style="list-style-type: none"> <li>The student will analyze data <u>in graphical form</u> in order to make predictions and solve real world problems.</li> </ul>
	<a href="#">A.7abc d</a>	Functions	<ul style="list-style-type: none"> <li><u>Using graphical representations, sets of ordered pairs, and tables of values</u>, determine whether a relation is a function, identify the domain, range, and zeros of a function, and the x and y intercepts. Use a variety of relations.</li> </ul>
	<a href="#">A.7f</a>	Functions	<ul style="list-style-type: none"> <li>Make <u>general</u> connections between and among multiple representations of functions including concrete, verbal, numerical, and graphical.</li> </ul>
	<a href="#">A.7e</a>	Functions	<ul style="list-style-type: none"> <li>Find the values of a function for elements in its domain and find the domain for given values of a function, <u>using the graphical representation</u>.</li> </ul>

**Unit 4A – Linear Equations (continues into Quarter 2)**

**Students should investigate linear functions and characteristics of linear functions as a function family, graphically first, and then explore solving linear equations algebraically. Students should be using multiple representations to justify their work.**

10	<a href="#">A.11</a>	Statistics	<ul style="list-style-type: none"> <li>The student will analyze data <u>in graphical form</u> in order to make predictions and solve real world problems for linear models.</li> </ul>
	<a href="#">A.7</a>	Functions	<ul style="list-style-type: none"> <li>Solve for each of the following <u>using graphical representations</u> (make explicit connections to concepts in Unit 2).                             <ul style="list-style-type: none"> <li>zeros of a linear function</li> <li>x- and y-intercepts of a linear function</li> <li>find values of a function given elements of its domain</li> <li>find the domain for given values of a function</li> </ul> </li> <li>Identify characteristics of linear function families using graphical, numerical, and verbal representations</li> <li>Solve real world problems involving linear equations</li> </ul>
	<a href="#">A.1</a>	Expressions & Operations	<ul style="list-style-type: none"> <li>Represent verbal quantitative linear situations algebraically and evaluate these expressions of given replacement values of the variables.</li> </ul>
	<a href="#">A.4bdf</a>	Equations & Inequalities	<ul style="list-style-type: none"> <li>Solve multistep equations graphically and algebraically. Use the graphing calculator as a tool to verify the solution set.</li> <li>Solve multistep equations and justify each step using properties of equality and real numbers.</li> </ul>
3	<b>Quarterly Assessments, Remediation, and Intervention*</b>		

\*These blocks reserved for quarterly assessments, remediation, and intervention should be dispersed throughout the quarter as needed.

\*The recommended pacing is based on the assumption that SOL testing will take place in early May. Time for classroom assessments is included within the suggested pacing for each unit.

**Quarter 2: 21 blocks total**

*Number of blocks	Standard	Reporting Category	Topic
<b><u>Unit 1 – Classroom Routines</u></b>			
The Entire Quarter	<a href="#">A.9</a>	Statistics	<ul style="list-style-type: none"> <li>Standard deviation, mean absolute deviation, z-score</li> </ul>
	<a href="#">A.10</a>	Statistics	<ul style="list-style-type: none"> <li>Box-and-whisker plots</li> </ul>
	<a href="#">A.4a</a>	Equations & Inequalities	<ul style="list-style-type: none"> <li>Solve literal equations (formulas) for linear situations (2 variables). (Include more rigorous literal equations (formulas) during classroom routines after this lesson).</li> </ul>
<b><u>Unit 4A – Linear Equations (continued from Quarter 1)</u></b>			
11	<a href="#">A.7</a>	Functions	<ul style="list-style-type: none"> <li>Solve for each of the following <u>algebraically</u>, justify using other representations (graphs, tables, etc...)               <ul style="list-style-type: none"> <li>zeros of a linear function</li> <li>x- and y-intercepts of a linear function</li> <li>find values of a function given elements of its domain</li> <li>find the domain for given values of a function</li> </ul> </li> <li>Identify characteristics of linear function families using graphical, numerical, symbolic, and verbal representations</li> <li>Solve real world problems involving linear equations</li> </ul>
	<a href="#">A.6</a>	Equations & Inequalities	<ul style="list-style-type: none"> <li>Graphing and writing linear equations in two variables</li> <li>Make connections to direct variation (A.8)</li> <li>Explicitly use the vocabulary, <u>slope as rate of change</u></li> <li>Use the parent function <math>y=x</math> to describe the transformation defined by changes in the slope or y-intercept.</li> </ul>
	<a href="#">A.4a</a>	Equations & Inequalities	<ul style="list-style-type: none"> <li>Solve literal equations (formulas) for linear situations (2 variables). (Include more rigorous literal equations (formulas) during classroom routines after this lesson).</li> </ul>
	<a href="#">A.8</a>	Functions & Statistics	<ul style="list-style-type: none"> <li>Direct and inverse variation</li> </ul>
	<a href="#">A.11</a>		<ul style="list-style-type: none"> <li>The student will collect and analyze data in order to make predictions and solve real world problems for linear models.</li> <li>Determine the equation of the line of best fit to make predictions given a set of data</li> </ul>

### Unit 4B – Linear Inequalities

**This unit expands on the study of linear functions to apply concepts into linear inequalities. Students should have extensive experience with real world problems in this unit.**

5	<a href="#">A.5abc</a>	Equations & Inequalities	<ul style="list-style-type: none"><li>• Solve real world problems involving linear inequalities</li><li>• Real world situations should include writing linear inequalities that model verbal situations, in two variables</li><li>• Real world situations should include problems with compound inequalities, in one variable</li><li>• Solve and justify multi-step inequalities graphically and algebraically</li></ul>
	<a href="#">A.6</a>	Equations & Inequalities	<ul style="list-style-type: none"><li>• Graphing linear inequalities in two variables</li></ul>

### Unit 4C – Linear Systems (continues into Q3)

**This unit expands on the study of linear functions to apply concepts to solving linear systems (linear Equations & Inequalities). Students should have extensive experience with real world problems in this unit. The graphing calculator should be used as a tool to support instruction in this unit and to verify solutions.**

3	<a href="#">A.4ef</a>	Equations & Inequalities	<ul style="list-style-type: none"><li>• Solve systems of linear equations, including real world problems, graphically and algebraically.</li></ul>
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2	<b>Midterm Review, Quarterly Assessments, Remediation, and Intervention*</b>		
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\*These blocks reserved for quarterly assessment, remediation, and intervention should be dispersed throughout the quarter as needed.

\*The recommended pacing is based on the assumption that SOL testing will take place in early May. Time for classroom assessments is included within the suggested pacing for each unit.

**Quarter 3: 21 blocks total**

*Number of blocks	Standard	Reporting Category	Topic
<b><u>Unit 1 – Classroom Routines</u></b>			
<i>The Entire Quarter</i>	<a href="#">A.9</a>	Statistics	<ul style="list-style-type: none"> <li>Standard deviation, mean absolute deviation, z-score</li> </ul>
	<a href="#">A.10</a>	Statistics	<ul style="list-style-type: none"> <li>Box-and-whisker plots</li> </ul>
	<a href="#">A.2</a>	Equations & Inequalities	<ul style="list-style-type: none"> <li>Review of scientific notation, laws of exponents, and operations of polynomials</li> </ul>
	<a href="#">A.1</a>	Expressions & Operations	<ul style="list-style-type: none"> <li>Include squares and cubes of whole numbers, square roots of monomial expressions, and absolute value.</li> <li>Include equations, expressions, and inequalities, exponents, and multiple operations</li> </ul>
<b><u>Unit 4C – Linear Systems</u></b> (continued from Q2)			
<b>This unit expands on the study of linear functions to apply concepts to solving linear systems (linear Equations &amp; Inequalities). Students should have extensive experience with real world problems in this unit. The graphing calculator should be used as a tool to support instruction in this unit and to verify solutions.</b>			
2	<a href="#">A.4ef</a>	Equations & Inequalities	<ul style="list-style-type: none"> <li>Solve systems of linear equations, including real world problems, graphically and algebraically.</li> </ul>
	<a href="#">A.5cd</a>		<ul style="list-style-type: none"> <li>Solve systems of linear inequalities, including real world problems graphically.</li> </ul>



**Unit 5 – Quadratic Functions (continues into Q4)**

**Students should investigate quadratic functions and characteristics of quadratic functions as a function family, graphically, and then explore solving quadratic equations algebraically. Students should be using multiple representations to justify their work.**

16	<a href="#">A.7</a>	Functions	<ul style="list-style-type: none"> <li>Solve for each of the following <u>using graphical representations</u> (make explicit connections to concepts in Unit 2).                             <ul style="list-style-type: none"> <li>zeros of a quadratic function</li> <li>x- and y-intercepts of a quadratic function</li> <li>find values of a function given elements of its domain</li> <li>find the domain for given values of a function</li> </ul> </li> <li>Identify characteristics of quadratic function families using graphical, numerical, and verbal representations</li> <li>Solve real world problems involving quadratic equations using the graphical representation</li> </ul>
	<a href="#">A.1</a>	Expressions & Operations	<ul style="list-style-type: none"> <li>Represent verbal quantitative situations algebraically and evaluate these expressions of given replacement values of the variables.</li> </ul>
	<a href="#">A.11</a>	Statistics	<ul style="list-style-type: none"> <li>Determine the curve of best fit and use it to make predictions based on real world data/model.</li> </ul>
	<a href="#">A.3</a>	Equations & Inequalities	<ul style="list-style-type: none"> <li>Simplify square roots only for the purpose of solving quadratic functions</li> </ul>
	<a href="#">A.2</a>	Equations & Inequalities	<ul style="list-style-type: none"> <li>Perform operations on <u>quadratic functions</u> (add, subtract, multiply, and factor completely)</li> </ul>
	<a href="#">A.4cf</a>	Equations & Inequalities	<ul style="list-style-type: none"> <li>Solve quadratic equations algebraically and justify each step using properties of equality and real numbers. Use the graphing calculator as a tool to verify the solution set.</li> <li>Solve real world problems involving quadratic models</li> </ul>
	<a href="#">A.2</a>	Equations & Inequalities	<ul style="list-style-type: none"> <li>Perform operations on <u>polynomials</u> (add, subtract, multiply, factor completely, and divide)</li> </ul>
	<a href="#">A.4a</a>	Equations & Inequalities	<ul style="list-style-type: none"> <li>Solve literal equations (formulas) for situations that include factoring and exponents.</li> </ul>
3	<b>Quarterly Assessments, Remediation, and Intervention*</b>		

\* The number of blocks reserved for assessment, remediation, and intervention should be dispersed throughout the quarter as needed.

\*The recommended pacing is based on the assumption that SOL testing will take place in early May. Time for classroom assessments is included within the suggested pacing for each unit.

**Quarter 4: 23 blocks total**

Number of blocks	Standard	Reporting Category	Topic
<b><u>Unit 1 – Classroom Routines</u></b>			
<i>The Entire Quarter</i>	<a href="#">A.9</a>	Statistics	<ul style="list-style-type: none"> <li>Standard deviation, mean absolute deviation, z-score</li> </ul>
	<a href="#">A.10</a>	Statistics	<ul style="list-style-type: none"> <li>Box-and-whisker plots</li> </ul>
	<a href="#">A.2</a>	Equations & Inequalities	<ul style="list-style-type: none"> <li>Review of scientific notation, laws of exponents, and operations of polynomials</li> </ul>
	<a href="#">A.1</a>	Expressions & Operations	<ul style="list-style-type: none"> <li>Include squares and cubes of whole numbers, square roots of monomial expressions, and absolute value.</li> <li>Include equations, expressions, and inequalities, exponents, and multiple operations</li> </ul>
<b><u>Unit 5 – Quadratic Functions (continued from Q3)</u></b>			
7	<a href="#">A.2</a>	Equations & Inequalities	<ul style="list-style-type: none"> <li>Perform operations on <u>polynomials</u> (add, subtract, multiply, factor completely, and divide)</li> </ul>
	<a href="#">A.4a</a>	Equations & Inequalities	<ul style="list-style-type: none"> <li>Solve literal equations (formulas) for situations that include factoring and exponents.</li> </ul>
	<a href="#">A.3</a>	Equations & Inequalities	<ul style="list-style-type: none"> <li>Simplify square and cube roots, including square roots of monomial expressions.</li> </ul>
	<a href="#">A.1</a>	Expressions & Operations	<ul style="list-style-type: none"> <li>Represent verbal quantitative situations algebraically and evaluate these expressions of given replacement values of the variables.</li> <li>When given replacement values of the variables, simplify variable expressions that involve square roots, cube roots, and absolute values.</li> </ul>
<b><u>Unit 2 – Statistics Revisited</u></b>			
<b>Students revisit the statistics unit after seeing this content in Quarter 1 and spiraling it throughout the entire school year. It is important for students to engage in analysis and interpretation of the statistics content.</b>			
2	<a href="#">A.9</a>	Statistics	<ul style="list-style-type: none"> <li>Standard deviation, mean absolute deviation, z-score</li> </ul>
<b><u>Unit 6 – Post SOL Content</u></b>			
9			Pythagorean theorem include situations involving solving equations and simplifying square roots
			Using the Distance Formula
			Area, perimeter, surface area, and volume where measurements include algebraic expressions
			Angle relationships with algebraic expressions
			Transformational graphing with quadratic functions
			Solving absolute value equations and compound inequalities
5	<b>Final Review, Quarterly Assessments, Remediation, and Intervention, and SOL Testing*</b>		

\* The number of blocks reserved for assessment, remediation, and intervention should be dispersed throughout the quarter as needed.

**Additional information about the Standards of Learning can be found in the**

**[VDOE 2009 Curriculum Framework](#)**

**[VDOE 2016 Curriculum Framework](#)**

**(click link above)**

**Additional information about math vocabulary can be found in the**

**[VDOE Vocabulary Word Wall Cards](#)**

**(click link above)**