# CURRICULUM GUIDE

## Algebra I

Providence Schools

## QUARTER 1

| Content students have to learn | Processes students will learn and use |
|---|---|
| **Unit 1.1 – Using Algebraic Expressions (15 days)** | |
| • Understand the real number system and use appropriate mathematical symbols.<br>• Translate problem situations into algebraic expressions.<br>• Understand the relationships among equivalent expressions to build a conceptual understanding of algebraic expressions.<br>• Use properties to solve problems involving algebraic expressions.<br>• Understand the function of absolute value in expressions.<br>• Recognize and relate arithmetic sequences to linear relationships. | » Communicate mathematical ideas using language, efficient tools, appropriate units, and graphical, numerical, physical, or algebraic representations<br>» Determine and use the appropriate mathematical representation to model situations.<br>» Select tools such as real objects, manipulatives, paper-pencil, and technology or techniques such as mental math, estimation, and number sense to solve problems.<br>» Draw logical conclusions and make generalizations. |
| **Unit 1.2 – Solving Algebraic Equations (12 days)** | |
| • Understand the relationship between solving equations and properties, including the properties of equality and identity.<br>• Understand the connections between problem situations and equations.<br>• Use and apply percent proportions to solve problems involving percent of change. | » Communicate mathematical ideas using language, efficient tools, appropriate units, and graphical, numerical, or algebraic mathematical models.<br>» Reflect on solutions and the problem-solving process for a given situation and refine strategies as needed.<br>» Explain and justify thinking and develop a problem-solving model that incorporates understanding the problem.<br>» Select tools such as real objects, manipulatives, paper/pencil, and technology or techniques such as mental math, estimation, and number sense to solve problems.<br>» Use different strategies to solve problems. |
| **Unit 1.3 – Using Inequalities (6 days)** | |
| • Understand and interpret linear inequalities and their solutions. | » Select or develop an appropriate problem-solving strategy from a variety of different types.<br>» Reflect on solutions and the problem-solving process for a given situation and refine strategies as needed.<br>» Communicate mathematical ideas using language, efficient tools, appropriate units, and graphical, numerical, physical, or algebraic mathematical models.<br>» Use different strategies to solve problems. |

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| **Unit 1.4 – Linear Functions/Relations, Part A (8 days)** | |
| • Understand the relationships that are shown in a graph.<br>• Understand when relationships are functions.<br>• Understand the relationships among equations, graphs, and their solutions. | » Select tools such as real objects, manipulatives, paper/pencil, and technology, or techniques such as mental math, estimation, and number sense to solve problems.<br>» Draw logical conclusions and make generalizations.<br>» Determine and use the appropriate mathematical representation to model situations.<br>» Use different strategies to solve problems. |

## QUARTER 2

| Content students have to learn | Processes students will learn and use |
|---|---|
| **Unit 2.1 – Linear Functions/Relations, Part B (16 days)** | |
| • Understand the relationship between slope and an equation.<br>• Use the different forms of writing and graphing equations.<br>• Interpret and apply understanding of the relationships between the slope and parallel and perpendicular lines. | » Select tools such as real objects, manipulatives, paper/pencil, and technology, or techniques such as mental math, estimation, and number sense to solve problems.<br>» Identify and apply mathematics to everyday experiences, to activities in and outside of school, with other disciplines, and with other mathematical topics.<br>» Communicate mathematical ideas using language, efficient tools, appropriate units, and graphical, numerical, physical, or algebraic mathematical models.<br>» Determine and use the appropriate mathematical representation to model situations.<br>» Use different strategies to solve problems. |
| **Unit 2.2 – Correlation and Lines of Best Fit (5 days)** | |
| • Determine the relationships in data to make predictions and estimates.<br>• Understand the use of linear regression to help analyze other situations. | » Use reasoning and proof to formulate, test, and justify mathematical conjectures and arguments.<br>» Use and create representations to solve problems and organize thoughts and ideas. |
| **Unit 2.3 – Solving Systems of Equations (20 days)** | |
| • Analyze and use systems of equations to understand problem situations that cannot be solved with one equation. | » Use problem-solving strategies appropriately when solving linear systems of equations.<br>» Translate problem situations into equations symbolically and graphically.<br>» Communicate mathematical ideas using language, efficient tools, appropriate units, and graphical, numerical, or algebraic mathematical models.<br>» Use different strategies to solve problems. |

## QUARTER 3

| Content students have to learn | Processes students will learn and use |
|---|---|
| **Unit 3.1 – Simplifying Polynomials (20 days)** | |
| • Understand the effects of applying operations to simplify polynomials and demonstrate conceptual understanding of algebraic expressions. | » Use different strategies to solve problems.<br>» Communicate mathematical ideas using language, efficient tools, appropriate units, and graphical, numerical, physical, or algebraic mathematical models.<br>» Reflect on solutions and the problem-solving process for a given situation and refine strategies as needed.<br>» Determine and use the appropriate mathematical representation to model situations.<br>» Identify and apply mathematics to everyday experiences, to activities in and outside of school, with other disciplines, and with other mathematical topics. |
| **Unit 3.2 – Nonlinear Functions (13 days)** | |
| • Analyze the characteristics of the graphs of the quadratic and exponential functions.<br>• Apply exponents in growth and decay problems.<br>• Distinguish between linear and nonlinear functions from various representations (i.e., graphs, data, equations, or problems). | » Select or develop an appropriate problemsolving strategy from a variety of different types.<br>» Communicate mathematical ideas using language, efficient tools, appropriate units, and graphical, numerical, physical, or algebraic mathematical models.<br>» Use different strategies to solve problems. |
| **Unit 3.3 – Using Square Roots (8 days)** | |
| • Understand the application of the Pythagorean theorem and the use of the theorem to solve problems.<br>• Understand the relationship between squares and square roots. | » Identify and apply mathematics to everyday experiences, to activities in and outside of school, with other disciplines, and with other mathematical topics.<br>» Use different strategies to solve problems.<br>» Communicate mathematical ideas using language, efficient tools, appropriate units, and graphical, numerical, physical, or algebraic mathematical models. |

## QUARTER 4

| Content students have to learn | Processes students will learn and use |
|---|---|
| **Unit 4.1 – Selecting Appropriate Representations of Data (10 days)** | |
| • Understand different representations of data and select an appropriate representation to present data and results.<br>• Understand the misrepresentation of data in graphical displays. | » Explain and justify thinking and develop a problem-solving model that incorporates understanding the problem.<br>» Evaluate the effectiveness of different representations to communicate ideas: formulate questions, conjectures, definitions, and generalizations about data, information, and problem situations.<br>» Communicate mathematical ideas using language, efficient tools, appropriate units, and graphical, numerical, physical, or algebraic mathematical models.<br>» Use and create representations to solve problems and organize thoughts and ideas.<br>» Determine and use the appropriate mathematical representation to model situations. |
| **Unit 4.2 – Statistical Sampling (11 days)** | |
| • Understand the components of creating a survey and effectively producing and analyzing conclusions based on the results of the survey. | » Determine, collect, and organize the relevant information needed to solve real-world problems.<br>» Draw logical conclusions and make generalizations using deductive and inductive reasoning.<br>» Evaluate the effectiveness of different representations to communicate ideas: formulate questions, conjectures, definitions, and generalizations about data, information, and problem situations.<br>» Communicate mathematical ideas using language, efficient tools, appropriate units, and graphical, numerical, physical, or algebraic mathematical models.<br>» Use and create representations to solve problems and organize thoughts and ideas.<br>» Determine and use the appropriate mathematical representation to model situations. |

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| **Unit 4.3 – Probability (9 days)**<br>• Understand the elements of probability to design a simulation and effectively produce and analyze the conclusion(s) based on the results of the simulation.<br>• Understand different counting techniques to solve contextualized problems. | » Determine, collect, and organize the relevant information needed to solve real-world problems.<br>» Reflect on solutions and the problem-solving process for a given situation and refine strategies as needed.<br>» Evaluate the effectiveness of different representations to communicate ideas: formulate questions, conjectures, definitions, and generalizations about data, information, and problem situations.<br>» Communicate mathematical ideas using language, efficient tools, appropriate units, and graphical, numerical, physical, or algebraic mathematical models.<br>» Use and create representations to solve problems and organize thoughts and ideas. |

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