

Reading Public Schools

Instilling a joy of learning and inspiring the innovative leaders of tomorrow



Mathematics Curriculum Guide

Algebra 1

Course Description

In this course, students will learn how to solve equations and inequalities and to classify and analyze types of functions by their characteristics. They will study both singular equations and inequalities and simultaneous systems of equations and inequalities. Students will gain a full understanding of functions in general and linear functions in particular. Students will also begin their study of exponential and polynomial functions. Their study of polynomials will focus on manipulating quadratic expressions and solving and graphing equations. Modeling real world problems with each type of function is an integral part of the course. Students are encouraged to purchase a graphing calculator to enhance their understanding and improve their analytical skills.

Content Standards

Number and Quantity

Quantities

- Reason quantitatively and use units to solve problems.

Algebra

Seeing Structure in Expressions

- Interpret the structure of expressions.
- Write expressions in equivalent forms to solve problems.

Arithmetic with Polynomials and Rational Expressions

- Perform arithmetic operations on polynomials.
- Understand the relationship between zeros and factors of polynomials.

Creating Equations

- Create equations that describe numbers or relationships.
- Reasoning with Equations and Inequalities
- Understand solving equations as a process of reasoning and explain the reasoning.
- Solve equations and inequalities in one variable.
- Solve systems of equations.
- Represent and solve equations and inequalities graphically.

Functions

Interpreting Functions

- Understand the concept of a function and use function notation.
- Interpret functions that arise in applications in terms of the context.
- Analyze functions using different representations.

Building Functions

- Build a function that models a relationship between two quantities.

Linear, Quadratic, and Exponential Models

- Construct and compare linear, quadratic, and exponential models and solve problems.
- Interpret expressions for functions in terms of the situation they model.

Statistics and Probability

Interpreting Categorical and Quantitative Data

- Interpret linear models.

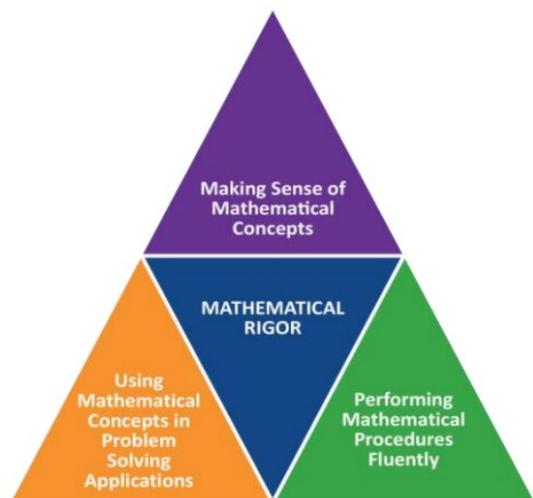
Mathematical Practice Standards

- Making sense of problems and persevering in solving them
- Reasoning abstractly and quantitatively
- Constructing viable arguments and critiquing the reasoning of others
- Modeling with mathematics
- Using appropriate tools strategically
- Attending to precision
- Looking for and making use of structure
- Looking for and expressing regularity in repeated reasoning

Units	Essential Questions
Solving Equations and Inequalities	<ul style="list-style-type: none"> • What are the "pieces" of an algebraic expression? What do they represent in the context of the real-world situation? • What are the similarities and difference between algebraic and arithmetic functions? • Can equations that appear to be different be equivalent? • In what ways can proportional relationships be represented?
Understanding Functions	<ul style="list-style-type: none"> • How are functions a special type of relation? • How are functions and relationships related? • How do functions describe real world situations?
Linear Functions	<ul style="list-style-type: none"> • How do you determine solutions to linear problems using algebraic methods? • How can you make predictions based on a scatter plot?
Systems of Linear Equations and Inequalities	<ul style="list-style-type: none"> • What is the significance of a solutions to a system of equations? • How do you use linear equations to represent real life situations? • How do you use linear inequalities to represent real life situations? • How do inequalities relate to equations?
Exponents and Exponential Functions	<ul style="list-style-type: none"> • What are the applications of exponential numbers? • What are the characteristics of exponential functions?
Polynomials and Factoring	<ul style="list-style-type: none"> • How do you use your understanding of the real number system and operations to carry out procedures and simplify polynomial expressions? • How are the properties of real numbers related to polynomials? • Why do different approaches yield valid solutions?
Quadratic Functions	<ul style="list-style-type: none"> • How can we determine the shape and tendency of a function using standard form? • What are the characteristics of quadratic functions? • How can you use quadratic functions to model real-world situations? • How are radical expressions represented?

Classroom Structures and Key Learning Routines

- Whole class instruction
- Small group instruction
- Formative assessments
- Summative assessments
- Performance tasks
- Group projects
- Explorations with technology
- Real-world application problems



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Curriculum Guide Overview

Algebra 1

Curriculum Guide

Curriculum guides are public documents aligned with the Massachusetts Department of Education Curriculum Frameworks. They focus on the set of standards that students will learn within certain disciplines at appropriate grade levels. Each area of the curriculum is divided into general strands (broad categories) under which the standards fall. When we discuss “standards-based education” we mean that students are measured against their proficiency and growth towards meeting these standards. Curriculum Guides are intended for teachers, parents, and the wider school community as an overview document of the course of study for the year.

Curriculum Map

Curriculum maps are internal documents utilized as planning tools for teachers. Curriculum maps keep a focus on the end-of-year standards and chart a course for the teaching and learning over the year. They are typically organized in a grade-level overview organized by month or marking period. Curriculum maps typically include; standards and expectations for the grade/content, essential skills/concepts, methods of assessment, and major content resources. Maps are never “done” as ongoing work of educators include revisions, additions, and revisits to the maps. They provide an overview for the year while also allowing educators to see a vertical picture of how the content develops as students progress through each grade.

Content Standards

The standards used as the foundation of our curriculum come directly from the Massachusetts Department of Education Curriculum Frameworks. State standards may be viewed here: <http://www.doe.mass.edu/frameworks/>

Mathematical

Practice Standards

Mathematical Practice Standards are a set of skills/behaviors that are replicated in grades preK-12. These standards describe ways in which students engage with the mathematical content and the level of application grows increasingly complex as students progress vertically throughout their education.

Units

Units are the learning themes for the course. They are generally cumulative in nature, meaning that new units are based upon knowledge from previous units.

Essential Questions

Essential questions are questions that are not answerable with an easy answer or a simple instruction. The purpose of essential questions is to provide opportunities for inquiry into the learning and act as an umbrella to anchor the unit/lesson.

Activities

Activities identified in Curriculum Guides are not intended to be exhaustive, nor are they intended to be prescriptive. The activities identified may function as a menu of curriculum resources from which educators identify the most appropriate tools to utilize in their classrooms.