



Unit Calendar 2013-2014
 Green Brook Township School District
 / **Algebra A Curriculum (D) / Grade 7 (District Middle Curriculum)**

Tuesday, August 27, 2013, 1:12PM



	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Unit:	1	2 3 4 5 6 7 8 9	10 11	12 13	14 15 16 17 18 19 20 21	22 23 24 25 26 27 28 29 30	31	32 33 34 35 36 37 38 39		
<u>Algebra Fundamentals</u>	█									
<u>Solving Linear Equations</u>		█								
<u>Solving Linear Inequalities</u>			█	█						
<u>Graphing Linear Equations and Inequalities</u>				█	█					
<u>Writing Linear Equations</u>					█	█				
<u>Systems of Equations and Inequalities</u>						█	█			
<u>Geometry</u>							█	█	█	
<u>Probability and Data Analysis</u>									█	█
<u>Final Exam Review</u>										█
	1	2 3 4 5 6 7 8 9	10 11	12 13	14 15 16 17 18 19 20 21	22 23 24 25 26 27 28 29 30	31	32 33 34 35 36 37 38 39		

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Unit Map 2013-2014

Green Brook Township School District

/ **Algebra A Curriculum (D)** / Grade 7 (District Middle Curriculum)

Tuesday, August 27, 2013, 1:12PM

Green Brook Township
Public Schools

Unit: Algebra Fundamentals (Week 1, 4 Weeks) 📅 📌

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 7, Mathematical Practice

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- 1. Make sense of problems and persevere in solving them.
- 2. Reason abstractly and quantitatively.
- 3. Construct viable arguments and critique the reasoning of others.
- 4. Model with mathematics.
- 5. Use appropriate tools strategically.
- 6. Attend to precision.
- 7. Look for and make use of structure.
- 8. Look for and express regularity in repeated reasoning.

CommonCore: Mathematics, CommonCore: Grade 7, Ratios & Proportional Relationships

7.RP Analyze proportional relationships and use them to solve real-world and mathematical problems.

- 7.RP.1. Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.

CommonCore: Mathematics, CommonCore: Grade 7, The Number System

7.NS Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

- 7.NS.1b. Understand $p + q$ as the number located a distance $|q|$ from p , in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.
- 7.NS.2. Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.
- 7.NS.2a. Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.

- 7.NS.2b. Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$. Interpret quotients of rational numbers by describing real-world contexts.
- 7.NS.2d. Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.
- 7.NS.3. Solve real-world and mathematical problems involving the four operations with rational numbers.

CommonCore: Mathematics, CommonCore: Grade 7, Expressions & Equations

7.EE Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

- 7.EE.3. Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.

CommonCore: Mathematics, CommonCore: Grade 8, The Number System

8.NS Know that there are numbers that are not rational, and approximate them by rational numbers.

- 8.NS.1. Understand informally that every number has a decimal expansion; the rational numbers are those with decimal expansions that terminate in 0s or eventually repeat. Know that other numbers are called irrational.
- 8.NS.2. Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions

CommonCore: Mathematics, CommonCore: HS: Num/Quantity, Vector & Matrix Quantities

N-VM Perform operations on matrices and use matrices in applications.

- N-VM.6. (+) Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network.
- N-VM.7. (+) Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled.
- N-VM.8. (+) Add, subtract, and multiply matrices of appropriate dimensions.
- N-VM.9. (+) Understand that, unlike multiplication of numbers, matrix multiplication for square matrices is not a commutative operation, but still satisfies the associative and distributive properties.

CommonCore: Mathematics, CommonCore: HS: Algebra, Seeing Structure in Expressions

A-SSE Interpret the structure of expressions.

- A-SSE.1. Interpret expressions that represent a quantity in terms of its context.
- A-SSE.1a. Interpret parts of an expression, such as terms, factors, and coefficients.
- A-SSE.1b. Interpret complicated expressions by viewing one or more of their parts as a single entity.
- A-SSE.2. Use the structure of an expression to identify ways to rewrite it.

A-SSE Write expressions in equivalent forms to solve problems.

- A-SSE.3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.

CommonCore: Mathematics, CommonCore: HS: Algebra, Creating Equations

A-CED Create equations that describe numbers or relationships.

- A-CED.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.

Description of Unit

In this unit, students will review and build upon concepts covered in Pre-Algebra. These will include evaluating algebraic and numeric expressions using real numbers, applying the order of operations to solve problems, writing and translating algebraic expressions, finding absolute value, solving problems with integers and rational numbers, calculating unit rates, applying the distributive property, applying the properties of addition and multiplication, and finding square roots.

Essential Questions

1. What makes an algebraic algorithm both effective and efficient?
2. How can change be represented mathematically?

Knowledge

Students will know that:

1. Fractions and decimals can be used to represent the same number.
2. An exponent indicates repeated multiplication of a factor.
3. Verbal sentences can be translated into mathematical equations or inequalities.
4. Real numbers can be compared and ordered.
5. Properties of addition and multiplication can be used to simplify expressions.
6. Algebraic expressions can be evaluated.
7. Order of operations can be applied to simplify expressions.
8. Square roots can be rational or irrational.

Skills

Students will be able to:

- A. Evaluate algebraic expressions and use exponents.
- B. Use the order of operations to evaluate expressions.
- C. Translate verbal phrases into expressions.
- D. Translate verbal sentences into equations or inequalities.
- E. Graph and compare positive and negative numbers.
- F. Add, subtract, multiply, and divide positive and negative numbers.
- G. Apply the distributive property.
- H. Find square roots.
- I. Compare real numbers.

Assessments

Pre-Test
Diagnostic: Written Test

Students will take a pre-course pre-test.

Daily Warm-Up Problems

Diagnostic: Other written assessments

Students will complete daily warm-up problems to assess readiness.

Communicator Practice

Diagnostic: Other written assessments

Students will solve practice problems on communicators to receive immediate feedback.

Ticket to Leave Problems

Formative: Other written assessments

Students will complete one or two problems to assess knowledge and skills learned during the class period.

Quiz 1

Formative: Written Test

Students will take a quiz on using order of operations, translating expressions and writing equations and inequalities.

Quiz 2

Formative: Written Test

Students will take a quiz on using all four operations with real numbers.

Unit Test

Summative: Written Test

Students will take a test on all material covered in the unit.

Activities

Textbook Scavenger Hunt

Students will complete a scavenger hunt to become familiar with the textbook.

I Have, Who Has, Translating Verbal Expressions Game

Each student will get a card with either a verbal or algebraic expression on it. Students must match the verbal expression with the appropriate algebraic expression.

Real Number Bingo

Students will play bingo with a focus on solving problems with rational numbers and integers.

Activities to Differentiate Instruction

- Mixed-ability grouping
- Interactive Smart Board activities
- Multi-Step Problem Solving
- Math stations
- Cooperative learning
- Study guides (teacher and student completed)
- Modify tests and homework as needed
- Modified grading rubrics
- Graphic organizers
- Communicator response boards
- Extended response questions
- Challenge and enrichment homework, worksheets, and activity

Optional weekly challenge problems

Human Number Line

Each student will get a card with a real number on it. Students will have to get in order from least to greatest.

Graphic Organizer: Real Numbers

Students will complete a graphic organizer that organizes the real, rational, and whole numbers, and integers.

Four-Corners Mathematical Properties Game

Students are given a card with an expression on it. They must go to the appropriate wall or corner in the room where the name of the property it represents is listed.

Worksheet Races

Students will work in small groups to solve problems. They will check their answers with the teacher. The goal is to complete all problems accurately and as quickly as possible.

Modeling the Distributive Property

Students will model the distributive property using algebra tiles.

Patterns and Expressions Activity

Students will use an algebraic expression to describe geometric patterns.

Graphing Calculator Activity Using Order of Operations

Students will use the graphing calculator to evaluate the BMI (Body Mass Index) for men and women.

Enrichment Activity: Add, subtract, and multiply matrices

Matrix Magic

Students will perform all three operations using matrices.

 Order of Operations Activity

Integrated/Cross-Disciplinary Instruction

Resources

[McDougal Littell Algebra 1](#) textbook and resource materials
Website: www.classzone.com (see link)

[Kuta Software](#)

[Algebra with Pizzazz](#)

[Punchline Algebra](#)

[Smart Exchange Website](#) (see link)

[NJ Ask Review Workbook Grade 7](#)



[McDougal Littel website](#)



[Smart Exchange Website](#)

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Unit Map 2013-2014

Green Brook Township School District

/ **Algebra A Curriculum (D)** / Grade 7 (District Middle Curriculum)

Tuesday, August 27, 2013, 1:13PM

Green Brook Township
Public Schools

Unit: Solving Linear Equations (Week 5, 5 Weeks)

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 7, Mathematical Practice

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- 1. Make sense of problems and persevere in solving them.
- 2. Reason abstractly and quantitatively.
- 3. Construct viable arguments and critique the reasoning of others.
- 4. Model with mathematics.
- 5. Use appropriate tools strategically.
- 6. Attend to precision.
- 7. Look for and make use of structure.
- 8. Look for and express regularity in repeated reasoning.

CommonCore: Mathematics, CommonCore: Grade 7, Ratios & Proportional Relationships

7.RP Analyze proportional relationships and use them to solve real-world and mathematical problems.

- 7.RP.2. Recognize and represent proportional relationships between quantities.
- 7.RP.2a. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.
- 7.RP.2c. Represent proportional relationships by equations.
- 7.RP.3. Use proportional relationships to solve multistep ratio and percent problems.

CommonCore: Mathematics, CommonCore: Grade 7, Expressions & Equations

7.EE Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

- 7.EE.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.

CommonCore: Mathematics, CommonCore: Grade 7, Geometry

7.G Draw construct, and describe geometrical figures and describe the relationships between them.

- 7.G.1. Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.

CommonCore: Mathematics, CommonCore: Grade 8, Expressions & Equations

8.EE Analyze and solve linear equations and pairs of simultaneous linear equations.

- 8.EE.7. Solve linear equations in one variable.
- 8.EE.7a. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers).
- 8.EE.7b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.

CommonCore: Mathematics, CommonCore: HS: Algebra, Seeing Structure in Expressions

A-SSE Interpret the structure of expressions.

- A-SSE.1. Interpret expressions that represent a quantity in terms of its context.
- A-SSE.1a. Interpret parts of an expression, such as terms, factors, and coefficients.
- A-SSE.1b. Interpret complicated expressions by viewing one or more of their parts as a single entity.

CommonCore: Mathematics, CommonCore: HS: Algebra, Creating Equations

A-CED Create equations that describe numbers or relationships.

- A-CED.4. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.

CommonCore: Mathematics, CommonCore: HS: Algebra, Reasoning with Equations & Inequalities

A-RE I Understand solving equations as a process of reasoning and explain the reasoning.

- A-REI.1. Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

A-RE I Solve equations and inequalities in one variable.

- A-REI.3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

Description of Unit

In this unit on quantities and reasoning with equations, students will use properties of equality and the distributive property to solve one, two, and multi-step linear equations in one variable. These will include equations with variables on

Essential Questions

1. How can mathematical models be used to clarify mathematical relationships?
2. How can mathematical models be used to describe physical relationships?

both sides and equations with no real solutions or infinite solutions. They will write and solve proportions and apply them to percent problems and problems with similar figures. Students will finish the unit by rewriting equations and formulas.

Knowledge	Skills
<p>Students will know that:</p> <ol style="list-style-type: none"> 1. inverse operations can be used to solve equations. 2. a linear equation can have one solution, no solution, or infinite solutions. 3. two equal ratios form a proportion. 4. proportions can be solved using cross products. 5. similar figures are proportional. 6. scale models are used to represent life-sized models. 7. formulas are used to simplify and solve problems. 	<p>Students will be able to:</p> <ol style="list-style-type: none"> a. solve one, two, and multi-step equations. b. solve equations with variables on both sides. c. find ratios and write and solve proportions. d. solve proportions using cross products. e. use similar figures to solve problems. f. solve percent problems and percent application problems. g. solve percent of change problems. h. rewrite equations and formulas.
<p><u>Assessments</u></p>	
<p>Daily Warm-Up Problems Diagnostic: Other written assessments Students will complete daily warm-up problems to assess readiness.</p> <p>Communicator Practice Diagnostic: Other written assessments Students will solve practice problems on communicators to receive immediate feedback.</p> <p>Ticket to Leave Problems Formative: Other written assessments Students will complete one or two problems to assess knowledge and skills learned during the class period.</p> <p>Quiz 1 Formative: Written Test Students will solve one, two, and multi-step equations with variables on both sides (including those with no real solutions and infinite solutions).</p>	

Quiz 2

Formative: Written Test

Students will take a quiz on proportion and percent problems including percent of change and application problems.

Unit Test

Summative: Written Test

Students will complete a test on all topics covered in the unit.

Activities

Modeling One-Step Equations using Algebra Tiles

Students will use algebra tiles to model one-step equations using addition and subtraction.

Exploring Multi-step Equations Game

Students will play a game in small groups to practice solving equations.

Road Trip Project (with optional challenge questions)

Students will plan a road trip in the United States and will use their knowledge of scale and proportions to solve problems.

Kooshball Percent/Proportion Game

Students will play an interactive game with problems on percents and proportions.

Exploring Proportions in Similar Triangles Activity

Students will explore proportions that exist in similar triangles.

Capture-Recapture Activity

Students will complete an activity using dried beans to explore the capture-recapture method used with wildlife populations.

Investigating Percents of Change Activity

Students will compare their heart rate before and after exercising and calculate the percent of change.

 [Discovering Math: Ration and Proportions Video](#)

Activities to Differentiate Instruction

- Mixed-ability grouping
- Interactive Smart Board activities
- Multi-Step Problem Solving
- Math stations
- Cooperative learning
- Study guides (teacher and student completed)
- Modify tests and homework as needed
- Modified grading rubrics
- Graphic organizers
- Communicator response boards
- Extended response questions
- Challenge and enrichment homework and worksheets
- Optional weekly challenge problems

Integrated/Cross-Disciplinary Instruction	Resources
	<p>McDougal Littell Algebra 1 textbook and resource materials Website: www.classzone.com (see link)</p> <p>Kuta Software</p> <p>Algebra with Pizzazz</p> <p>Punchline Algebra</p> <p>Smart Exchange Website (see link)</p> <p>NJ Ask Review Workbook Grade 7</p> <p> McDougal Littel website</p> <p> Smart Exchange Website</p>

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Unit Map 2013-2014

Green Brook Township School District

/ **Algebra A Curriculum (D)** / Grade 7 (District Middle Curriculum)

Tuesday, August 27, 2013, 1:13PM

Green Brook Township
Public Schools

Unit: Solving Linear Inequalities (Week 10, 4 Weeks)

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 7, Mathematical Practice

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- 1. Make sense of problems and persevere in solving them.
- 2. Reason abstractly and quantitatively.
- 3. Construct viable arguments and critique the reasoning of others.
- 4. Model with mathematics.
- 5. Use appropriate tools strategically.
- 6. Attend to precision.
- 7. Look for and make use of structure.
- 8. Look for and express regularity in repeated reasoning.

CommonCore: Mathematics, CommonCore: Grade 7, Expressions & Equations

7.EE Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

- 7.EE.4b. Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p , q , and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem.

CommonCore: Mathematics, CommonCore: HS: Algebra, Creating Equations

A-CED Create equations that describe numbers or relationships.

- A-CED.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.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.

CommonCore: Mathematics, CommonCore: HS: Algebra, Reasoning with Equations & Inequalities

A-RE I Solve equations and inequalities in one variable.

- A-REI.3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

Description of Unit	Essential Questions
<p>In this unit, students will use properties of equality and the distributive property to solve one, two, and multi-step linear inequalities in one variable. These will include equations with variables on both sides and absolute value equations and compound inequalities using <i>and</i> or <i>or</i>. Students will also solve absolute value equations and inequalities in one variable.</p>	<ol style="list-style-type: none"> 1. How can mathematical models be used to clarify mathematical relationships? 2. How can mathematical models be used to describe physical relationships?
Knowledge	Skills
<p>Students will know that:</p> <ol style="list-style-type: none"> 1. linear inequalities can be solved by using the same steps used to solve linear equations. 2. linear inequalities are solved by using the properties of equality. 3. linear inequalities have an infinite number of solutions. 4. absolute value equations have two solutions. 	<p>Students will be able to:</p> <ol style="list-style-type: none"> a. solve single and multi-step inequalities. b. solve compound inequalities. c. solve absolute value equations. d. solve absolute value inequalities.
<u>Assessments</u>	
<p>Daily Warm-Up Problems Diagnostic: Other written assessments Students will complete daily warm-up problems to assess readiness.</p> <p>Communicator Practice Diagnostic: Other written assessments Students will solve practice problems on communicators to receive immediate feedback.</p> <p>Ticket to Leave Problems Formative: Other written assessments Students will complete one or two problems to assess knowledge and skills learned during the class period.</p>	

Inequalities Quiz

Formative: Written Test

Students will solve one, two, and multistep inequalities including compound inequalities.

Absolute Value Equations Quiz

Formative: Written Test

Students will take a quiz on solving absolute value equations.

Unit Test

Summative: Written Test

Students will complete a test on all topics covered in the unit.

Activities	Activities to Differentiate Instruction
<p><u>Matching Inequalities Game</u> Students will match inequalities with their correct solutions.</p> <p><u>Investigating Statements Using <i>And</i> or <i>Or</i></u> Students will use Venn diagrams to compare inequalities using <i>and</i> or <i>or</i>.</p> <p><u>Solve Compound Inequalities</u> Students will solve compound inequalities and use the graphing calculator to display the solutions.</p> <p><u>Modeling Graphs of Absolute Value Inequalities</u> Students will be given number cards and will determine if their number is a solution to the graph of an inequality.</p> <p> <u>Compound Inequalities Notes</u></p> <p> <u>Solving Multistep Inequalities Notes</u></p>	<p>Mixed-ability grouping Interactive Smart Board activities Multi-Step Problem Solving Math stations Cooperative learning Study guides (teacher and student completed) Modify tests and homework as needed Modified grading rubrics Graphic organizers Communicator response boards Extended response questions Challenge and enrichment homework and worksheets Optional weekly challenge problems</p>
Integrated/Cross-Disciplinary Instruction	Resources
	<p><u>McDougal Littell Algebra 1</u> textbook and resource materials Website: www.classzone.com (see link)</p>

[Kuta Software](#)

[Algebra with Pizzazz](#)

[Punchline Algebra](#)

[Smart Exchange Website](#) (see link)

[NJ Ask Review Workbook Grade 7](#)



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Unit Map 2013-2014

Green Brook Township School District

/ **Algebra A Curriculum (D)** / Grade 7 (District Middle Curriculum)

Tuesday, August 27, 2013, 1:13PM

Green Brook Township
Public Schools

Unit: Graphing Linear Equations and Inequalities (Week 14, 5 Weeks)  

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 7, Mathematical Practice

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- 1. Make sense of problems and persevere in solving them.
- 2. Reason abstractly and quantitatively.
- 3. Construct viable arguments and critique the reasoning of others.
- 4. Model with mathematics.
- 5. Use appropriate tools strategically.
- 6. Attend to precision.
- 7. Look for and make use of structure.
- 8. Look for and express regularity in repeated reasoning.

CommonCore: Mathematics, CommonCore: Grade 8, Functions

8.F Define, evaluate, and compare functions.

- 8.F.1. Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.
- 8.F.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.

8.F Use functions to model relationships between quantities.

- 8.F.4. Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.
- 8.F.5. Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.

CommonCore: Mathematics, CommonCore: HS: Algebra, Reasoning with Equations & Inequalities

A-RE I Represent and solve equations and inequalities graphically.

- A-REI.10. Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).
- A-REI.12. Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.

CommonCore: Mathematics, CommonCore: HS: Functions, Interpreting Functions

F-IF Understand the concept of a function and use function notation.

- F-IF.1. Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x . The graph of f is the graph of the equation $y = f(x)$.
- F-IF.2. Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.

F-IF Interpret functions that arise in applications in terms of the context.

- F-IF.5. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.
- F-IF.6. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

F-IF Analyze functions using different representations.

- F-IF.7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

Description of Unit

In this unit, students will identify the domain and range of a function. They will graph linear equations on the coordinate plane by making tables, using x-and y-intercepts, and using the slope and y-intercept. Students will interpret slope as a rate of change in real-world situations and explore how changing the slope and y-intercept changes the graph. They will use slope to identify parallel lines. Students will also graph linear inequalities in two variables. They will write and graph direct variation equations and use them to solve real-world problems. Students will graph absolute value functions.

Essential Questions

- How can change be best represented mathematically?
- How are patterns of change related to the behavior of functions?
- How can patterns, relations, and functions be used as tools to best describe and help explain real-life situations?
- Where are linear inequalities used in real-world situations?

Knowledge

Skills

Students will know that:

- 1) the Cartesian plane (coordinate plane) is comprised of an x-axis and y-axis.
- 2) the domain of a function is the set of all inputs
- 3) the range of a function is the set of all outputs
- 4) a relation represented by a graph is a function provided that no vertical line passes through more than one point on the graph
- 5) the intercepts of a graph are the locations where a line crosses the axes.
- 6) the slope of a non-vertical line is the ratio of the vertical change to the horizontal change between any two points on the line
- 7) slope intercept form is $y=mx+b$
- 8) parallel lines have the same slope
- 9) perpendicular lines have slopes that are opposite reciprocals
- 10) direct variation is an equation in the form $y=kx$
- 11) the graph of absolute value functions is in the shape of a "V"

Students will be able to:

- a) Identify and plot points on the coordinate plane
- b) Identify the domain and range of a function
- c) Use the vertical line test to identify functions on the coordinate plane
- d) Identify x-intercepts and y-intercepts
- e) Calculate slope of a line
- f) Graph linear equations using tables
- g) Graph linear equations in slope-intercept form
- h) Identify parallel and perpendicular lines given the slope
- i) Graph linear inequalities in two variables
- j) Identify and graph direct variation equations
- k) Solve for the constant of variation
- l) Graph absolute value functions

Assessments

Daily Do Now Problems

Diagnostic: Other written assessments

Students will complete daily Do Now problems to assess readiness.

Communicator Practice

Diagnostic: Other written assessments

Students will solve practice problems on communicators to receive immediate feedback.

Tickets to Leave

Formative: Other written assessments

One or two problems will be used to determine whether students mastered material taught during the lesson.

Quiz 1

Formative: Written Test

Students will take a quiz on domain and range, functions, and graphing linear using a table of values. Students will also identify and calculate the slope of a line and calculate intercepts.

Quiz 2

Formative: Written Test

Students will take a quiz on graphing equations using intercepts, graphing equations in slope-intercept form, parallel and perpendicular lines, and word problems.

Graphing Test

Summative: Written Test

Topics will include: Identifying domain and range, calculating slope, graphing equations using a table, graphing equations using intercepts, graphing equations in slope-intercept form, parallel and perpendicular lines, graphing inequalities in two variables, graphing direct variation equations, and graphing of absolute value functions.

Activities	Activities to Differentiate Instruction
<p><u>Intercepts Investigation</u> Students discover how to find intercepts of an equation by interpreting the meaning of the intercepts in the context of a real-world problem.</p> <p><u>Slope Activity</u> Students visualize the rise and the run of slope by creating a ramp using a ruler and textbooks. This leads to the algebraic representation of slope.</p> <p><u>Exploring Slope and Y-Intercept Investigation</u> Students use algebra to find the y-intercepts and slopes of equations and then compare their results to each equation to find that the y-intercept of a graph $y=mx+b$ is b and the slope is m.</p> <p><u>Stained Glass Window Activity</u> Students graph multiple linear equations in slope-intercept form on graph paper. The result is a stained glass design.</p> <p><u>Linear Inequality in Two Variables Investigation</u> Students will use knowledge of graphing equations and checking solutions to discover how to graph linear inequalities in two variables.</p> <p><u>Graphing Calculator Activity</u> Pairs of students will use graphing calculators to graph linear equations and inequalities and check answers to independent practice problems.</p>	<p>Interactive Smart Board Activities will be utilized.</p> <p>Students will work in mixed-level groups.</p> <p>Students will be assigned optional and mandatory challenge problems on homework assignments.</p> <p>Enrichment worksheets will be available for classwork and/or homework.</p> <p>Homework will be modified as needed.</p> <p>Guided notes and study guides will be provided accordingly.</p> <p>Modified versions of quizzes and tests will be distributed.</p> <p>Appropriately leveled problems for students to solve when participating in communicator practice will be provided.</p>

Absolute Value Graph Activity

Students will use TI-83 Graphing Calculators to graph absolute value functions.

Modeling Direct Variation Activity

Students will create a scatter plot of student standing height versus kneeling height to demonstrate direct variation.

Communicator Practice

Students will solve differentiated practice problems on SmartPal response boards.

-  Intercepts Investigation
-  Slope Activity
-  Slope and Y-Intercept Investigation
-  Stained Glass Window Activity
-  Direct Variation Investigation

Integrated/Cross-Disciplinary Instruction

Art History - As students investigate direct variation, they will acquire knowledge about Leonardo da Vinci and his study of human proportion to create more accurate drawings.

Technology - Students will utilize the TI-83 Plus graphing calculators.

Resources

McDougal Littell Algebra 1 textbook and resource materials

Kuta software

SmartExchange resources

 McDougal Littell Algebra 1

 SMART Exchange

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Atlas Version 7.2.6



Unit Map 2013-2014

Green Brook Township School District

/ **Algebra A Curriculum (D)** / Grade 7 (District Middle Curriculum)

Tuesday, August 27, 2013, 1:14PM

Green Brook Township
Public Schools

Unit: Writing Linear Equations (Week 19, 5 Weeks)

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 7, Mathematical Practice

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- 1. Make sense of problems and persevere in solving them.
- 2. Reason abstractly and quantitatively.
- 3. Construct viable arguments and critique the reasoning of others.
- 4. Model with mathematics.
- 5. Use appropriate tools strategically.
- 6. Attend to precision.
- 7. Look for and make use of structure.
- 8. Look for and express regularity in repeated reasoning.

CommonCore: Mathematics, CommonCore: HS: Algebra, Creating Equations

A-CED Create equations that describe numbers or relationships.

- A-CED.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.2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

CommonCore: Mathematics, CommonCore: HS: Functions, Interpreting Functions

F-IF Understand the concept of a function and use function notation.

- F-IF.2. Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.

Description of Unit

In this unit, students will write equations of lines in slope-intercept form given three situations: the slope and y-intercept;

Essential Questions

the slope and a point; or two points. They also write equations using a graph of the line or using real-world data. Students will write equations of lines in standard form, and they will use their equations to solve real-world problems. They will also write equations of lines parallel or perpendicular to a given line and use function notation. In addition, students will make scatter plots of data and use a line of fit to model and interpret the data. They will perform linear regression to find the best-fitting line for data and make predictions using the graph and the equation.

- How can mathematical models be used to clarify mathematical relationships?
- How can mathematical models be used to describe physical relationships?
- How can knowing the equation of a line help in decision-making?

Knowledge

Students will know that:

- 1) slope-intercept form of a line is $y = mx + b$
- 2) point-slope form of a line is $y - y_1 = m(x - x_1)$
- 3) standard form of a line is $Ax + By = C$
- 4) parallel lines have the same slope and perpendicular lines have negative reciprocal slopes
- 5) the symbol $f(x)$ is another name for y and is read as 'the value of f at x '
- 6) a line of fit is used to model the trend in data that shows a positive or negative correlation
- 7) a best-fitting line is a line that most closely follows a trend in data

Skills

Students will be able to:

- a) Write linear equations in slope-intercept form
- b) Write linear equations in point-slope form
- c) Write linear equations in standard form
- d) Write equations of parallel and perpendicular lines
- e) Write linear functions using function notation
- f) Solve for values of x or $f(x)$ using function notation
- g) Create scatter plots and write equations to model data
- h) Make predictions using best-fitting lines

Assessments

Daily Do Now Problems

Diagnostic: Other written assessments

Students will complete daily Do Now problems to assess readiness.

Communicator Practice

Diagnostic: Other written assessments

Students will solve practice problems on communicators to receive immediate feedback.

Tickets to Leave

Formative: Other written assessments

One or two problems will be used to determine whether students mastered material taught during the lesson.

Homework

Formative: Other written assessments

Students will complete daily homework assignments to reinforce concepts and skills used in class.

Writing Equations Quiz

Formative: Written Test

Students will take a quiz on writing equations in slope-intercept form given the slope and y-intercept, a graph, a table, a real-world situation, the slope and a point, and two points; writing equations in point-slope form given the slope and a point, and two points; word problems.

Writing Equations Test

Summative: Written Test

Topics will include: writing equations in slope-intercept form, point-slope form, and standard form; parallel and perpendicular lines; function notation; creating scatter plots and equations of lines of best fit.

Activities	Activities to Differentiate Instruction
<p><u>Point-Slope Activity</u> Students will work with equations in point-slope form to discover that the line passes through (x_1, y_1) and has a slope of m.</p> <p><u>Graphs of Equations in Standard Form Activity</u> Students will discover how to identify equivalent equations from standard form.</p> <p><u>Writing Linear Equations Tic-Tac-Toe</u> Students play a game of tic-tac-toe in pairs by correctly solving problems that practice writing linear equations.</p> <p><u>Linear Equation Bull's Eye Worksheet</u> Students will complete a worksheet that reviews and makes connections between slope-intercept form, standard form, and x-intercepts.</p> <p><u>Food Preference Correlation Activity</u> Students will compare favorite foods in partners to create and analyze a scatter plot.</p> <p><u>Cell Phone Scatter Plot Activity</u> Students will use a scatter plot to create an equation and make predictions.</p>	<p>Interactive Smart Board Activities will be utilized.</p> <p>Students will work in mixed-level groups.</p> <p>Students will be assigned optional and mandatory challenge problems on homework assignments.</p> <p>Enrichment worksheets will be available for classwork and/or homework.</p> <p>Homework will be modified as needed.</p> <p>Self-selection of problem-solving strategy.</p> <p>Guided notes and study guides will be provided accordingly.</p> <p>Modified versions of quizzes and tests will be distributed.</p> <p>Appropriately leveled problems for students to solve when participating in communicator practice will be provided.</p> <p>Tic Tac Toe game consists of tiered levels.</p>

Fuel Consumption Scatter Plot Class Activity

The class will predict future fuel consumption from given data using a table and compare their prediction with that of a linear model.

Communicator Practice

Students will solve differentiated practice problems on SmartPal response boards.

-  Point-Slope Activity
-  Standard Form Activity
-  Tic Tac Toe Boards
-  Bull's Eye Worksheet

Integrated/Cross-Disciplinary Instruction

Technology - An excel spreadsheet will be utilized and projected on the Smart Board to complete the Fuel Consumption Activity.

Resources

- McDougal Littell Algebra 1 textbook and resource materials
- Kuta software
- SmartExchange resources
-  McDougal Littell Algebra 1
-  SMART Exchange

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Last Updated: Wednesday, August 15, 2012, 11:54AM



Unit Map 2013-2014

Green Brook Township School District

/ **Algebra A Curriculum (D)** / Grade 7 (District Middle Curriculum)

Tuesday, August 27, 2013, 1:14PM

Green Brook Township
Public Schools

Unit: Systems of Equations and Inequalities (Week 24, 4 Weeks) 📅 📄

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 7, Mathematical Practice

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- 1. Make sense of problems and persevere in solving them.
- 2. Reason abstractly and quantitatively.
- 3. Construct viable arguments and critique the reasoning of others.
- 4. Model with mathematics.
- 5. Use appropriate tools strategically.
- 6. Attend to precision.
- 7. Look for and make use of structure.
- 8. Look for and express regularity in repeated reasoning.

CommonCore: Mathematics, CommonCore: Grade 8, Expressions & Equations

8.EE Analyze and solve linear equations and pairs of simultaneous linear equations.

- 8.EE.8. Analyze and solve pairs of simultaneous linear equations.
- 8.EE.8a. Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.
- 8.EE.8b. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. For example, $3x + 2y = 5$ and $3x + 2y = 6$ have no solution because $3x + 2y$ cannot simultaneously be 5 and 6.
- 8.EE.8c. Solve real-world and mathematical problems leading to two linear equations in two variables. For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.

CommonCore: Mathematics, CommonCore: HS: Algebra, Creating Equations

A-CED Create equations that describe numbers or relationships.

- A-CED.2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

- A-CED.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.

CommonCore: Mathematics, CommonCore: HS: Algebra, Reasoning with Equations & Inequalities

A-RE I Solve systems of equations.

- A-REI.5. Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.
- A-REI.6. Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

A-RE I Represent and solve equations and inequalities graphically.

- A-REI.10. Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).
- A-REI.11. Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.
- A-REI.12. Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.

Description of Unit	Essential Questions
<p>In this unit, students learn various methods for solving systems of equations: by graphing and finding the point where the lines intersect (graphing method), by solving one equation for one of the variables and substituting it into the other equation (substitution method), and by combining the equations to eliminate one of the variables (elimination method). Students also examine special cases where a system has no solution or infinitely many solutions. Students will also solve systems of linear inequalities through graphing.</p>	<ul style="list-style-type: none"> • How can we model a real-life situation using a system of equations? • How can we construct equations in order to solve a real-world problem? • What types of real-world problems can be solved using a system of linear equations?
Knowledge	Skills
<p>Students will know that:</p> <p>1) a system of linear equations consists of two or more linear equations in the same variables</p>	<p>Students will be able to:</p> <p>a) Check solutions to systems algebraically b) Solve systems by graphing</p>

- 2) the point of intersection on a graph is the solution to a system
- 3) the substitution method is useful when a coefficient is one or negative one
- 4) the elimination method is useful when all coefficients are different from one
- 5) a system of parallel lines has no solution
- 6) a system of the same line has infinitely many solutions
- 7) the graph of a system of linear inequalities is the intersection of the half-planes of each inequality in the system

- c) Solve systems by substitution
- d) Solve systems by elimination
- e) Solve systems by arranging like terms and by multiplying first
- f) Solve special types of linear systems
- g) Write and solve linear systems from word problems
- h) Solve systems of linear inequalities

Assessments

Daily Do Now Problems

Diagnostic: Other written assessments

Students will complete daily Do Now problems to assess readiness.

Communicator Practice

Diagnostic: Other written assessments

Students will solve practice problems on communicators to receive immediate feedback.

Tickets to Leave

Formative: Other written assessments

Students will complete one or two problems to assess knowledge and skills learned during the class period.

Homework

Formative: Narrative Writing Assignment

Students will complete daily homework assignments to reinforce concepts and skills used in class.

Systems of Equations Quiz

Formative: Written Test

Students will take a quiz to assess their understanding of solving systems using three methods - graphing, substitution, and elimination.

Systems of Equations Test

Summative: Written Test

Topics will include: solving systems by graphing, substitution, and elimination including those that are special cases; solving word problems using systems; solving systems of inequalities.

Unit Project

Summative: Other written assessments

Students will demonstrate their understanding of linear systems by creating their own short story that incorporates a system of linear equations. They will create their problem and solve it using all three methods: graphing, substitution, and elimination.

Unit Project

Activities	Activities to Differentiate Instruction
<p><u>Linear Systems Investigation Activity</u> Students will be introduced to systems of linear equations and their solutions using a table.</p> <p><u>Amusement Park Activity</u> Students work to interpret the best admission and ride package by graphing a system of linear equations.</p> <p><u>Solve Systems using Substitution Activity</u> Students are introduced to the substitution method using real-life context.</p> <p><u>Math Sprints</u> Students will work in pairs to solve sets of systems and race their classmates to complete all sets.</p> <p><u>System Partner Practice</u> Students will complete a two-columned worksheet whose parallel problems yield the same answers and self-check their work.</p> <p><u>Word Problem Box Activity</u> Students will solve a word problem by writing a system of equations and using all three methods to solve it.</p> <p><u>Battleship Review</u> Students will work in pairs to solve systems by playing a game of battleship.</p> <p><u>Communicator Practice</u> Students will solve differentiated practice problems on SmartPal response boards.</p>	<p>Interactive Smart Board Activities will be utilized.</p> <p>Students will work in mixed-level groups.</p> <p>Students will be assigned optional and mandatory challenge problems on homework assignments.</p> <p>Enrichment worksheets will be available for classwork and/or homework.</p> <p>Homework will be modified as needed.</p> <p>Guided notes and study guides will be provided accordingly.</p> <p>Modified versions of quizzes and tests will be distributed.</p> <p>Self-selection of problem-solving strategy</p> <p>Appropriately leveled problems for students to solve when participating in communicator practice will be provided.</p> <p>Math Sprints - tiered levels of cards</p>

-  [Math Sprints](#)
-  [Word Problem Box Activity](#)
-  [Battleship Review](#)
-  [Substitution Activity](#)

Integrated/Cross-Disciplinary Instruction	Resources
<p>Language Arts Literacy - Students will use writing skills when creating their story for their word problems for the System of Equations Unit Project.</p>	<p>McDougal-Littell Algebra 1 textbook and resource materials</p> <p>Kuta software</p> <p>SmartExchange resources</p> <p> McDougal Littell Algebra 1</p> <p> SMART Exchange</p>

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Unit Map 2013-2014

Green Brook Township School District

/ **Algebra A Curriculum (D)** / Grade 7 (District Middle Curriculum)

Tuesday, August 27, 2013, 1:15PM

Green Brook Township
Public Schools

Unit: Geometry (Week 28, 4 Weeks) 📅 📄

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 7, Mathematical Practice

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- 1. Make sense of problems and persevere in solving them.
- 2. Reason abstractly and quantitatively.
- 3. Construct viable arguments and critique the reasoning of others.
- 4. Model with mathematics.
- 5. Use appropriate tools strategically.
- 6. Attend to precision.
- 7. Look for and make use of structure.
- 8. Look for and express regularity in repeated reasoning.

CommonCore: Mathematics, CommonCore: Grade 7, Geometry

7.G Draw construct, and describe geometrical figures and describe the relationships between them.

- 7.G.1. Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.
- 7.G.2. Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.
- 7.G.3. Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.

7.G Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

- 7.G.4. Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.
- 7.G.5. Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.
- 7.G.6. Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

CommonCore: Mathematics, CommonCore: Grade 8, Geometry

8.G Understand congruence and similarity using physical models, transparencies, or geometry software.

- 8.G.1. Verify experimentally the properties of rotations, reflections, and translations:
- 8.G.3. Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
- 8.G.5. Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.

8.G Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.

- 8.G.9. Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.

Description of Unit	Essential Questions
<p>In this unit, students will learn and classify the basic figures of geometry. They will be able to identify special pairs of angles, lines, and angle measurements and apply these concepts to classify triangles and quadrilaterals. Students will name corresponding parts of polygons as well as congruent parts. They will also study transformations and learn about space figures and identify the given nets. In addition, they will find the area, volume and surface area of geometric and irregular figures. Students will also convert customary and metric units of measurements.</p>	<ul style="list-style-type: none"> • What are the connections between Algebra and Geometry? • Is it important to have precise measurements? • How can geometric relationships help to solve problems and/or make sense of phenomena? • What situations can be analyzed using transformations and symmetries?
Knowledge	Skills
<p>Students will know that:</p> <ol style="list-style-type: none"> 1) the sum of complementary angles is 90° 2) the sum of supplementary angles is 180° 3) vertical angles are opposite from one another and congruent 4) corresponding angles occupy the same relative position when parallel lines are cut by a transversal 5) both alternate interior and alternate exterior angles are congruent 6) missing angles can be found by using the properties of angle relationships such as complementary, supplementary, 	<p>Students will be able to:</p> <ol style="list-style-type: none"> a) Classify basic geometric figures, lines, and angles b) Identify supplementary, complementary, and vertical angles c) Recognize angle relationships and use their properties to find missing angles d) Identify special angles given parallel lines cut by a transversal e) Find the sum of interior and exterior angles measures in a polygon f) Identify polygons and 3D shapes

vertical, corresponding, alternate interior, and alternate exterior angles
 7) the sum of interior angles of a polygon can be found using the formula $(n-2) \times 180$
 8) transformations include translations, reflections, rotations, and dilations
 9) area calculates the space inside a two-dimensional figure
 10) surface area is the sum of the exterior area of a three-dimensional solid
 11) volume calculates the space inside a three-dimensional figure
 12) the metric system uses base ten units

g) Complete transformations of geometric figures on the coordinate plane
 h) Identify lines of symmetry and rotational symmetry
 i) Classify triangles and quadrilaterals
 j) Calculate area of parallelograms, triangles, trapezoids, circles, and irregular figures
 k) Calculate circumference of circles
 l) Calculate volume of prisms, cylinders, spheres, pyramids, and cones
 m) Calculate surface area of rectangular prisms and cylinders
 n) Convert customary and metric units

Assessments

Daily Do Now Problems

Diagnostic: Other written assessments

Students will complete daily Do Now problems to assess readiness.

Tickets to Leave

Formative: Other written assessments

One or two problems will be used to determine whether students mastered material taught during the lesson.

Communicator Practice

Diagnostic: Other written assessments

Students will solve practice problems on communicators to receive immediate feedback.

Angles Quiz

Formative: Written Test

Students will take a quiz to demonstrate understanding of angle relationships and interior angles of polygons.

Transformations Quiz

Formative: Written Test

Students will take a quiz to demonstrate understanding of translations, reflections, rotations, and dilations.

Geometry Test

Summative: Written Test

Topics will include: angle relationships, polygons, transformations, area, surface area, volume, and measurement.

Activities

Activities to Differentiate Instruction

Sum of Interior Angles Investigation

Students will use protractors to measure the sum of interior angles of polygons and use their data to complete a table.

Tessellation Activity

Students will cut index cards to create a unique shape and use it to create a tessellation.

NJASK Preparation Packet

Students will work in pairs to work through sample NJASK geometry problems in preparation for the state testing.

Reflections Investigation

Students will reflect given figures about the x-axis, record the images' coordinates, and look for a pattern among the new and original coordinates. Repeat for y-axis.

Communicator Practice

Students will solve differentiated practice problems on SmartPal response boards.

 Transformations Guided Notes

Interactive Smart Board Activities will be utilized.

Students will work in mixed-level groups.

Students will be assigned optional and mandatory challenge problems on homework assignments.

Enrichment worksheets will be available for classwork and/or homework.

Homework will be modified as needed.

Guided notes and study guides will be provided accordingly.

Modified versions of quizzes and tests will be distributed.

Appropriately leveled problems for students to solve when participating in communicator practice will be provided.

Integrated/Cross-Disciplinary Instruction

Science - students should be familiar with the metric system and its applications from their science classes.

Resources

McDougal-Littell Algebra 1 textbook and resource materials

Kuta Software

Smart Exchange resources

NJASK Review Workbook Grade 7

NJASK Reference Sheet Grade 7

 McDougall Littell Algebra 1

 SMART Exchange

 NJASK Reference



Unit Map 2013-2014

Green Brook Township School District

/ **Algebra A Curriculum (D)** / Grade 7 (District Middle Curriculum)

Tuesday, August 27, 2013, 1:15PM

Green Brook Township
Public Schools

Unit: Probability and Data Analysis (Week 32, 5 Weeks)  

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 6, Statistics & Probability

6.SP Summarize and describe distributions.

- 6.SP.4. Display numerical data in plots on a number line, including dot plots, histograms, and box plots.

CommonCore: Mathematics, CommonCore: Grade 7, Mathematical Practice

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- 1. Make sense of problems and persevere in solving them.
- 2. Reason abstractly and quantitatively.
- 3. Construct viable arguments and critique the reasoning of others.
- 4. Model with mathematics.
- 5. Use appropriate tools strategically.
- 6. Attend to precision.
- 7. Look for and make use of structure.
- 8. Look for and express regularity in repeated reasoning.

CommonCore: Mathematics, CommonCore: Grade 7, Statistics & Probability

7.SP Use random sampling to draw inferences about a population.

- 7.SP.1. Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.
- 7.SP.2. Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions.

7.SP Draw informal comparative inferences about two populations.

- 7.SP.3. Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability.

- 7.SP.4. Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.

7.SP Investigate chance processes and develop, use, and evaluate probability models.

- 7.SP.5. Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.
- 7.SP.6. Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability.
- 7.SP.7. Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.
- 7.SP.7a. Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events.
- 7.SP.7b. Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process.
- 7.SP.8. Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.
- 7.SP.8a. Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.
- 7.SP.8b. Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event.
- 7.SP.8c. Design and use a simulation to generate frequencies for compound events.

Description of Unit

In this unit, students will understand that statistics can be used to gain information about a population. They will find probabilities of simple and compound events by determining if the events are mutually exclusive or overlapping, or whether the events are dependent or independent. Students will use measures of central tendency to describe a population. Different forms of data representation will be created and analyzed including; stem-and-leaf plots, box-and-whisker plots, frequency tables, histograms, line graphs, bar graphs, and circle graphs.

Essential Questions

1. How can mathematical models be used to clarify mathematical relationships?
2. How can mathematical models be used to describe physical relationships?
3. How can you determine which type of display to use with a set of data?

Knowledge

Skills

<p>Students will know that:</p> <ol style="list-style-type: none"> 1. the probability of a chance event is between 0 and 1. 2. probability can be dependent or independent. 3. probability can be simple or compound. 4. a simulation can be used to represent a real-life event. 5. a biased sample has a population that is over- or under-represented. 6. measures of central tendency and dispersion are used to describe a set of data. 7. different data displays are used to represent different types of data. 8. data displays can be misleading. 	<p>Students will be able to:</p> <ol style="list-style-type: none"> a. find sample spaces. b. calculate probabilities of simple and compound events. c. develop a probability model and use it to find probabilities of events. d. use organized lists, tree diagrams, and tables to find probabilities of compound events. e. use sample data to make inferences about a population. f. compare measures of central tendency and dispersion. g. make and interpret the following: stem-and-leaf plots, box-and-whisker plots, frequency tables, histograms, line graphs, bar graphs, and circle graphs.
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<p><u>Assessments</u></p>	
<p>Daily Warm-up Problems Diagnostic: Other written assessments Students will complete daily warm-up problems to assess readiness</p>	
<p>Communicator Practice Diagnostic: Other written assessments Students will solve practice problems on communicators to receive immediate feedback.</p>	
<p>Ticket to Leave Problems Formative: Other written assessments Students will complete one or two problems to assess knowledge and skills learned during the class period.</p>	
<p>Probability Quiz Formative: Written Test Topics will include simple and compound probability and dependent and independent events.</p>	
<p>Unit Test Summative: Written Test Students will take a test on all topics covered in the unit.</p>	

<p>Activities</p> <p><u>2-Dice Sum Game</u> Students will play the 2-Dice Sum Game to learn about probabilities and sample spaces.</p>	<p>Activities to Differentiate Instruction</p> <p>Mixed-ability grouping Interactive Smart Board activities Multi-Step Problem Solving</p>
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<p><u>Finding Probabilities of Compound Events</u> Students will use Venn diagrams to find probabilities.</p> <p> <u>sample and misleading graphs.notebook</u>  <u>Independent Dependent events_G7.notebook</u></p>	<p>Math stations Cooperative learning Study guides (teacher and student completed) Modify tests and homework as needed Modified grading rubrics Graphic organizers Communicator response boards Extended response questions Challenge and enrichment homework and worksheets Optional weekly challenge problems</p>
<p>Integrated/Cross-Disciplinary Instruction</p>	<p>Resources</p> <p><u>McDougal Littell Algebra 1</u> textbook and resource materials Website: www.classzone.com (see link)</p> <p><u>Kuta Software</u></p> <p><u>Algebra with Pizzazz</u></p> <p><u>Punchline Algebra</u></p> <p><u>Smart Exchange Website</u> (see link)</p> <p><u>Grade 7 Ask Math Workbook</u></p> <p> <u>Discovering Math: Intermediate: Statistics and Data Analysis Video</u>  <u>www.classzone.com</u>  <u>http://exchange.smarttech.com/#tab=0</u></p>

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Unit Map 2013-2014

Green Brook Township School District

/ **Algebra A Curriculum (D)** / Grade 7 (District Middle Curriculum)

Tuesday, August 27, 2013, 1:16PM

Green Brook Township
Public Schools

Unit: Final Exam Review (Week 37, 3 Weeks) 📅 📌

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 7, Mathematical Practice

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- 1. Make sense of problems and persevere in solving them.
- 2. Reason abstractly and quantitatively.
- 3. Construct viable arguments and critique the reasoning of others.
- 4. Model with mathematics.
- 5. Use appropriate tools strategically.
- 6. Attend to precision.
- 7. Look for and make use of structure.
- 8. Look for and express regularity in repeated reasoning.

CommonCore: Mathematics, CommonCore: Grade 7, Ratios & Proportional Relationships

7.RP Analyze proportional relationships and use them to solve real-world and mathematical problems.

- 7.RP.1. Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.
- 7.RP.2. Recognize and represent proportional relationships between quantities.
- 7.RP.2b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
- 7.RP.3. Use proportional relationships to solve multistep ratio and percent problems.

CommonCore: Mathematics, CommonCore: Grade 7, The Number System

7.NS Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

- 7.NS.1b. Understand $p + q$ as the number located a distance $|q|$ from p , in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.

- 7.NS.1c. Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.
- 7.NS.1d. Apply properties of operations as strategies to add and subtract rational numbers.
- 7.NS.2. Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.
- 7.NS.2a. Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.
- 7.NS.2b. Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$. Interpret quotients of rational numbers by describing real-world contexts.
- 7.NS.2c. Apply properties of operations as strategies to multiply and divide rational numbers.
- 7.NS.2d. Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.
- 7.NS.3. Solve real-world and mathematical problems involving the four operations with rational numbers.

CommonCore: Mathematics, CommonCore: Grade 7, Expressions & Equations

7.EE Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

- 7.EE.3. Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.
- 7.EE.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.
- 7.EE.4b. Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p , q , and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem.

CommonCore: Mathematics, CommonCore: Grade 7, Geometry

7.G Draw, construct, and describe geometrical figures and describe the relationships between them.

- 7.G.1. Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.

CommonCore: Mathematics, CommonCore: Grade 8, The Number System

8.NS Know that there are numbers that are not rational, and approximate them by rational numbers.

- 8.NS.1. Understand informally that every number has a decimal expansion; the rational numbers are those with decimal expansions that terminate in 0s or eventually repeat. Know that other numbers are called irrational.
- 8.NS.2. Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions

CommonCore: Mathematics, CommonCore: Grade 8, Expressions & Equations

8.EE Analyze and solve linear equations and pairs of simultaneous linear equations.

- 8.EE.7. Solve linear equations in one variable.
- 8.EE.7a. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers).
- 8.EE.7b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.
- 8.EE.8. Analyze and solve pairs of simultaneous linear equations.
- 8.EE.8a. Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.
- 8.EE.8b. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. For example, $3x + 2y = 5$ and $3x + 2y = 6$ have no solution because $3x + 2y$ cannot simultaneously be 5 and 6.
- 8.EE.8c. Solve real-world and mathematical problems leading to two linear equations in two variables. For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.

CommonCore: Mathematics, CommonCore: Grade 8, Functions

8.F Define, evaluate, and compare functions.

- 8.F.1. Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.
- 8.F.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.

8.F Use functions to model relationships between quantities.

- 8.F.4. Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.
- 8.F.5. Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.

CommonCore: Mathematics, CommonCore: HS: Num/Quantity, Vector & Matrix Quantities

N-VM Perform operations on matrices and use matrices in applications.

- N-VM.6. (+) Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network.
- N-VM.7. (+) Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled.

- N-VM.8. (+) Add, subtract, and multiply matrices of appropriate dimensions.
- N-VM.9. (+) Understand that, unlike multiplication of numbers, matrix multiplication for square matrices is not a commutative operation, but still satisfies the associative and distributive properties.

CommonCore: Mathematics, CommonCore: HS: Algebra, Seeing Structure in Expressions

A-SSE Interpret the structure of expressions.

- A-SSE.1. Interpret expressions that represent a quantity in terms of its context.
- A-SSE.1a. Interpret parts of an expression, such as terms, factors, and coefficients.
- A-SSE.1b. Interpret complicated expressions by viewing one or more of their parts as a single entity.
- A-SSE.2. Use the structure of an expression to identify ways to rewrite it.

A-SSE Write expressions in equivalent forms to solve problems.

- A-SSE.3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.

CommonCore: Mathematics, CommonCore: HS: Algebra, Creating Equations

A-CED Create equations that describe numbers or relationships.

- A-CED.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.2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
- A-CED.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.4. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.

CommonCore: Mathematics, CommonCore: HS: Algebra, Reasoning with Equations & Inequalities

A-RE I Understand solving equations as a process of reasoning and explain the reasoning.

- A-REI.1. Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

A-RE I Solve equations and inequalities in one variable.

- A-REI.3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

A-RE I Solve systems of equations.

- A-REI.5. Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.

- A-REI.6. Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

A-RE I Represent and solve equations and inequalities graphically.

- A-REI.10. Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).
- A-REI.11. Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.
- A-REI.12. Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.

CommonCore: Mathematics, CommonCore: HS: Functions, Interpreting Functions

F-IF Understand the concept of a function and use function notation.

- F-IF.1. Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x . The graph of f is the graph of the equation $y = f(x)$.
- F-IF.2. Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.

F-IF Interpret functions that arise in applications in terms of the context.

- F-IF.4. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
- F-IF.5. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.
- F-IF.6. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

F-IF Analyze functions using different representations.

- F-IF.7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

Description of Unit

In this unit, students will review for the Algebra A Final Exam. Review for the exam will include guided and independent

Essential Questions

1. How does algebra assist in making decisions?
2. How is algebra used in real-world applications?

practice. Students will also participate in other review activities, such as games and stations.

<p>Knowledge</p>	<p>Skills</p>
<p>Students will know that:</p> <ol style="list-style-type: none"> 1. equations can be solved by using properties of equality. 2. linear equations have three forms (slope-intercept, point-slope, and standard). 3. linear inequalities have an infinite number of solutions. 4. absolute value equations have two solutions. 5. systems of equations can be solve using graphing, substitution, and elimination methods. 	<p>Students will be able to:</p> <ol style="list-style-type: none"> a. write and solve simple and multi-step linear equations. b. write and solve simple and compound linear inequalities. c. write linear equations in slope-intercept, point-slope, and standard form. d. graph linear equations. e. graph linear inequalities in two variables. d. solve systems of equations.
<p><u>Assessments</u></p>	
<p>Daily Warm-Up Problems Diagnostic: Other written assessments Students will complete daily warm-up problems to assess readiness.</p> <p>Communicator Practice Diagnostic: Other written assessments Students will solve practice problems on communicators to receive immediate feedback.</p> <p>Ticket to Leave Problems Formative: Other written assessments Students will complete one or two problems to assess knowledge and skills learned during the class period.</p> <p>Algebra A Final Exam Summative: Written Test</p>	
<p>Activities</p>	<p>Activities to Differentiate Instruction</p>
<p><u>Worksheet Races</u> Students will complete practice problems in groups.</p> <p><u>Math Stations</u> Students will work in different review stations to cooperatively practice problems.</p>	<p>Mixed-ability grouping Interactive Smart Board activities Multi-Step Problem Solving Math stations Cooperative learning Study guides (teacher and student completed)</p>

<p><u>Communicator Practice</u></p> <p><u>Student-Led Lessons</u> Students will work cooperatively to present a review topic to the class.</p>	<p>Modify homework as needed Graphic organizers Communicator response boards Extended response questions Challenge and enrichment homework and worksheets Optional weekly challenge problems</p>
<p>Integrated/Cross-Disciplinary Instruction</p>	<p>Resources</p>
	<p><u>McDougal Littel Algebra 1</u> textbook and resource materials Website: www.classzone.com (see link)</p> <p><u>Kuta Software</u></p> <p><u>Algebra with Pizzazz</u></p> <p><u>Punchline Algebra</u></p> <p><u>Smart Exchange Website</u> (see link)</p>

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