



ESL
SCIENCE
BUSINESS
BILINGUAL
PRESCHOOL
MATHEMATICS
LIBRARY MEDIA
SOCIAL STUDIES
WORLD LANGUAGES
GIFTED & TALENTED
TECHNOLOGY EDUCATION
ENGLISH LANGUAGE ARTS
FINE & PERFORMING ARTS
FAMILY & CONSUMER SCIENCE
HEALTH & PHYSICAL EDUCATION

RAHWAY PUBLIC SCHOOLS

CURRICULUM & INSTRUCTION

Content Area: Mathematics

Course: Algebra A

Grade Level: 9 - 12

This curriculum is part of the Educational Program of Studies of the Rahway Public Schools.

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Subject/Course Title:
Algebra A
Grade 9 - 12

Date of Board Adoptions:
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RAHWAY PUBLIC SCHOOLS CURRICULUM

Algebra A- Grade 9 - 12

Pacing Guide

Unit	Title	Pacing
1	Expression, Equation, and Inequalities	20 weeks
2	Linear Functions	10 weeks
3	Systems of Equations and Inequalities	10 weeks

ACCOMMODATIONS

504 Accommodations:

- Provide scaffolded vocabulary and vocabulary lists.
- Provide extra visual and verbal cues and prompts.
- Provide adapted/alternate/excerpted versions of the text and/or modified supplementary materials.
- Provide links to audio files and utilize video clips.
- Provide graphic organizers and/or checklists.
- Provide modified rubrics.
- Provide a copy of teaching notes, especially any key terms, in advance.
- Allow additional time to complete assignments and/or assessments.
- Provide shorter writing assignments.
- Provide sentence starters.
- Utilize small group instruction.
- Utilize Think-Pair-Share structure.
- Check for understanding frequently.
- Have student restate information.
- Support auditory presentations with visuals.
- Weekly home-school communication tools (notebook, daily log, phone calls or email messages).
- Provide study sheets and teacher outlines prior to assessments.
- Quiet corner or room to calm down and relax when anxious.
- Reduction of distractions.
- Permit answers to be dictated.
- Hands-on activities.
- Use of manipulatives.
- Assign preferential seating.
- No penalty for spelling errors or sloppy handwriting.
- Follow a routine/schedule.
- Provide student with rest breaks.
- Use verbal and visual cues regarding directions and staying on task.
- Assist in maintaining agenda book.

Gifted and Talented Accommodations:

- Differentiate reading levels of texts (e.g., Newsela).
- Offer students additional texts with higher lexile levels.
- Provide more challenging and/or more supplemental readings and/or activities to deepen understanding.
- Allow for independent reading, research, and projects.
- Accelerate or compact the curriculum.
- Offer higher-level thinking questions for deeper analysis.
- Offer more rigorous materials/tasks/prompts.
- Increase number and complexity of sources.
- Assign group research and presentations to teach the class.
- Assign/allow for leadership roles during collaborative work and in other learning activities.

IEP Accommodations:

- Provide scaffolded vocabulary and vocabulary lists.
- Differentiate reading levels of texts (e.g., Newsela).
- Provide adapted/alternate/excerpted versions of the text and/or modified supplementary materials.
- Provide extra visual and verbal cues and prompts.
- Provide links to audio files and utilize video clips.
- Provide graphic organizers and/or checklists.
- Provide modified rubrics.
- Provide a copy of teaching notes, especially any key terms, in advance.
- Provide students with additional information to supplement notes.
- Modify questioning techniques and provide a reduced number of questions or items on tests.
- Allow additional time to complete assignments and/or assessments.
- Provide shorter writing assignments.
- Provide sentence starters.
- Utilize small group instruction.
- Utilize Think-Pair-Share structure.
- Check for understanding frequently.
- Have student restate information.
- Support auditory presentations with visuals.
- Provide study sheets and teacher outlines prior to assessments.
- Use of manipulatives.
- Have students work with partners or in groups for reading, presentations, assignments, and analyses.
- Assign appropriate roles in collaborative work.
- Assign preferential seating.
- Follow a routine/schedule.

ELL Accommodations:

- Provide extended time.
- Assign preferential seating.
- Assign peer buddy who the student can work with.
- Check for understanding frequently.
- Provide language feedback often (such as grammar errors, tenses, subject-verb agreements, etc...).
- Have student repeat directions.
- Make vocabulary words available during classwork and exams.
- Use study guides/checklists to organize information.
- Repeat directions.
- Increase one-on-one conferencing.
- Allow student to listen to an audio version of the text.
- Give directions in small, distinct steps.
- Allow copying from paper/book.
- Give student a copy of the class notes.
- Provide written and oral instructions.
- Differentiate reading levels of texts (e.g., Newsela).
- Shorten assignments.
- Read directions aloud to student.
- Give oral clues or prompts.
- Record or type assignments.
- Adapt worksheets/packets.
- Create alternate assignments.
- Have student enter written assignments in criterion, where they can use the planning maps to help get them started and receive feedback after it is submitted.
- Allow student to resubmit assignments.
- Use small group instruction.

- Simplify language.
- Provide scaffolded vocabulary and vocabulary lists.
- Demonstrate concepts possibly through the use of visuals.
- Use manipulatives.
- Emphasize critical information by highlighting it for the student.
- Use graphic organizers.
- Pre-teach or pre-view vocabulary.
- Provide student with a list of prompts or sentence starters that they can use when completing a written assignment.
- Provide audio versions of the textbooks.
- Highlight textbooks/study guides.
- Use supplementary materials.
- Give assistance in note taking
- Use adapted/modified textbooks.
- Allow use of computer/word processor.
- Allow student to answer orally, give extended time (time-and-a-half).
- Allow tests to be given in a separate location (with the ESL teacher).
- Allow additional time to complete assignments and/or assessments.
- Read question to student to clarify.
- Provide a definition or synonym for words on a test that do not impact the validity of the exam.
- Modify the format of assessments.
- Shorten test length or require only selected test items.
- Create alternative assessments.
- On an exam other than a spelling test, don't take points off for spelling errors.

RAHWAY PUBLIC SCHOOLS CURRICULUM

UNIT OVERVIEW TEMPLATE

Content Area: Algebra

Unit Title: Unit one- Expressions, Equations, and Inequalities

Target Course/Grade Level: Grade 9 Algebra

Unit Summary:

- Using the distributive property
- Interpret parts of an expression
- Solving single and multi-variable equations
- Solving multi-step equations
- Solving literal equations
- Solving Inequalities
- Graphing Inequalities

Approximate Length of Unit: 20 weeks

LEARNING TARGETS

NJ Student Learning Standards:

- A.SSE.A- 1a: Interpret expressions that represent a quantity in terms of its context. Interpret parts of an expression, such as terms, factors, and coefficients.
- A.SSE.A-1 b: Interpret parts of an expression, such as terms, factors, and coefficients.
- A.SSE.A-2: Use the structure of an expression to identify ways to rewrite it.
- A.SSE. B-3a: Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. Factor a quadratic expression to reveal the zeros of the function it defines.
- A.SSE.B-3 b:Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.
- A.SSE.B-3c: Use the properties of exponents to transform expressions for exponential functions.
- A.SSE.A-4: Derive and/or explain the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. For example, calculate mortgage payments. 21st Century Life and Career Skills: growth

21st Century Life and Career Skills:

- CRP2: Apply appropriate academic and technical skills.
- 9.1.12.D.4: Distinguish between income and investment growth.
- 9.1.5.EG.1: Explain and give examples of what is meant by the term “tax.”
- 9.1.5. EG.4: Describe how an individual’s financial decisions affect society and contribute to the overall economy.
- 9.1.8.FP.1: Describe the impact of personal values on various financial scenarios.
- 9.1.8.FP.2: Evaluate the role of emotions, attitudes, and behavior (rational and irrational) in making financial decisions.
- 9.1.8.FP.3: Explain how self-regulation is important to managing money (e.g., delayed gratification, impulse buying, peer pressure, etc.).
- 9.1.8.FP.4: Analyze how familial and cultural values influence savings rates, spending, and other financial decisions.
- 9.1.8.FP.5: Determine how spending, investing, and using credit wisely contributes to financial well-being

Interdisciplinary Connections and Standards:

- 4.O.A.A.1: Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.
- MS-PS1-6: Undertake a design project to construct, test, and modify a device that either relates or absorbs thermal energy by chemical processes.
- 7.EE.B.4: Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.
- 8.F.A.3: Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line, give examples of functions that are not linear.
- 7.EE.B.4: Use variables to represent quantities in a real-world or mathematical problem, and construct multiple equations and inequalities to solve problems by reasoning about the quantities.
- L.KL.9–10.2. Apply knowledge of language to make effective choices for meaning, or style, and to comprehend more fully when reading, writing, speaking or listening.
- RI.AA.9–10.7. Describe and evaluate the argument and specific claims in an informational text, assessing whether the reasoning is valid and the evidence is relevant and sufficient; identify false statements and reasoning.

Unit Understandings:

Students will understand that...

- Algebraic equations can be solved using properties of equality.
- Algebraic inequalities can be solved using properties of equality.
- Equations and inequalities can be used to describe real-world scenarios.
- Various mathematical properties are used in solving equations and inequalities.
- Real-world problems can be solved with equations and inequalities.

Unit Essential Questions:

- Identify the coefficient, variable, and constant in the expression $4x + 2$.
- Simplify the expressions: $2x - 6 + 3x$, $-4(5x - 2)$, and $3(x-1) + 2(x+2) - 6$
- Solve varying types of equations.
- How can real world situations be represented as equations?
- Create an equation for the given situation and solve: Jenna buys 2 sodas and spends \$3.10. How much did each soda cost?
- Solve literal equations for a given variable. Example: Solve $A = \frac{1}{2}bh$, for h .
- Solve and graph an inequality.
- Create an inequality for the given situation and solve: Mike buys a sandwich for \$4.50, a soda for \$1.89, and wants to buy a snack. He cannot spend more than \$7.00 for his lunch. How much can Mike spend on his snack?
- Identify the properties used to solve an equation.

Knowledge and Skills:

Students will know.....

- Expressions, coefficient, constant, variable, simplifying like terms, order of operations
- Real numbers, positive, negative, integers, irrational numbers, absolute value
- Equations, solutions, evaluate
- Algebraic properties of equality, distributive property, substitution property, commutative property
- Literal equations, formulas
- Proportion, ratio, probability
- Fahrenheit to Celsius conversion formula
- Simple Interest Formula
- Density Formula

Students will be able to ...

- Use mathematical vocabulary fluently
- Use appropriate vocabulary to describe algebraic concepts
- Interpret parts of an expression, such as terms, factors, and coefficients
- Use order of operations to simplify expressions
- Evaluate expressions
- Solve single variable and multivariable algebraic equations
- Solve single-step and multi-step equations
- Use the distributive property
- Create equations and inequalities and use them to solve real-world problems
- Explain each step in solving equations and inequalities
- Construct a viable argument to justify a solution
- Rearrange formulas to highlight a quantity of interest
- Reason abstractly and quantitatively
- Construct viable arguments and critique the reasoning of others
- Model with mathematics
- Attend to precision
- Look for and express regularity in repeated reasoning

EVIDENCE OF LEARNING

Assessment:

What evidence will be collected and deemed acceptable to show that students truly “understand”?

- Unit tests, quizzes,
- Open-ended problems that involve written responses
- Daily student work
- Student/group presentations
- Daily Homework

Learning Activities:

What differentiated learning experiences and instruction will enable all students to achieve the desired results?

- Mathematical investigations
- Fundraising activity
- Khan Academy/Mathspace assignments
- Create real world situations in a word problem format and solve each other’s problems
- Use real-world literal equations and solve them for a variable different than the one given (science formulas: density, Fahrenheit to Celsius, etc.)

RESOURCES

Teacher Resources:

- Algebra 1 Textbook: Teachers’ Edition & accompanying softcover practice workbook
- Teacher developed worksheets
- Teacher developed activities
- Teacher developed presentations and guided notes
- Math websites interactive practice and lessons: Khan Academy, Freckle, Mathspace

Equipment Needed:

- Graphing calculators
- Chromebook’s
- Projectors / Interactive Board / Document Camera
- Paper to show work

RAHWAY PUBLIC SCHOOLS CURRICULUM

UNIT OVERVIEW TEMPLATE

Content Area: Algebra

Unit Title: Unit two- Linear Functions

Target Course/Grade Level: Grade 9 Algebra

Unit Summary:

- Understand the concept of a function and use function notation
- Identify the domain and range of linear functions
- Graph linear functions
- Relate the domain of a linear function to its graph.
- Write a linear function that describes a relationship between two quantities

Approximate Length of Unit: 10 weeks

LEARNING TARGETS

NJ Student Learning Standards:

- A.APR.A-1: Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.
- A.APR.B-2: Know and apply the Remainder Theorem: For a polynomial $p(x)$ and a number a , the remainder on division by $x - a$ is $p(a)$, so $x - a$ is a factor of $p(x)$ if and only if $p(a) = 0$.
- A.APR.B-3: Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.
- A.APR.C-4: (+) Prove polynomial identities and use them to describe numerical relationships.
- A.APR.C-5: (+) Know and apply the Binomial Theorem for the expansion $(x + y)^n$ of $(x + y)^n$ in powers of x and y for a positive integer n , where x and y are any numbers, with coefficients determined for example by Pascal's Triangle.

21st Century Life and Career Skills:

- 9.1.12.B.4: Analyze how income and spending plans are affected by age, needs, and resources.
- 9.1.12.B. 5: Analyze how changes in taxes, inflation, and personal circumstances can affect a personal budget.
- 9.1.5.EG.2: Describe how tax monies are spent
- 9.1.5.EG.3: Explain the impact of the economic system on one's personal financial goals
- 9.1.5. EG.4: Describe how an individual's financial decisions affect society and contribute to the overall economy.
- 9.1.8.FP.1: Describe the impact of personal values on various financial scenarios.
- 9.1.8.FP.2: Evaluate the role of emotions, attitudes, and behavior (rational and irrational) in making financial decisions.
- 9.1.8.FP.3: Explain how self-regulation is important to managing money (e.g., delayed gratification, impulse buying, peer pressure, etc.).

Interdisciplinary Connections and Standards:

- L.KL.9–10.2. Apply knowledge of language to make effective choices for meaning, or style, and to comprehend more fully when reading, writing, speaking or listening.
- RI.AA.9–10.7. Describe and evaluate the argument and specific claims in an informational text, assessing whether the reasoning is valid and the evidence is relevant and sufficient; identify false statements and reasoning.
- 8.1.2.DA.3: Identify and describe patterns in data visualizations.
- 8.1.2.DA.4: Make predictions based on data using charts or graphs.

Unit Understandings:

Students will understand that...

- Equations and graphs are alternative ways of depicting and analyzing data and patterns of change.
- Functional relationships can be expressed in a variety of ways: real contexts, graphs, algebraic equations, tables, and words.
- Functions can be analyzed using different representations.

- A variety of families of functions can be used to model and solve real world problems.

Unit Essential Questions:

- How can change be best represented mathematically?
- How can we use mathematical language to describe change?
- How can we use mathematical models to describe change over time?
- How can patterns, relations, and functions be used as tools to best describe and explain real-life situations?
- How are functions and their graphs related?
- How can technology be used to investigate properties of linear functions and their graphs?

Knowledge and Skills:

Students will know.....

- Relation, domain, range, function, correlation, ordered pair
- Rise, run, slope, rate of change, x-coordinate, y-coordinate, y-intercept
- Slope-intercept form, standard form, and point-slope form
- Parallel and perpendicular lines
- Slope intercept form - $y = mx + b$
- Standard form - $Ax + By = C$
- Point slope form - $y - y_1 = m(x - x_1)$
- How to write linear equations and functions
- How to graph linear equations
- Whether a relation is a function
- The domain and range of a function
- How to use slope intercept form, standard form, and point slope form
- How to find and identify the slope and y-intercept of a linear function
- How to identify and graph horizontal and vertical lines
- How to identify parallel and perpendicular lines

Students will be able to ...

- Define relations, functions, domain, range, correlation, slope, and y-intercepts
- Calculate the slope of a line
- Find the rate of change from a graph
- Use slope-intercept form, standard form, and point-slope form
- Write linear equations in all forms and graph them
- Graph horizontal and vertical lines
- Write linear equations in function notation
- Describe and identify parallel and perpendicular lines
- Reason abstractly and quantitatively
- Construct viable mathematical arguments and critique the work of others
- Model with mathematics
- Use appropriate tools strategically
- Attend to precision
- Look for and make use of mathematical patterns

EVIDENCE OF LEARNING

Assessment:

What evidence will be collected and deemed acceptable to show that students truly “understand”?

- Unit tests, quizzes
- Open-ended problems that involve written responses
- Daily student work
- Student/group presentations
- Daily Homework

Learning Activities:

What differentiated learning experiences and instruction will enable all students to achieve the desired results?

- Mathematical investigations
- Fundraising activity
- Portfolio Activity
- Graphing Calculators maze activity

RESOURCES

Teacher Resources:

- Algebra Textbook: Teachers' Edition & accompanying softcover workbook
- Teacher developed worksheets and activities
- Teacher developed lecture presentation and guided notes
- Math websites interactive practice: Freckle, Khan Academy, Mathspace

Equipment Needed:

- Graphing calculators
- Projectors / Interactive Board / Document Camera
- Chromebook's
- Graph paper
- Rulers
- Tape measures
- Math manipulatives

RAHWAY PUBLIC SCHOOLS CURRICULUM

UNIT OVERVIEW TEMPLATE

Content Area: Algebra

Unit Title: Unit three- System of Equations and Inequalities

Target Course/Grade Level: Grade 9 Algebra

Unit Summary:

- Understand, explain, and solve systems of linear equations using three methods.
- Understand, explain, and solve systems of linear inequalities.

Approximate Length of Unit: 10 weeks

LEARNING TARGETS

NJ Student Learning Standards:

- A.APR.D: Rewrite rational expressions in different forms.
- A.APR.D-6: Rewrite simple rational expressions in different forms; write $a(x)/b(x)$ in the form $q(x) + r(x)/b(x)$, where $a(x)$, $b(x)$, $q(x)$, and $r(x)$ are polynomials with the degree of $r(x)$ less than the degree of $b(x)$, using inspection, long division, or, for the more complicated examples, a computer algebra system.
- A.APR.D-7: Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.
- A.CED.A-1: Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions
- A.CED.A-2: Create equations that describe numbers or relationships.
- A.CED.A.2: Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
- A.CED.A-3: Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.
- A.CED.A-4: Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.

21st Century Life and Career Skills:

- 9.1.8.PB.1: Predict future expenses or opportunities that should be included in the budget planning process.
- 9.1.8.PB.2: Explain how different circumstances can affect one's personal budget.
- 9.1.8.PB.3: Explain how to create budget that aligns with financial goals.
- 9.1.8.PB.4: Construct a simple personal savings and spending plan based on various sources of income and different stages of life (e.g. teenager, young adult, family).
- 9.1.12. C.1: Compare and contrast the financial benefits of different products and services offered by a variety of financial institutions.

Interdisciplinary Connections and Standards:

- L.KL.9–10.2. Apply knowledge of language to make effective choices for meaning, or style, and to comprehend more fully when reading, writing, speaking or listening.
- RI.AA.9–10.7. Describe and evaluate the argument and specific claims in an informational text, assessing whether the reasoning is valid and the evidence is relevant and sufficient; identify false statements and reasoning.
- 8.1.8.DA.1: Organize and transform data collected using computational tools to make it usable for a specific purpose
- 8.1.8.DA.2: Explain the difference between how the computer stores data as bits and how the data is displayed.
- 8.1.8.DA.3: Identify the appropriate tool to access data based on its file format.

Unit Understandings:

Students will understand that...

- A system of equations/inequalities includes two or more equations/inequalities in the same variables.
- A system of equations can be solved using three methods: graphing, substitution, and elimination.
- A system of equations may have one, none, or infinite solutions.

Unit Essential Questions:

- Given a system of equations, which method would best be used to solve the system?
- Will you get the same solution set if you solve a system using different methods?
- How can real world situations be modeled using systems of equations/inequalities?

Knowledge and Skills:

Students will know.....

- Systems of equations/inequalities
- Classifying systems: Consistent dependent system, consistent independent system, inconsistent system
- Graphing method, substitution method, and elimination method
- How to classify systems of equations
- How to solve systems of equations/inequalities

Students will be able to ...

- Classify systems of equations
- Graph systems of equations/inequalities
- Solve systems of equations using the three methods: graphing, substitution, and elimination
- Choose an appropriate method for solving a system of equations
- Solve real world problems using systems of equations/inequalities
- Reason abstractly and quantitatively
- Construct mathematical arguments and critique the work of others
- Model with mathematics
- Use appropriate tools strategically
- Attend to precision
- Look for patterns in the context of mathematical problem solving

EVIDENCE OF LEARNING

Assessment:

What evidence will be collected and deemed acceptable to show that students truly “understand”?

- Unit tests/quizzes
- Open-ended problems that involve written responses
- Daily student work
- Student/group presentations
- Daily Homework

Learning Activities:

What differentiated learning experiences and instruction will enable all students to achieve the desired results?

- *Mathematical investigations*
- *Fundraising activity*
- *Khan Academy, Freckle, and Mathspace*
- *Create real world situations in a word problem format and solve each other's problems*
- *Use real-world literal equations and solve them for a variable different than the one given (science formulas: density, Fahrenheit to Celsius, etc.)*

RESOURCES

Teacher Resources:

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Equipment Needed:

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