



District 15

Grades 6-8 & Algebra 1

Family Guide





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What is Imagine IM?

Imagine IM is a problem-based core curriculum designed to address content and practice standards to foster learning for all. Students learn by doing math, solving problems in mathematical and real-world contexts, and constructing arguments using precise language. Teachers can shift their instruction and facilitate student learning with high-leverage routines to guide learners to understand and make connections between concepts and procedures.

What is a Problem-Based Curriculum?

Illustrative Mathematics is a **problem-based curriculum** that fosters the development of mathematics learning communities in classrooms, gives students access to the mathematics through a coherent progression, and provides teachers the opportunity to deepen their knowledge of mathematics, students' thinking, and their own teaching practice. The curriculum and the professional-learning materials are designed to support students' and teachers' learning.

This Curriculum Guide defines the principles that guide Imagine IM's approach to mathematics teaching and learning. It then outlines how each component of the curriculum supports teaching and learning, based on these principles.

All Students Are Capable Learners of Mathematics

With unique knowledge and needs, every student enters the mathematics learning community as a capable learner of meaningful mathematics.

Mathematics instruction that supports students in viewing themselves as capable and competent leverages and builds upon the funds of knowledge they bring to the classroom. Instruction is grounded in equitable structures and practices that provide all students with access to grade-level content and provide teachers with necessary guidance to listen to, learn from, and support each student. The curriculum materials include classroom structures that support students in taking risks, engaging in mathematical discourse, productively struggling through problems, and participating in ways that make their ideas visible. It is through these classroom structures that teachers have daily opportunities to learn about and leverage students' understandings and experiences, and to position each student as a capable learner of mathematics.

Sources: *Illustrative Math Resources Hub:* [IM Math Video Lesson Summaries](#)
[Imagine IM Family Support Hub](#)



Learning Mathematics by Doing Mathematics

Students learn mathematics by doing mathematics, rather than by watching someone else do mathematics or getting told what to do.

“Doing mathematics” means learning mathematical concepts and procedures while engaging in the mathematical practices—making sense of problems, reasoning abstractly and quantitatively, constructing arguments and critiquing the reasoning of others, modeling with mathematics, using appropriate tools strategically, attending to precision in the use of language, looking for and making use of structure, and expressing regularity in repeated reasoning. By engaging in the mathematical practices with their peers, students have the opportunity to see themselves as mathematical thinkers, with worthwhile ideas and perspectives, and to cultivate positive attitudes and beliefs about mathematics. “Students learn mathematics as a result of solving problems. Mathematical ideas are the outcomes of the problem-solving experience rather than the elements that must be taught before problem solving” (Hiebert et al., 1996). A problem-based instructional framework supports teachers in structuring lessons so students are the problem solvers learning the mathematics. The activities and routines are designed to give teachers opportunities to see what students already know and what they can notice and figure out before having concepts and procedures explained to them.

Principles for Mathematics Teaching and Learning

Active learning is best: Students learn best and retain what they learn better by solving problems. Often, mathematics instruction is shaped by the belief that if teachers tell students how to solve problems and students practice, then students will learn how to do mathematics.

Decades of research tells us that the traditional model of instruction is flawed. Traditional instructional methods may get short-term results, with procedural skills, but students tend to forget the procedural skills and do not develop problem-solving skills, deep conceptual understanding, or a mental framework for how ideas fit together. They also don’t develop strategies for tackling non-routine problems, including a propensity for engaging in productive struggle to make sense of problems and persevere in solving them.

In a problem-based instructional framework, teachers play a critical role in mediating student learning, but that role looks different than simply showing, telling, and correcting. The teacher, in fact, has many roles in this framework: listener, facilitator, questioner, synthesizer, and more. In all these roles, teachers listen to and make use of students’ thinking, are mindful about who participates, and continuously monitor students’ positions in terms of status inside and outside the classroom.

Sources: *Illustrative Math Resources Hub:* [IM Math Video Lesson Summaries](#)
[Imagine IM Family Support Hub](#)



The teacher's role is multifaceted:

1. Ensure students understand the context and what is asked.
2. Ask questions to advance students' thinking in productive ways.
3. Help students share their work and understand others' work, through orchestrating productive discussions.
4. Synthesize the learning with students at the end of activities and lessons.

Teachers should build on what students know: New mathematical ideas are built on what students already know about mathematics and the world. As they learn new ideas, students need to make connections between them (NRC, 2001). In order to do this, teachers need to understand what knowledge students bring to the classroom and monitor what they do and do not understand as they are learning. Teachers must themselves know how the mathematical ideas connect in order to mediate students' learning.

Good instruction starts with explicit learning goals: Learning goals are clear not only to teachers, but also to students, and they influence the activities in which students participate. Without a clear understanding of the learning objectives, activities in the classroom, implemented haphazardly, have little impact on advancing students' understanding. Strategic negotiation of whole-class discussion during an Activity Synthesis is crucial to making the intended learning goals explicit. Have a clear idea of the destination for the day, the week, the month, and the year, and select and sequence instructional activities (or use well-sequenced materials) that will get the class to their successive destinations. To arrive at a destination, know the address and plan a route, because driving around aimlessly leads nowhere.

Different learning goals require different instructional moves: The kind of instruction that is appropriate at any given time depends on the learning goals of a particular lesson.

- Explore new topics of study and access the mathematics.
- Study new concepts and procedures in depth.
- Integrate and connect representations, concepts, and procedures.
- Work toward mastery.
- Apply mathematics.

Lessons are designed on the basis of the intended learning outcomes. To facilitate these goals, have a toolbox of instructional moves to use as appropriate.

Intentional planning: Different learning goals require different instructional moves. Plan instruction appropriately. While a high-quality curriculum does reduce the burden to create or curate lessons and tasks, it does not reduce the need to spend deliberate time planning them. Instead, planning time can shift to

Sources: *Illustrative Math Resources Hub:* [IM Math Video Lesson Summaries](#)
[Imagine IM Family Support Hub](#)



high-leverage practices: reading and understanding the curriculum materials; identifying connections to prior and upcoming work; diagnosing students' readiness to do the work; leveraging instructional routines to address students' individual needs and differentiate instruction; anticipating students' responses that will move the learning forward; planning questions and prompts to help students attend to, make sense of, and learn from each other's work; planning supports and extensions to give the greatest access to the main mathematical goals; figuring out timing, pacing, and opportunities for practice; preparing necessary supplies; and providing feedback on students' work.

Each and every student should have access to the mathematical work: With proper structures, accommodations, and supports, all students can learn mathematics. Teachers' instructional toolboxes should include knowledge of and skill in implementing supports for different learners.

Interested in Learning More?

Utilize the links below to learn more about how the materials support all learners as well as why the curriculum is designed this way.

Imagine IM for Families: A Video Series

What Is Problem-Based Instruction?	Link	
How Does Imagine IM Prepare Students for Success in the Real World?	Link	



What is a Math Community?	Link	
The Benefits of Math Practice	Link	
Supporting Math Learning Outside the Classroom	Link	

About the Curriculum: Read More

How do the materials support all learners?	Link	
Advancing Mathematical Language and Access for Multilingual Language and Access for Multilingual Learners	Link	
Mathematical Language Routines	Link	



Universal Design for Learning and Access for Students with Diverse Abilities	Link	
How the Curriculum Extends Learning	Link	
About the 6-12 Unit Adaptation Packs	Link	
Spanish Translation	Link	
Why is the curriculum designed this way?	Link	



6th Grade Course Overview

Grade 6 begins with a unit on reasoning about area and understanding and applying concepts of surface area. It is common to begin the year by reviewing the arithmetic learned in previous grades, but starting instead with a mathematical idea that students haven't seen before sets up opportunities for students to surprise the teacher and themselves with the connections they make. Instead of front-loading review and practice from prior grades, these materials incorporate opportunities to practice elementary arithmetic concepts and skills through warm-ups, in the context of instructional tasks, and in practice problems as they are reinforcing the concepts they are learning in the unit.

One of the design principles of these materials is that students should encounter plenty of examples of a mathematical or statistical idea in various contexts before that idea is named and studied as an object in its own right. For example, in the first unit, students will generalize arithmetic by writing simple expressions like $\frac{1}{2}bh$ and $6s^2$ before they study algebraic expressions as a class of objects in the sixth unit. Sometimes this principle is put into play several units before a concept is developed more fully, and sometimes in the first several lessons of a unit, where students have a chance to explore ideas informally and concretely, building toward a more formal and abstract understanding later in the unit.

Units of Study

Unit 1: Area and Surface Area

Unit 2: Introducing Ratios

Unit 3: Unit Rates and Percentages

Unit 4: Dividing Fractions

Unit 5: Arithmetic Base Ten

Unit 6: Expressions and Equations

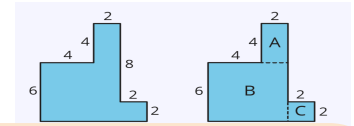
Unit 7: Rational Numbers

Unit 8: Data Sets and Distributions



6th Grade

Unit 1: Area and Surface Area



In this unit, students learn to find areas of polygons by decomposing, rearranging, and composing shapes. They learn to understand and use the terms “base” and “height,” and find areas of parallelograms and triangles. Students approximate areas of non-polygonal regions by polygonal regions. They represent polyhedra with nets and find their surface areas.

Family Support Materials

Unit 1 (All Languages)



Unit 1: Area and Surface Area	Vimeo	YouTube	QR Code
Video 1: Reasoning to Find Area (Lessons 1–3, 11)	Link	Link	
Video 2: Parallelograms (Lessons 4–6)	Link	Link	
Video 3: Triangles (Lessons 7–10)	Link	Link	
Video 4: Surface Area (Lessons 12–15)	Link	Link	
Video 5: Distinguishing between Surface Area and Volume (Lessons 16–18)	Link	Link	



6th Grade

Unit 2: Introducing Ratios

In this unit, students learn to understand and use the terms “ratio,” “rate,” “equivalent ratios,” “per,” “at this rate,” “constant speed,” and “constant rate,” and to recognize when two ratios are or are not equivalent. They represent ratios as expressions, and represent equivalent ratios with double number line diagrams, tape diagrams, and tables. They use these terms and representations in reasoning about situations involving color mixtures, recipes, unit pricing, and constant speed.

Family Support Materials

Unit 2 (All Languages)



Unit 2: Introducing Ratios	Vimeo	YouTube	QR Code
Video 1: What are Equivalent Ratios (Lessons 1–5)	Link	Link	
Video 2: Double Number Line Diagrams (Lessons 6–8)	Link	Link	
Video 3: Comparing Situations by Examining Ratios (Lessons 9–10)	Link	Link	
Video 4: Tables of Equivalent Ratios (Lessons 11–14)	Link	Link	
Video 5: Using Diagrams to Solve Ratio Problems (Lessons 15–16)	Link	Link	



6th Grade

Unit 3: Unit Rates and Percentages

In this unit, students learn to understand and use the terms “unit rate,” “speed,” “pace,” “percent,” and “percentage,” and recognize that equivalent ratios have equal unit rates. They represent percentages with tables, tape diagrams, and double number line diagrams, and as expressions. They use these terms and representations in reasoning about situations involving unit price, constant speed, and measurement conversion.

Family Support Materials

Unit 3 (All Languages)



Unit 3: Unit Rates and Percentages	Vimeo	YouTube	QR Code
Video 1: Converting Measurements (Lessons 2–4)	Link	Link	
Video 2: Unit Rates (Lessons 5–8)	Link	Link	
Video 3: Understanding Percentage (Lessons 10–13)	Link	Link	
Video 4: Solving Percentage Problems (Lessons 14–16)	Link	Link	



6th Grade

Unit 4: Dividing Fractions

In this unit, students examine how the relative sizes of numerator and denominator affect the size of their quotient when numerator or denominator (or both) is a fraction. They acquire the understanding that dividing by a/b has the same outcome as multiplying by b , then by $1/a$. They compute quotients of fractions.

Family Support Materials

Unit 4 (All Languages)



Unit 4: Dividing Fractions	Vimeo	YouTube	QR Code
Video 1: Meanings of Division (Lessons 1–3)	Link	Link	
Video 2: Using Diagrams to Divide Fractions (Lessons 5–9)	Link	Link	
Video 3: Using an Algorithm to Divide Fractions (Lessons 10–12)	Link	Link	
Video 4: Area and Volume with Fractions (Lessons 13–15)	Link	Link	



6th Grade

Unit 5: Arithmetic in Base Ten

In this unit, students compute sums, differences, products, and quotients of multi-digit whole numbers and decimals, using efficient algorithms. They use calculations with whole numbers and decimals to solve problems set in real-world contexts.

Family Support Materials

Unit 5 (All Languages)



Unit 5: Arithmetic in Base Ten	Vimeo	YouTube	QR Code
Video 1: Adding and Subtracting Decimals (Lessons 2–4)	Link	Link	
Video 2: Multiplying Decimals (Lessons 5–8)	Link	Link	
Video 3: Dividing Whole Numbers (Lessons 9–10)	Link	Link	
Video 4: Dividing Decimals (Lessons 11–14)	Link	Link	



6th Grade

Unit 6: Expressions and Equations

In this unit, students learn to understand and use the terms “variable,” “coefficient,” “solution,” “equivalent expressions,” “exponent,” “independent variable,” and “dependent variable.”

Family Support Materials

Unit 6 (All Languages)



Unit 6: Expressions and Equations	Vimeo	YouTube	QR Code
Video 1: Understanding Equations (Lessons 1–3)	Link	Link	
Video 2: Writing and Solving Equations (Lessons 4–7)	Link	Link	
Video 3: Writing Equivalent Expressions (Lessons 8–11)	Link	Link	
Video 4: Expressions with Exponents (Lessons 12–15)	Link	Link	
Video 5: Relationships Between Quantities (Lessons 16–18)	Link	Link	



6th Grade

Unit 7: Rational Numbers

In this unit, students interpret signed numbers in contexts (e.g., temperature above or below zero, elevation above or below sea level) and plot points in all four quadrants of the coordinate plane for the first time.

Family Support Materials

Unit 7 (All Languages)



Unit 7: Rational Numbers	Vimeo	YouTube	QR Code
Video 1: What are Negative Numbers? (Lessons 1–5)	Link	Link	
Video 2: Absolute Value (Lessons 6–7)	Link	Link	
Video 3: Inequalities (Lessons 8–10)	Link	Link	
Video 4: The Coordinate Plane (Lessons 11–15)	Link	Link	
Video 5: Common Factors and Common Multiples (Lessons 16–18)	Link	Link	



6th Grade

Unit 8: Data Sets and Distributions

In this unit, students learn about populations and study variables associated with a population. They understand and use the terms “numerical data,” “categorical data,” “survey” (as noun and verb), “statistical question,” “variability,” “distribution,” and “frequency.”

Family Support Materials

Unit 8 (All Languages)



Unit 8: Data Sets and Distributions	Vimeo	YouTube	QR Code
Video 1: Data and Variability (Lessons 1–3)	Link	Link	
Video 2: Distributions and Histograms (Lessons 4–8)	Link	Link	
Video 3: Mean (Lessons 9–10)	Link	Link	
Video 4: Variability and MAD (Lessons 11–12)	Link	Link	
Video 5: Median (Lessons 13–14)	Link	Link	
Video 6: Five Number Summary and Box Plots (Lessons 15–17)	Link	Link	



7th Grade Course Overview

As in grade 6, students start grade 7 by studying scale drawings, an engaging geometric topic that supports the subsequent work on proportional relationships in the second and fourth units. It also makes use of grade 6 arithmetic understanding and skill, without arithmetic becoming the major focus of attention at this point. Geometry and proportional relationships are also interwoven in the third unit on circles, where the important proportional relationship between a circle's circumference and its diameter is studied.

By the time students reach the fifth unit on operations with rational numbers, both positive and negative, students have had time to brush up on and solidify their understanding and skill in grade 6 arithmetic. The work on operations on rational numbers, with its emphasis on the role of the properties of operations in determining the rules for operating with negative numbers, is a natural lead-in to the work on expressions and equations in the next unit. Students then put their arithmetical and algebraic skills to work in the last two units, on angles, triangles, and prisms, and on probability and sampling.

Units of Study

Unit 1: Scale Drawings

Unit 2: Introducing Proportional Relationships

Unit 3: Measuring Circles

Unit 4: Proportional Relationships and Percentages

Unit 5: Rational Number Arithmetic

Unit 6: Expressions, Equations, and Inequalities

Unit 7: Angles, Triangles, and Prisms

Unit 8: Probability and Sampling



7th Grade

Unit 1: Scale Drawings

In this unit, students learn to understand and use the terms “scaled copy,” “to scale,” “scale factor,” “scale drawing,” and “scale,” and recognize when two pictures or plane figures are or are not scaled copies of each other.

Family Support Materials

Unit 1 (All Languages)



Unit 1: Scale Drawings	Vimeo	YouTube	QR Code
Video 1: Scaled Copies (Lessons 1–4)	Link	Link	
Video 2: More about Scale Factor (Lessons 5–6)	Link	Link	
Video 3: What are Scaled Drawings (Lessons 7–9, 11)	Link	Link	
Video 4: Scale Drawings with Different Scales (Lessons 10 and 12)	Link	Link	



7th Grade

Unit 2: Introducing Proportional Relationships

In this unit, students learn to understand and use the terms “proportional,” “constant of proportionality,” and “proportional relationship,” and recognize when a relationship is or is not proportional. They represent proportional relationships with tables, equations, and graphs. Students use these terms and representations in reasoning about situations that involve constant speed, unit pricing, and measurement conversions.

Family Support Materials

Unit 2 (All Languages)



Unit 2: Introducing Proportional Relationships	Vimeo	YouTube	QR Code
Video 1: Representing Proportional Relationships with Tables (Lessons 2–3)	Link	Link	
Video 2: Representing Proportional Relationships with Equations (Lessons 4–6)	Link	Link	
Video 3: Comparing Proportional and Nonproportional Relationships (Lessons 7–8)	Link	Link	
Video 4: Representing Proportional Relationships with Graphs (Lessons 10–13)	Link	Link	



7th Grade

Unit 3: Measuring Circles

In this unit, students learn to understand and use the term “circle” to mean the set of points that are equally distant from a point called the “center.” They gain an understanding of why the circumference of a circle is proportional to its diameter, with constant of proportionality π .

Family Support Materials

Unit 3 (All Languages)



Unit 3: Measuring Circles	Vimeo	YouTube	QR Code
Video 1: Measuring Relationships (Lesson 1)	Link	Link	
Video 2: Circumference of a Circle (Lessons 2–5)	Link	Link	
Video 3: Area of a Circle (Lessons 7–9)	Link	Link	
Video 4: Distinguishing Circumference and Area (Lesson 10)	Link	Link	



7th Grade

Unit 4: Proportional Relationships and Percentages

In this unit, students use ratios, scale factors, unit rates (also called constants of proportionality), and proportional relationships to solve multi-step, real-world problems that involve fractions and percentages.

Family Support Materials

Unit 4 (All Languages)



Unit 4: Proportional Relationships and Percentages	Vimeo	YouTube	QR Code
Video 1: Proportional Relationships with Fractions & Decimals (Lessons 4–5)	Link	Link	
Video 2: Percent Increase and Decrease (Lessons 6–8)	Link	Link	
Video 3: Applications of Percentages (Lessons 10–12)	Link	Link	
Video 4: More Applications of Percentages (Lessons 14–15)	Link	Link	



7th Grade

Unit 5: Rational Number Arithmetic

In this unit, students interpret signed numbers in contexts (e.g., temperature, elevation, deposit and withdrawal, position, direction, speed and velocity, percent change) together with their sums, differences, products, and quotients.

Family Support Materials

Unit 5 (All Languages)



Unit 5: Rational Number Arithmetic	Vimeo	YouTube	QR Code
Video 1: Adding Rational Numbers (Lessons 1–4)	Link	Link	
Video 2: Subtracting Rational Numbers (Lessons 5–7)	Link	Link	
Video 3: Multiplying and Dividing Rational Numbers (Lessons 8–11)	Link	Link	
Video 4: Solving With Rational Numbers (Lessons 12–16)	Link	Link	



7th Grade

Unit 6: Expressions, Equations, and Inequalities

In this unit, students solve equations of the forms $px+q=r$ and $p(x+q)=r$ where p , q , and r are rational numbers. They draw, interpret, and write equations in one variable for balanced “hanger diagrams,” and write expressions for sequences of instructions, e.g., “number puzzles.” They use tape diagrams together with equations to represent situations with one unknown quantity. They learn algebraic methods for solving equations. Students solve linear inequalities in one variable and represent their solutions on the number line.

Family Support Materials

Unit 6 (All Languages)



Unit 6: Expressions, Equations, and Inequalities	Vimeo	YouTube	QR Code
Video 1: Representing Two Types of Situations (Lessons 1–6)	Link	Link	
Video 2: Reasoning About Solving Equations (Lessons 7–9)	Link	Link	
Video 3: Using Equations to Solve Problems (Lessons 10–12)	Link	Link	
Video 4: Solving Inequalities (Lessons 14–17)	Link	Link	
Video 5: Writing Equivalent Expressions (Lessons 18–22)	Link	Link	



7th Grade

Unit 7: Angles, Triangles, and Prisms

In this unit, students investigate whether sets of angle and side length measurements determine unique triangles or multiple triangles, or fail to determine triangles. Students also study and apply angle relationships, learning to understand and use the terms “complementary,” “supplementary,” “vertical angles,” and “unique.”

Family Support Materials

Unit 7 (All Languages)



Unit 7: Angles, Triangles, and Prisms	Vimeo	YouTube	QR Code
Video 1: Angle Relationships (Lessons 1–5)	Link	Link	
Video 2: Drawing Polygons with Given Conditions (Lessons 6–10)	Link	Link	
Video 3: Volume of Right Prisms and Pyramids (Lessons 11–13)	Link	Link	
Video 4: Volume and Surface Area of Right Prisms (Lessons 14–16)	Link	Link	



7th Grade

Unit 8: Probability and Sampling

In this unit, students understand and use the terms “event,” “sample space,” “outcome,” “chance experiment,” “probability,” “simulation,” “random,” “sample,” “random sample,” “representative sample,” “overrepresented,” “underrepresented,” “population,” and “proportion.” They design and use simulations to estimate probabilities of outcomes of chance experiments and understand the probability of an outcome as its long-run relative frequency.

Family Support Materials

Unit 8 (All Languages)



Unit 8: Probability and Sampling	Vimeo	YouTube	QR Code
Video 1: Estimating Probabilities (Lessons 1–5)	Link	Link	
Video 2: Multi-step Experiments (Lessons 6–10)	Link	Link	
Video 3: Sampling (Lessons 11–14)	Link	Link	
Video 4: Using Samples (Lessons 15–19)	Link	Link	



Grade 8 Course Overview

Students begin Grade 8 with transformational geometry, studying rigid transformations like reflections and rotations, then exploring dilations and similarity. This geometric foundation supports their understanding of slope and linear relationships in the coordinate plane. From there, they build on Grade 7 proportional reasoning to study linear relationships more deeply, learning to express these relationships using equations, tables, and graphs while making connections across different representations.

Students then discover that linear relationships are examples of functions—a crucial mathematical concept they'll continue studying in high school. They learn to solve systems of linear equations and apply their understanding to analyze data with variability. The year concludes with important extensions to their number system: they work with integer exponents and scientific notation for very large and small quantities, encounter irrational numbers through the Pythagorean Theorem, and study volumes of three-dimensional shapes like cones, cylinders, and spheres.

Units of Study

Unit 1: Rigid Transformations and Congruence

Unit 2: Dilations, Similarity, and Introducing Slope

Unit 3: Linear Relationships

Unit 4: Linear Equations and Linear Systems

Unit 5: Functions and Volume

Unit 6: Associations in Data

Unit 7: Exponents and Scientific Notation

Unit 8: Pythagorean Theorem and Irrational Numbers



Grade 8

Unit 1: Rigid Transformations and Congruence

In this unit, students learn to understand and use the terms “reflection,” “rotation,” “translation,” recognizing what determines each type of transformation, e.g., two points determine a translation. They learn to understand and use the terms “transformation” and “rigid transformation.” They identify and describe translations, rotations, and reflections, and sequences of these, using the terms “corresponding sides” and “corresponding angles,” and recognizing that lengths and angle measures are preserved.

Family Support Materials

Unit 1 (All Languages)



Unit 1: Rigid Transformations and Congruence	Vimeo	YouTube	QR Code
Video 1: Rigid Transformations (Lessons 1–6)	Link	Link	
Video 2: Properties of Rigid Transformations (Lessons 7–10)	Link	Link	
Video 3: Congruence (Lessons 11–13)	Link	Link	
Video 4: Angles in a Triangle (Lessons 14–16)	Link	Link	



Grade 8

Unit 2: Dilations, Similarity, and Introducing Slope

In this unit, students learn to understand and use the term “dilation,” and to recognize that a dilation is determined by a point called the “center” and a number called the “scale factor.” They learn that under a dilation, the image of a circle is a circle and the image of a line is a line parallel to the original. They draw images of figures under dilations on and off the coordinate plane.

Family Support Materials

Unit 2 (All Languages)



Unit 2: Dilations, Similarity, and Introducing Slope	Vimeo	YouTube	QR Code
Video 1: Dilations (Lessons 1–5)	Link	Link	
Video 2: Similarity (Lesson 6–9)	Link	Link	
Video 3: Slope (Lessons 10–12)	Link	Link	



Grade 8

Unit 3: Linear Relationships

In this unit, students deepen their understanding of slope, learn to understand and use key terms and representations to reason about situations involving one or two constant rates.

Family Support Materials

Unit 3 (All Languages)



Unit 3: Linear Relationships	Vimeo	YouTube	QR Code
Video 1: Representing Proportional Relationships (Lessons 1–4)	Link	Link	
Video 2: Representing Linear Relationships (Lessons 5–8)	Link	Link	
Video 3: Finding Slopes (Lessons 9–10)	Link	Link	
Video 4: Linear Equations (Lessons 11–13)	Link	Link	



Grade 8

Unit 4: Linear Equations and Linear Systems

In this unit, students write and solve linear equations in one variable.

Family Support Materials

Unit 4 (All Languages)



Unit 4: Linear Equations and Linear Systems	Vimeo	YouTube	QR Code
Video 1: Solving Linear Equations in One Variable (Lessons 1–4)	Link	Link	
Video 2: Solving Any Linear Equation (Lessons 5–6)	Link	Link	
Video 3: Equations with Different Numbers of Solutions (Lessons 7–8)	Link	Link	
Video 4: Systems of Equations (Lessons 10–12)	Link	Link	
Video 5: Solving Systems of Equations (Lessons 13–15)	Link	Link	



Grade 8

Unit 5: Functions and Volume

In this unit, students are introduced to the concept of a function. They learn to understand and use the terms “input,” “output,” and “function,” e.g., “temperature is a function of time.” They describe functions as increasing or decreasing between specific numerical inputs, and they consider the inputs of a function to be values of its independent variable and its outputs to be values of its dependent variable.

Family Support Materials

Unit 5 (All Languages)



Unit 5: Functions and Volume	Vimeo	YouTube	QR Code
Video 1: Inputs and Outputs (Lessons 1–3)	Link	Link	
Video 2: Representing and Interpreting Functions (Lessons 4–7)	Link	Link	
Video 3: Linear Functions and Rates of Change (Lessons 8–10)	Link	Link	
Video 4: Cylinders and Cones (Lessons 11–16)	Link	Link	
Video 5: Spheres (Lessons 19–21)	Link	Link	



Grade 8

Unit 6: Associations in Data

In this unit, students generate and work with bivariate data sets that has more variability than in previous units.

Family Support Materials

Unit 6 (All Languages)



Unit 6: Associations in Data	Vimeo	YouTube	QR Code
Video 1: Using Scatter Plots to Visualize Data (Lessons 1–3)	Link	Link	
Video 2: Using Lines to Model Data (Lesson 4–8)	Link	Link	
Video 3: Associations in Categorical Data (Lessons 9–10)	Link	Link	



Grade 8

Unit 7: Exponents and Scientific Notation

In this unit, students extend the definition of exponents to include all integers, and in the process codify the properties of exponents.

Family Support Materials

Unit 7 (All Languages)



Unit 7: Exponents and Scientific Notation	Vimeo	YouTube	QR Code
Video 1: Exponent Rules (Lessons 1–4)	Link	Link	
Video 2: More Exponent Rules (Lesson 5–8)	Link	Link	
Video 3: Powers of 10 (Lessons 9–12)	Link	Link	
Video 4: Scientific Notation (13–15)	Link	Link	



Grade 8

Unit 8: Pythagorean Theorem and Irrational Numbers

In this unit, students work with geometric and symbolic representations of square and cube roots.

Family Support Materials

Unit 8 (All Languages)



Unit 8: Pythagorean Theorem and Irrational Numbers	Vimeo	YouTube	QR Code
Video 1: Side Lengths and Areas of Squares (Lessons 1–2)	Link	Link	
Video 2: Square Roots on the Number Line (Lesson 3–5)	Link	Link	
Video 3: The Pythagorean Theorem (Lessons 6–8)	Link	Link	
Video 4: Using the Pythagorean Theorem (Lessons 9–11)	Link	Link	
Video 5: Cube Roots and Decimal Representations (Lessons 12–15)	Link	Link	



Algebra 1 Course Overview

Students begin Algebra 1 with statistics, learning to collect and analyze data in meaningful contexts. This foundation helps students think about quantities and relationships before diving into more abstract algebraic concepts. From there, they explore linear equations and systems, learning to write, solve, and use these tools to model real-world situations. Students then extend their understanding of scatter plots and correlation from middle school in a unit on two-variable statistics, followed by work with linear inequalities and systems.

The heart of the course focuses on functions—a major mathematical idea that connects algebra to many areas of mathematics. Students learn to represent relationships using function notation and graphs, starting with familiar linear functions and moving on to exponential and quadratic functions. They discover how different types of functions can model different real-world patterns, from population growth to the path of a ball. The course concludes with a deep study of quadratic equations, where students learn multiple methods for solving these important equations and encounter both rational and irrational numbers as solutions.

Units of Study

Unit 1: One-variable Statistics

Unit 2: Linear Equations and Systems

Unit 3: Two-Variable Statistics

Unit 4: Linear Inequalities and Systems

Unit 5: Functions

Unit 6: Introduction to Exponential Functions

Unit 7: Introduction to Quadratic Functions

Unit 8: Quadratic Equations



Algebra 1

Unit 1: One-variable Statistics

In this unit on one-variable statistics, students discuss the difference between statistical and non-statistical questions and classify that data as numerical or categorical.

Family Support Materials

Unit 1 (All Languages)



Unit 1: One-variable Statistics	Vimeo	YouTube	QR Code
Video 1: Representing Data (Lessons 1, 3)	Link	Link	
Video 2: Distribution Types (Lesson 4)	Link	Link	
Video 3: Statistics and Data Displays (Lessons 9–11)	Link	Link	
Video 4: Manipulating Data (Lessons 12–15)	Link	Link	



Algebra 1

Unit 2: Linear Equations and Systems

Students expand and deepen their prior understanding of linear equations and systems, learning to write, solve, and graph these relationships.

Family Support Materials

Unit 2 (All Languages)



Unit 2: Linear Equations and Systems	Vimeo	YouTube	QR Code
Video 1: Building a Model (Lessons 1–3)	Link	Link	
Video 2: Solutions to Linear Equations (Lessons 4–6)	Link	Link	
Video 3: Rewriting Equations (Lessons 7–9)	Link	Link	
Video 4: Equations and Their Graphs (Lessons 10–12)	Link	Link	
Video 5: Solving Systems of Equations (Lessons 13–17)	Link	Link	



Algebra 1

Unit 3: Two-Variable Statistics

In this unit, students revisit two-way tables to find associations in categorical data using relative frequencies.

Family Support Materials
Unit 3 (All Languages)



Unit 3: Two-Variable Statistics	Vimeo	YouTube	QR Code
Video 1: Two-Way Tables (Lessons 1–3)	Link	Link	
Video 2: Scatter Plots (Lessons 4–6)	Link	Link	
Video 3: Correlation Coefficients (Lessons 7–9)	Link	Link	



Algebra 1

Unit 4: Linear Inequalities and Systems

Students expand their understanding of linear inequalities and systems, building on their work with equations to solve and graph inequality relationships.

Family Support Materials

Unit 4 (All Languages)



Unit 4: Linear Inequalities and Systems	Vimeo	YouTube	QR Code
Video 1: One-Variable Inequalities (Lessons 1–3)	Link	Link	
Video 2: Systems of Inequalities (Lessons 4–8)	Link	Link	



Algebra 1

Unit 5: Functions

In this unit, students expand their understanding of functions, building on what they learned in grade 8. Students develop their capacity to represent, interpret, and use functions to make sense of quantities in situations and to solve problems.

Family Support Materials

Unit 5 (All Languages)



Unit 5: Functions	Vimeo	YouTube	QR Code
Video 1: Functions and Function Notation (Lessons 1–2)	Link	Link	
Video 2: Interpreting Function Notation (Lessons 3–5)	Link	Link	
Video 3: Graphs of Functions (Lessons 6–7)	Link	Link	
Video 4: Making and Interpreting Graphs (Lessons 8–9)	Link	Link	
Video 5: Domain and Range (Lessons 10–11)	Link	Link	
Video 6: Piecewise and Absolute Value Functions (Lessons 12–14)	Link	Link	
Video 7: Inverse Functions (Lessons 15–17)	Link	Link	



Algebra 1

Unit 6: Introduction to Exponential Functions

In this unit, students are introduced to exponential relationships. Students learn that exponential relationships are characterized by a constant quotient over equal intervals, and compare them to linear relationships which are characterized by a constant difference over equal intervals.

Family Support Materials

Unit 6 (All Languages)



Unit 6: Introduction to Exponential Functions	Vimeo	YouTube	QR Code
Video 1: Exponential Relationships (Lessons 3–7)	Link	Link	
Video 2: Defining Exponential Functions (8–10, 20)	Link	Link	
Video 3: Graphs of Exponential Functions (Lessons 11–13, 19)	Link	Link	
Video 4: Percent Growth and Decay (Lessons 15–18)	Link	Link	



Algebra 1

Unit 7: Introduction to Quadratic Functions

Students study quadratic functions systematically. They look at patterns which grow quadratically and contrast them with linear and exponential growth.

Family Support Materials

Unit 7 (All Languages)



Unit 7: Introduction to Quadratic Functions	Vimeo	YouTube	QR Code
Video 1: Introducing Quadratic Functions (Lessons 2–4)	Link	Link	
Video 2: Building Quadratic Functions (5–7)	Link	Link	
Video 3: Working With Quadratic Expressions (Lessons 8–9)	Link	Link	
Video 4: Graphing Quadratic Equations (Lessons 10–11)	Link	Link	
Video 5: Graphing Standard Form (Lessons 12, 14)	Link	Link	
Video 6: Vertex Form (Lessons 15-17)	Link	Link	



Algebra 1

Unit 8: Quadratic Equations

In this unit, students interpret, write, and solve quadratic equations.

Family Support Materials

Unit 8 (All Languages)



Unit 8: Quadratic Equations	Vimeo	YouTube	QR Code
Video 1: Solutions to Quadratic Equations (Lessons 1–5)	Link	Link	
Video 2: Factored Form (6–10)	Link	Link	
Video 3: Completing the Square (Lessons 11–15)	Link	Link	
Video 4: The Quadratic Formula (Lessons 16–18)	Link	Link	
Video 5: Rational and Irrational Solutions (Lessons 19–21)	Link	Link	
Video 6: Vertex Form (Lessons 22–24)	Link	Link	