

LIVE Online Math Pre-Algebra Scope and Sequence

The course is broken down into Units. The Units, and lessons that make up each Unit, are below.

Note: If there is a specific concept/technique that is not listed, please [contact us](#) to see if it is part of the course. Specific content is not always readily identifiable simply from the title of a lesson.

Unit 1: The Building Blocks of Pre-Algebra

In Unit 1, students are introduced to various fundamental concepts that the rest of the course will be built around. Some of these concepts will be review, but they are important for the work that lies ahead. Patterns, properties and number operations will be explored throughout. In lessons 2 and 3 students will focus on exponents and square roots, as well as discovering the relationship between the two. Lessons 5 and 6 begin to introduce some abstract thinking as students learn about variables and translate algebraic expressions. The final lesson allows students to discover various number patterns and has an extra segment on the Fibonacci Sequence.

Lesson 1: Number Operations and Commutative and Associative Properties

Lesson 2: Exponents

Lesson 3: Square Roots

Lesson 4: Order of Operations

Lesson 5: Variables and Algebraic Expressions

Lesson 6: Translating with Algebraic Expressions

Lesson 7: Number Patterns

Unit 2: Being Positive About Negatives

Negative numbers can be a big stumbling block and it is imperative that this concept be solid before going forward. Therefore, unit 2 is all about negative numbers. Students get a thorough introduction to how to work with negatives, as they work with them in a variety of contexts. In lesson 1, the concept of integers is introduced along with absolute value. In lessons 2 and 3, several different techniques are used to show how to add and subtract with negative numbers. Lesson 4 has an entire section devoted to "little things" that pop up when multiplying with negative numbers. Finally, lesson 6 brings students back to the Order of Operations, but with a much different perspective, as they work with negatives, square roots, and absolute value in that context.

Lesson 1: Integers and Absolute Value

Lesson 2: Adding Negative Numbers

Lesson 3: Subtracting Negative Numbers

Lesson 4: Multiplying Negative Numbers

Lesson 5: Dividing Negative Numbers

Lesson 6: Advanced PEMDAS

Unit 3: Terms, Distribution and Introduction to Solving Equations

The first part of Unit 3 introduces students to two foundational skills used frequently in Algebra: Combining Like Terms and Distribution. This transitions into exposing students to several

foundational concepts related to equations. Lessons 4 and 5 show students how to solve one-step equations using the four main operations. Lesson 6 is an important lesson. It introduces a general problem solving plan that can be applied to a variety of word problems and real life situations.

Lesson 1: Terms and Like Terms

Lesson 2: Distribution

Lesson 3: Introduction to Equations

Lesson 4: Solving Addition and Subtraction Equations

Lesson 5: Solving Multiplication and Division Equations

Lesson 6: Problem Solving Using Equations

Unit 4: Solving Equations

Unit 4 picks up where Unit 3 left off by extending students' solving equations skills using many of the skills introduced in Unit 3. Students will be introduced to a step-by-step process for solving equations and several peripheral tips and techniques will be shown as well. Negative numbers are used throughout to give students more experience working with negatives. Since equations are used for solving real life problems, almost every lesson has a Real Life Application section. Finally, lesson 7 extends students' problem solving skills by demonstrating a variety of word problems and cementing the problem solving process first introduced in Unit 3.

Lesson 1: Solving Equations: Two-Steppers

Lesson 2: Solving Equations: Combining Like Terms

Lesson 3: Solving Equations: Distribution

Lesson 4: Solving Equations: Combining Like Terms Across the Equal Sign

Lesson 5: Solving Equations Involving Fractions and Decimals

Lesson 6: Perimeter and Area

Lesson 7: Problem Solving Using Advanced Equations

Unit 5: Exponents and Fractions

This unit has a dual focus on exponents and fractions and ends up blending the two by the end. In several lessons, students will connect previously learned concepts to new learning and apply their knowledge to a variety of situations. Lessons 2 and 3 introduce students to several very useful exponent laws (including how to work with zero and negative exponents). In lesson 4, students learn about Scientific Notation and will see how it can be used in science via a Real Life Application. Lesson 6 has an interesting part called "Music Connection" which shows how the concept of Greatest Common Factor is used in music.

Lesson 1: Rational Numbers

Lesson 2: Exponent Laws (Part 1)

Lesson 3: Exponent Laws (Part 2)

Lesson 4: Scientific Notation

Lesson 5: Prime Factorization and Factoring

Lesson 6: Greatest Common Factor

Lesson 7: Least Common Multiple

Lesson 8: Comparing Fractions and Simplifying Algebraic Expressions

Unit 6: Advanced Fractions and Percents

Unit 6 applies previously learned fractions concepts to new situations as students work with negative fractions and algebraic fractions. By working with fractions in these new ways, students will increase their comfort level with algebraic concepts. The unit then transitions into working with percents in various contexts. Lessons 5 and 6 allow students to discover formulas for percent of a number problems and percent increase/decrease problems respectively. Lesson 7 concludes the unit by giving students practice with various word problems that involve percents. Almost all Unit 6 lessons have a Real Life Application aspect which gives students more practice with thinking through word problems.

Lesson 1: Adding and Subtracting Like Fractions

Lesson 2: Adding and Subtracting Unlike Fractions

Lesson 3: Multiplying and Dividing Fractions

Lesson 4: Fractions, Decimals and Percents

Lesson 5: Percent of a Number Problems

Lesson 6: Percent Increase and Decrease

Lesson 7: Percent Word Problems

Unit 7: Rates, Ratios, Proportions and Statistics

Unit 7 starts out by re-introducing rates and ratios (as these are concepts which should have been introduced in previous courses). However, these topics are given more of an in depth treatment than in the past. Students get a lot of work with proportions in lessons 2 and 3 and they see how proportions are used in a variety of contexts. Lesson 2 also focuses on the concept of proportionality, in addition to the essentials of working with proportions. The latter part of the unit focuses on some general statistics concepts. While combinations and permutations are similar, and can be fairly complex, and students are given various tips on how to distinguish one situation from the other. The unit wraps up with lessons 6 and 7 focusing on probability concepts. In lesson 6, students will participate in an interesting activity designed to have them discover something about theoretical and experimental probability. Most lessons have a Real Life Application since things like proportions and probability are very useful in daily life.

Lesson 1: Rates and Ratios

Lesson 2: Proportions

Lesson 3: Problem Solving Using Proportions

Lesson 4: The Counting Principle and Combinations

Lesson 5: Permutations

Lesson 6: Probability

Lesson 7: Compound Probability

Unit 8: Irrational Numbers and Inequalities

The main focus of unit 8 is on inequalities, but the first two lessons extend previous learning about square roots and also introduce irrational numbers as one of the "sets of numbers". Lesson 1 concludes with a Real Life Application that shows how an equation can be used to determine the time it takes an object to fall. One part of lesson 2 aims to expand the student's understanding of the "infiniteness" of numbers and, most likely, they will come away with a new understanding of the vastness of numbers. In lesson 3, the unit begins to transition into the inequality side of things by formally introducing students to inequalities and how they work. Overall, students will get a good review of the techniques involved with solving equations as they work on solving inequalities throughout this unit. Additionally, most lessons have a real life application and one (in lesson 6) shows students the complexity involved with starting a business.

Lesson 1: Solving Equations Using Square Roots

Lesson 2: Irrational Numbers

Lesson 3: Inequality Basics and Graphing Inequalities

Lesson 4: Basic One-Step Inequalities

Lesson 5: Advanced One-Step Inequalities

Lesson 6: Multi-Step Inequalities

Unit 9: Geometric Concepts (Part 1): Fundamentals, Triangles and Quadrilaterals

Unit 9 begins a three part section of the course that focuses on geometric concepts and spatial thinking. This unit starts by laying a foundation for future concepts. The first two lessons teach students about many of the building blocks of geometry. Lesson 2 has a real life application which shows how angles are used in constructing a roof. Then, students transition into learning some interesting properties of triangles. Specifically, lesson 4 engages students in several interactive discovery activities, which increase their knowledge of triangle concepts and also gives them practice using various geometric tools. Throughout the unit, several animations are used to enhance the learning of concepts. Also, lessons 2-5 allow students to link to external websites which allow them to use some interactive tools related to the topics in those lessons. The unit wraps up by introducing a variety of quadrilaterals and extends students' knowledge of area, as well as how to use unit multipliers to convert units of area.

Lesson 1: Geometry Basics

Lesson 2: Angles

Lesson 3: Classifying and Making Triangles

Lesson 4: Angle and Side Relationships in a Triangle

Lesson 5: Quadrilaterals

Lesson 6: Area of Polygons

Unit 10: Geometric Concepts (Part 2): Similarity, Transformations and Circles

Unit 10 continues the three part geometry-centered portion of the course. Lesson 1 fully introduces the concepts of similarity and scale factor, and students perform a couple discovery activities to deepen their learning. The middle part of the unit involves working with various transformations (the movement of a point or figure to a new location). In addition to learning what some transformations are, students will discover various "motion rules", which provide a mathematical way of determining

the results of a transformation. Lesson 3 has an interesting section called "Where's Waldo?" in which students use the rotation rules introduced in that lesson. The unit concludes with two lessons about circles in which students are led to discover the formulas for circumference and area of a circle. Finally, most lessons have a Real Life Application section, since geometry is encountered everywhere.

Lesson 1: Similar Figures and Scale Factor

Lesson 2: The Coordinate Plane and Plotting Points

Lesson 3: Reflection and Rotation

Lesson 4: Translation and Dilation

Lesson 5: Circle Properties, Pi and Circumference

Lesson 6: Area of a Circle and Complex Shapes

Unit 11: Geometric Concepts (Part 3): Solids and the 3rd Dimension

Unit 11 completes the three part portion of the course that focuses on geometric concepts. In lesson 1, students are introduced to the properties of solids and they also work on 3D visualization. They even get to use an interactive 3D shape builder applet. In lessons 2 and 3, students will end up seeing how similar the formulas are for calculating the surface area of prisms and cylinders. The rest of the unit focuses on working with the volume of various solids. One part of lesson 4 teaches students how to convert units of volume using unit multipliers. Lesson 5 contains an interesting activity called "Cylinder Investigation" which is designed to strengthen students' understanding of how changing the dimensions effects the surface area and volume of a cylinder. Finally, lesson 7 is an optional lesson that can be completed through external links and independent study.

Lesson 1: Introduction to Solids

Lesson 2: Surface Area of Prisms

Lesson 3: Surface Area of Cylinders

Lesson 4: Volume of a Prism

Lesson 5: Volume of a Cylinder

Lesson 6: Volume of Cones and Pyramids

Lesson 7: Volume of a Sphere and Similar Solids
(optional independent study lesson)

Unit 12: Linear Equations and Polynomials

Unit 12 comes in two parts. The first half of the unit focuses on introducing to the basics of working with and graphing linear equations. This topic is given a much more thorough treatment in Algebra, so the goal is to begin familiarizing students with this content. Students will want to have graph paper handy as they go through this unit. An activity in lesson 2 allows students to use an interactive graphing website to try to match a given graph. Lesson 3 wraps up the first part of the unit by showing students how linear equations can be used in a variety of real life situations and gives them practice with solving word problems. The second half of the unit focuses on working with polynomials. Algebra Tiles are used to make a concrete connection to an abstract concept. Like with linear equations, working with polynomials is another concept that is gone over in more depth in Algebra. However, working with polynomials in Pre-Algebra, gives students practice with previously learned concepts and further develops their "algebraic sense" as they move toward the end of the course.

Lesson 1: Introduction to Linear Equations

Lesson 2: Graphing Linear Equations

Lesson 3: Problem Solving Using Linear Equations

Lesson 4: Polynomial Basics and Adding Polynomials

Lesson 5: Subtracting Polynomials

Lesson 6: Multiplying/Dividing Polynomials by Monomials

Unit 13: Working With Data

Unit 13 is a shorter unit that focuses on working with data in a variety of contexts. Lesson 1 focuses on Mean, Median and Mode and includes practice aimed at determining which of those is the best choice for extracting meaning from a given set of data. Lesson 2 introduces students to an interesting type of graph (Box and Whisker Plot) which allows the data to be looked at from different perspectives. Finally, lesson 3 shows how data can be displayed using many different charts and graphs. There is also a section in which various charts are analyzed, and the data they are showing is critiqued. The goal of that section is for students to think critically about data and charts that they might find in real life. In place of a unit test, there is an end of unit project which incorporates learning from all three lessons in this unit.

Lesson 1: Measures of Central Tendency

Lesson 2: Box and Whisker Plots

Lesson 3: Charts and Graphs