



LCPS Foundations of Algebra Yearly Overview and [Scope and Sequence](#) 2021-22

Foundations of Algebra Yearly Overview

<u>Quarter</u> <u>1</u>	Applying Rational Numbers Standards of Learning: 7.1, 7.2	
<u>Quarter</u> <u>2</u>	Solving Algebraic Expressions, Equations, and Inequalities Standards of Learning: 7.11, 7.12, 7.13	Using Proportional Reasoning and Linear Functions Standards of Learning: 7.3, 7.10
<u>Quarter</u> <u>3</u>	Using Proportional Reasoning and Linear Functions <i>(Continued from Quarter 2)</i>	Representing Data with Histograms and Determining Probability Standards of Learning: 7.8, 7.9
<u>Quarter</u> <u>4</u>	Solving Problems Involving Two- and Three-Dimensional Geometry Standards of Learning: 7.4, 7.5, 7.6, 7.7	

VDOE Process Goals

- To build new mathematical knowledge through problem solving and to develop a repertoire of skills and strategies for solving a variety of problem types (**Problem Solving**)
- To communicate mathematical ideas coherently and clearly and to analyze and evaluate the mathematical thinking of others (**Communication**)
- To use logical reasoning in solving mathematical problems and to explain and justify mathematical ideas (**Reasoning**)
- To understand how mathematical ideas interconnect and build on one another and to use those connections to solve problems (**Connections**)
- To create and use a variety of representations in learning, doing, and communicating mathematics (**Representations**)



Foundations of Algebra Scope and Sequence

The Loudoun County Public Schools Mathematics Scope and Sequence provides a broad overview of the content units, the quarter in which each unit is taught, and the sequence of the standards within each unit. Resources to support instruction are located in the [Mathematics Curriculum Schoology Groups](#).

[Curriculum Framework](#): The Curriculum Framework contains the 2016 *Mathematics Standards of Learning*, guidance for Understanding the Standard, and Essential Knowledge and Skills for students. Students are expected to continue to connect and apply knowledge and skills from Standards of Learning presented in previous grades as they deepen their mathematical understanding. Assessment items may not and should not be a verbatim reflection of the information presented in the Curriculum Framework.

[VDOE Bridging Document](#): This document identifies bridging standards in the 2016 *Mathematics Standards of Learning*. Bridging standards allow for the identification of content that can be connected when planning instruction and promote deeper student understanding.

[Prerequisite Knowledge](#): These standards are the supporting concepts for the grade level concept. The hyperlinks are to the Just In Time Quick Check documentation which includes teacher notes, instructional plans, formative assessments, and activities to support student learning.

[Mathematics Vertical Articulation Tool \(MVAT\)](#): This tool provides support in identifying concepts aligned to the 2016 *Mathematics Standards of Learning* (SOL) that articulate across mathematics grade levels or courses.

[Just In Time Quick Checks](#): Just in Time Mathematics Quick Checks are formative assessments that align to the 2016 Mathematics Standards of Learning (SOL). They are designed to help teachers identify students with unfinished learning and assist in planning instruction to fill potential gaps “just in time.” As new content is introduced throughout the school year, teachers can use these Quick Checks to identify and diagnose unfinished learning at grade level and/or to assess understanding of prerequisite knowledge that may be needed to access grade level content. Student gaps in mathematics understanding exist for a variety of reasons and these resources can be used to help get student mathematical learning back on track.

[Essential Skills and Knowledge](#): This section provides a detailed expansion of the mathematics knowledge and skills that each student should know and be able to demonstrate. This is not meant to be an exhaustive list of student expectations.



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Quarter 1

Applying Rational Numbers

[Curriculum Framework](#): 7.1e, 7.1d, 7.1b, 7.1c, 7.1a, 7.2

[VDOE Bridging Document](#)

Prerequisite Knowledge MVAT	Essential Skills and Knowledge (with links to VDOE Just In Time Quick Checks for details on how to support student understanding for each standard)
6.3a , 6.3c	7.1e Identify and describe absolute value of rational numbers <ul style="list-style-type: none">● Demonstrate absolute value using a number line.● Determine the absolute value of a rational number.● Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle to solve practical problems.
6.4	7.1d Determine square roots of perfect squares <ul style="list-style-type: none">● Identify the perfect squares from 0 to 400.● Determine the positive square root of a perfect square from 0 to 400.
5.2a , 6.2a , 6.4	7.1a Investigate and describe the concept of negative exponents for powers of ten <ul style="list-style-type: none">● Recognize powers of 10 with negative exponents by examining patterns.● Represent a power of 10 with a negative exponent in fraction and decimal form.
5.2a , 5.2b , 6.2b	7.1b Compare and order numbers greater than zero written in scientific notation <ul style="list-style-type: none">● Convert between numbers greater than 0 written in scientific notation and decimals.● Compare and order no more than four numbers greater than 0 written in scientific notation. Ordering may be in ascending or descending order.
5.2a , 5.2b , 6.2a , 6.2b , 6.3b	7.1c Compare and order rational numbers <ul style="list-style-type: none">● Compare and order no more than four rational numbers expressed as integers, fractions (proper or improper), mixed numbers, decimals, and percents. Fractions and mixed numbers may be positive or negative. Decimals may be positive or negative and are limited to the thousandths place. Ordering may be in ascending or descending order.



5.2a , 5.4 , 5.5b , 5.6a , 5.6b , 6.2a , 6.5a , 6.5b , 6.5c , 6.6a , 6.6b	7.2 Solve practical problems involving operations with rational numbers <ul style="list-style-type: none">Solve practical problems involving addition, subtraction, multiplication, and division with rational numbers expressed as integers, fractions (proper or improper), mixed numbers, decimals, and percents. Fractions may be positive or negative. Decimals may be positive or negative and are limited to the thousandths place.
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Quarter 2

Solving Algebraic Expressions, Equations, and Inequalities

[Curriculum Framework](#): 7.11, 7.12, 7.13

[VDOE Bridging Document](#)

Prerequisite Knowledge MVAT	Essential Skills and Knowledge (with links to VDOE Just In Time Quick Checks for details on how to support student understanding for each standard)
5.5a , 5.6a , 5.6b , 5.7 , 5.19a , 6.5a , 6.6a , 6.6c	7.11 Evaluate algebraic expressions for given replacement values of the variables <ul style="list-style-type: none">Represent algebraic expressions using concrete materials and pictorial representations. Concrete materials may include colored chips or algebra tiles.Use the order of operations and apply the properties of real numbers to evaluate expressions for given replacement values of the variables. Exponents are limited to 1, 2, 3, or 4 and bases are limited to positive integers. Expressions should not include braces { } but may include brackets [] and absolute value . Square roots are limited to perfect squares. Limit the number of replacements to no more than three per expression.
5.5a , 5.6a , 5.6b , 5.19a , 5.19b , 5.19c	7.12 Solve two-step linear equations in one variable, including practical problems that require the solution of a two-step linear equation in one variable <ul style="list-style-type: none">Represent and solve two-step linear equations in one variable using a variety of concrete materials and pictorial



5.19d , 6.5a , 6.6a , 6.6c , 6.13	representations. <ul style="list-style-type: none">● Confirm algebraic solutions to linear equations in one variable.● Apply properties of real numbers and properties of equality to solve two-step linear equations in one variable. Coefficients and numeric terms will be rational.● Solve practical problems that require the solution of a two-step linear equation.● Write verbal expressions and sentences as algebraic expressions and equations.● Write algebraic expressions and equations as verbal expressions and sentences.
6.14a , 6.14b	7.13 Solve one- and two-step linear inequalities in one variable, including practical problems, involving addition, subtraction, multiplication, and division, and graph the solution on a number line <ul style="list-style-type: none">● Represent solutions to inequalities algebraically and graphically using a number line.● Solve practical problems that require the solution of a one or two-step inequality. Identify a numerical value(s) that is part of the solution set of a given inequality.● Apply properties of real numbers and the multiplication and division properties of inequality to solve one-step inequalities in one variable, and the addition, subtraction, multiplication, and division properties of inequality to solve two-step inequalities in one variable. Coefficients and numeric terms will be rational.● Write verbal expressions and sentences as algebraic expressions and inequalities.● Write algebraic expressions and inequalities as verbal expressions and sentences.

Using Proportional Reasoning and Linear Functions

(continued in Quarter 3)

[Curriculum Framework](#): [7.3](#), [7.10a](#), [7.10b](#), [7.10c](#), [7.10d](#), [7.10e](#)

[VDOE Bridging Document](#)

Prerequisite Knowledge MVAT	Essential Skills and Knowledge (with links to VDOE Just In Time Quick Checks for details on how to support student understanding for each standard)
5.2a , 5.4 , 5.5b , 5.6a , 5.6b , 5.9a , 5.9b , 6.1 , 6.5b , 6.5c , 6.6b , 6.12a , 6.12c , 6.13	7.3 Solve single-step and multistep practical problems, using proportional reasoning <ul style="list-style-type: none">● Given a proportional relationship between two quantities, create and use a ratio table to determine missing values.● Write and solve a proportion that represents a proportional relationship between two quantities to find a missing value.● Using 10% as a benchmark, compute 5%, 10%, 15%, or 20% of a given whole number.● Using 10% as a benchmark, compute 5%, 10%, 15%, or 20% in a practical situation such as tips, tax, and



	<p>discounts.</p> <ul style="list-style-type: none">● Solve problems involving tips, tax, and discounts. Limit problems to only one percent computation per problem.● Apply proportional reasoning to convert units of measurement within and between the U.S. Customary System and the metric system when given the conversion factor.● Apply proportional reasoning to solve practical problems, including scale drawings. Scale factors shall have denominators no greater than 12 and decimals no less than tenths.
5.18 , 6.1 , 6.8b , 6.12a , 6.12b , 6.12c	<p>7.10a Determine the slope, m, as rate of change in a proportional relationship between two quantities and write an equation in the form $y = mx$ to represent the relationship</p> <ul style="list-style-type: none">● Determine the slope, m, as rate of change in a proportional relationship between two quantities given a table of values or a verbal description, including those represented in a practical situation, and write an equation in the form $y = mx$ to represent the relationship. Slope will be limited to positive values. <p>7.10b Graph a line representing a proportional relationship between two quantities given the slope and an ordered pair, or given the equation in $y = mx$ form where m represents the slope as rate of change</p> <ul style="list-style-type: none">● Graph a line representing a proportional relationship between two quantities given the equation of the line in the form $y = mx$, where m represents the slope as rate of change. Slope will be limited to positive values.● Graph a line representing a proportional relationship, between two quantities given an ordered pair on the line and the slope, m, as rate of change. Slope will be limited to positive values.
5.18 , 6.8b	<p>7.10c Determine the y-intercept, b, in an additive relationship between two quantities and write an equation in the form $y = x + b$ to represent the relationship</p> <ul style="list-style-type: none">● Determine the y-intercept, b, in an additive relationship between two quantities given a table of values or a verbal description, including those represented in a practical situation, and write an equation in the form $y = x + b$, $b \geq 0$, to represent the relationship. <p>7.10d Graph a line representing an additive relationship between two quantities given the y-intercept and an ordered pair, or given the equation in the form $y = x + b$, where b represents the y-intercept</p> <ul style="list-style-type: none">● Graph a line representing an additive relationship between two quantities, given the equation in the form $y = x + b$, $b \geq 0$. The y-intercept (b) is limited to integer values and slope is limited to 1.● Graph a line representing an additive relationship ($y = x + b$, $b \geq 0$) between two quantities, given an ordered pair on the line and the y-intercept (b). The y-intercept (b) is limited to integer values and slope is limited to 1.
6.12a , 6.12b , 6.12c , 6.12d	<p>7.10e Make connections between and among representations of a proportional or additive relationship between two quantities using verbal descriptions, tables, equations, and graphs</p> <ul style="list-style-type: none">● Make connections between and among representations of a proportional or additive relationship between two quantities using verbal descriptions, tables, equations, and graphs.



Quarter 3

Using Proportional Reasoning and Linear Functions

(continued from Quarter 2)

Representing Data with Histograms and Determining Probability

Curriculum Framework: [7.9a](#), [7.9b](#), [7.9c](#), [7.8a](#), [7.8b](#)

[VDOE Bridging Document](#)

Prerequisite Knowledge MVAT	Essential Skills and Knowledge (with links to VDOE Just In Time Quick Checks for details on how to support student understanding for each standard)
6.10a	7.9a Represent data in a histogram <ul style="list-style-type: none">Collect, organize, and represent data in a histogram.
5.16b , 6.10b	7.9b Make observations and inferences about data represented in a histogram <ul style="list-style-type: none">Make observations and inferences about data represented in a histogram.
5.16c , 6.10c	7.9c Compare histograms with the same data represented in stem-and-leaf plots, line plots, and circle graphs <ul style="list-style-type: none">Compare data represented in histograms with the same data represented in line plots, circle graphs, and stem-and-leaf plots.
5.2a , 5.2b , 5.15 , 6.2a , 6.2b	7.8a Determine the theoretical and experimental probabilities of an event <ul style="list-style-type: none">Determine the theoretical probability of an event.Determine the experimental probability of an event.
	7.8b Investigate and describe the difference between the experimental probability and theoretical probability of an event <ul style="list-style-type: none">Describe changes in the experimental probability as the number of trials increases.Investigate and describe the difference between the probability of an event found through experiment or simulation versus the theoretical probability of that same event.



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Quarter 4

Solving Problems with Two- and Three Dimensional Geometry

[Curriculum Framework](#): 7.6a, 7.6b, 7.5, 7.7, 7.4a, 7.4b

[VDOE Bridging Document](#)

Prerequisite Knowledge MVAT	Essential Skills and Knowledge (with links to VDOE Just In Time Quick Checks for details on how to support student understanding for each standard)
6.9	7.6a Compare and contrast quadrilaterals based on their properties <ul style="list-style-type: none">● Compare and contrast properties of the following quadrilaterals: parallelogram, rectangle, square, rhombus, and trapezoid.● Sort and classify quadrilaterals, as parallelograms, rectangles, trapezoids, rhombi, and/or squares based on their properties
5.13b , 6.9	7.6b Determine unknown side lengths or angle measures of quadrilaterals <ul style="list-style-type: none">● Given a diagram, determine an unknown angle measure in a quadrilateral, using properties of quadrilaterals.● Given a diagram, determine an unknown side length in a quadrilateral using properties of quadrilaterals.
5.13a , 5.14b , 6.9 , 6.12a , 6.13	7.5 Solve problems, including practical problems, involving the relationship between corresponding sides and corresponding angles of similar quadrilaterals and triangles <ul style="list-style-type: none">● Identify corresponding sides and corresponding congruent angles of similar quadrilaterals and triangles.● Given two similar quadrilaterals or triangles, write similarity statements using symbols.● Write proportions to express the relationships between the lengths of corresponding sides of similar quadrilaterals and triangles.● Solve a proportion to determine a missing side length of similar quadrilaterals or triangles.● Given angle measures in a quadrilateral or triangle, determine unknown angle measures in a similar quadrilateral or triangle.
5.14a , 6.8a , 6.8b , 6.9	7.7 Apply translations and reflections of right triangles or rectangles in the coordinate plane <ul style="list-style-type: none">● Given a preimage in the coordinate plane, identify the coordinates of the image of a right triangle or rectangle that has been translated either vertically, horizontally, or a combination of a vertical and horizontal translation.



	<ul style="list-style-type: none">● Given a preimage in the coordinate plane, identify the coordinates of the image of a right triangle or a rectangle that has been reflected over the x- or y-axis.● Given a preimage in the coordinate plane, identify the coordinates of the image of a right triangle or rectangle that has been translated and reflected over the x- or y-axis or reflected over the x- or y-axis and then translated.● Sketch the image of a right triangle or rectangle that has been translated vertically, horizontally, or a combination of both.● Sketch the image of a right triangle or rectangle that has been reflected over the x- or y-axis.● Sketch the image of a right triangle or rectangle that has been translated and reflected over the x- or y-axis or reflected over the x- or y-axis and then translated.
5.8a , 5.8b , 5.10 , 6.7b , 6.7c	<p>7.4a Describe and determine the volume and surface area of rectangular prisms and cylinders</p> <ul style="list-style-type: none">● Determine the surface area of rectangular prisms and cylinders using concrete objects, nets, diagrams, and formulas.● Determine the volume of rectangular prisms and cylinders using concrete objects, diagrams, and formulas. <p>7.4b Solve problems, including practical problems, involving the volume and surface area of rectangular prisms and cylinders</p> <ul style="list-style-type: none">● Determine if a practical problem involving a rectangular prism or cylinder represents the application of volume or surface area.● Solve practical problems that require determining the surface area of rectangular prisms and cylinders.● Solve practical problems that require determining the volume of rectangular prisms and cylinders.