

CURRICULUM

GUIDE

Algebra I

Providence
Schools

Background

Providence Schools teachers and administrators worked collaboratively with consultants from the Charles A. Dana Center at the University of Texas at Austin to develop the mathematics and science curriculum frameworks. The curriculum frameworks encompass two critical questions:

- Content Standards that establish clearly defined expectations for all students, helping to answer the question, ***What do students have to learn?***
- Performance Standards that determine performance expectations for content standards, helping to answer the question, ***How well do the students have to learn it?***

The curriculum framework provides a work plan that directs the instruction delivered in every classroom in every school in the district. Instruction—the way the curriculum is presented to students—will focus on the needs of students.

Purpose and Use of Curriculum Guides

Curriculum Guides for the curriculum for each grade and subject outline the approximate number of days that each unit in the curriculum will be taught; describe the content to be learned; and list the essential questions that students should be able to answer by the end of the unit.

Parents should become familiar with the Curriculum Guides. You should know when your child is being taught different topics. You should also know the essential questions that your child should be able to answer by the end of each unit.

It is important that you understand that you do not have to be familiar with the content that your child is learning in order to help them with their studies. There are basic questions that you can ask to determine if your child understands the content.

Ask your child what she is learning in each subject

Does she understand the topic? Is the unit exciting or boring? What specifically does she like or dislike about the topic? Does she understand how the topic relates to the real world?

You know your child better than anyone. You will be able to tell if she or he is benefiting from the instruction and understanding the content of the material by the way they answer you. Speak to your child's teacher if you suspect there is a problem.

Ask your child about his assignments

What is the required work? Has he finished the work on time? Is he having difficulty? If he is having difficulty, why?

Encourage your child to talk to her teachers if she is having difficulty understanding a concept or completing an assignment. If your child continues to experience difficulty, speak to the teacher yourself so that the two of you can work together to support your child.

Even if you do not understand the content that your child is learning, the fact that you are showing interest in his or her school work and believe that it is important that he or she does well sends a powerful message.

Sharon Contreras
Chief Academic Officer
Providence Public School Department

QUARTER I

Content students will be learning

Essential questions students should be able to answer by end of unit

Unit 1.1 - Real Numbers (10 days)

- Recognize and relate arithmetic sequences to linear functions.
- Understand the real number system.
- Understand operations of rational numbers.
- Use and apply percent proportions to solve problems involving percent of change.

- » How do you find a certain term of an arithmetic sequence?
- » How is an arithmetic sequence related to a linear function?
- » What are some ways to compare rational numbers?
- » How do you set up a proportion to solve a problem and can a different proportion solve the same problem? Explain.
- » How do you find a percent change between two values and how do you determine if the change is an increase or decrease?

Unit 1.2 - Using Algebraic Expressions (6 days)

- Translate problem situations into algebraic expressions.
- Understand the relationships among equivalent expressions to build a conceptual understanding of algebraic expressions.
- Use properties to solve problems involving algebraic expressions.

- » What role does a variable play in an algebraic expression?
- » How do you write an algebraic expression from a real-world situation?
- » How do you know when two algebraic expressions are equivalent, and why is it important to know this?
- » Why does order matter when you are doing computation? Explain.
- » What is the distributive property, and how does it help you evaluate expressions?

Unit 1.3 - Solving Algebraic Equations (12 days)

- Understand the relationship between solving equations and properties, including the properties of equality and identity.
- Understand the connections between problem situations and equations.
- Understand the function of absolute value in expressions and equations.

- » What does it mean when you apply the property of equality to solve an equation?
- » What are some general strategies for solving linear equations, including those with grouping symbols?
- » What does the solution of an equation tell you?
- » Do equations with more than one variable have more than one solution?

QUARTERS 1 & 2

Content students will be learning

Essential questions students should be able to answer by end of unit

Unit 1.4 - Linear Functions/Relations, Part A (13 days)

- Understand the relationships that are shown in a graph.
- Understand when relationships are functions.
- Understand the relationships between equations, graphs, and their solutions.

- » What steps would you take to make a graph to show the relationship between two related variables and summarize graphing a linear equation?
- » What type of dependency is there between the domain and the range?
- » When is a relation a proportional or nonproportional function?
- » How are the rate of change and the slope related and how do you find the slope of a line?
- » What are the advantages and disadvantages to solving a problem algebraically? Graphically?

QUARTER 2

QUARTER 2

Unit 2.1 - Linear Functions/Relations, Part B (12 days)

- Understand the relationship between slope and an equation.
- Understand and use the different forms of writing and graphing equations. writing and graphing equations.

- » How can I write and graph a linear function in all of its forms?
- » How do I use a graphing calculator to investigate linear functions?
- » How do I model real-world data using linear functions?

Unit 2.2 - Using the Coordinate Plane (5 days)

- Understand the relationships between the slope and parallel and perpendicular lines.
- Understand the application of the Pythagorean theorem and the use of the theorem to solve problems.

- » How do I write equations for lines that are parallel or perpendicular to a given line?
- » How do I find the midpoint between two points in the coordinate plane?
- » How do I use the Pythagorean theorem to solve problems or to find distance in the coordinate plane?
- » How can I determine if a triangle is a right triangle?

Unit 2.3 - Correlation and Lines of Best Fit (5 days)

- Understand the relationships in data to make predictions and estimates.

- » How can you use scatterplots to investigate relationships between quantities?

QUARTERS 2 & 3

Content students will be learning

Essential questions students should be able to answer by end of unit

- Understand the use of linear regressions to help analyze other situations.

- » How can you use the line of best fit to make and evaluate predictions?
- » How can you write the equation of best fit?

Unit 2.4 - Solving Systems of Equations (20 days)

- Analyze and use systems of equations to understand problem situations that cannot be solved with one equation.

- » What is a system of equations and what does it mean to solve a system?
- » Where is the solution on the graph of a system of equations? How do we know that is the solution?
- » How many solutions are possible in each system of equations?
- » What are some methods that help to write equation(s) to model application problems? Explain the algebraic steps for the method being used.
- » How can the answer be verified for reasonableness and accuracy?
- » When should we choose which method (substitution vs. graphing vs. elimination)?

QUARTER 3

QUARTER 3

Unit 3.1 - Using Inequalities (8 days)

- Understand and interpret linear inequalities and their solutions.

- » What are the critical features of an inequality?
- » What are the effects of applying various operations to inequalities?
- » How are inequalities represented graphically?
- » How is an inequality affected when it is multiplied or divided by a negative integer?
- » How are inequalities applied to real-world situations?

Unit 3.2 - Simplifying Polynomials (15 days)

- Understand the effects of applying operations to simplify polynomials and demonstrate conceptual understanding of algebraic expressions.

- » How do you add, subtract, multiply, and divide monomials?
- » How do you identify polynomials?
- » How are polynomials used in geometric formulas?
- » What strategies can we use to multiply binomials? How is the distributive property useful in multiplying polynomials?

QUARTERS 3 & 4

Content students will be learning

Essential questions students should be able to answer by end of unit

Unit 3.3 - Applying Exponents (11 days)

- Understand the applications of exponents.
- Understand the relationship between squares and square roots.

» What similarities and differences exist between multiplying polynomials and dividing them, and what are the essential components?

- » Why do we use scientific notation? What form do we use to write numbers in scientific notation?
- » How can you choose which representation is best to analyze exponential behavior?
- » How are exponential decay and exponential growth relationships similar? How are they different?
- » How are exponential patterns similar to and different from linear growth patterns?
- » How do you write radical expressions in simplest form?

QUARTER 4

QUARTER 4

Unit 4.1 - Selecting Appropriate Representations of Data (5 days)

- Understand different representations of data and select an appropriate representation to present data and results.
- Understand the misrepresentation of data in graphical displays.

- » How are a table of data, a line plot, and a bar graph alike? How are they different?
- » What are some variables that influence ways graphical data are interpreted?
- » Numerical data can be displayed using more than one kind of graph. How do you decide when to use a particular display?
- » How are distribution and variation of data shown in bar graphs, histograms, line graphs, stem-and-leaf plots, circle graphs, and box-and-whisker plots?

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.

- » What are the types of data collection techniques and how are they used?

QUARTER 4 (CONTINUED)

Content students will be learning

Essential questions students should be able to answer by end of unit

Unit 4.3 - Probability (11 days)

- Understand the elements of probability to design a simulation and effectively produce and analyze the conclusion(s) based on the results of the simulation.
- Understand different counting techniques to solve contextualized problems.

- » What are the measures of central tendencies and when is each best used?
- » When analyzing conclusions from a survey, why should you consider statistics and parameters?
- » What purpose do surveys serve in gathering information about the world around us?

- » When is it appropriate to use a combination or a permutation?
- » How do you determine which sampling technique is appropriate to use to collect data?
- » Why is this particular representation appropriate for summarizing data from simulations?
- » What strategies can you use to compare two different sets of data?
- » Describe a situation in which probability can be used to make a decision. Can the probabilities of the outcomes be determined both experimentally and theoretically? Why or why not?



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