



Unit Calendar 2013-2014
Green Brook Township School District
/ *Pre-Algebra Curriculum (D)* / Grade 6 (District Middle Curriculum)

Tuesday, August 27, 2013, 11:58AM



	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>Variables, Expressions, and Integers</u>	■									
<u>Solving Algebraic Equations</u>		■ ■								
<u>Decimals and Inequalities</u>			■ ■ ■							
<u>Fractions, Factors and Exponents</u>			■ ■ ■ ■	■						
<u>Rational Numbers, Operations and Equations</u>				■ ■ ■ ■						
<u>Ratio, Proportion and Probability</u>					■ ■ ■ ■					
<u>Percents</u>					■ ■ ■ ■ ■					
<u>Measurement, Area, and Volume</u>						■ ■ ■ ■ ■				
<u>Angle Relationships and Transformations</u>							■ ■ ■			
<u>Data Analysis and Probability</u>								■ ■ ■ ■ ■		
<u>Radicals, Systems of Measurement, NJASK</u>									■ ■ ■ ■ ■	
<u>Linear Functions and Final Exam</u>										■ ■ ■ ■ ■
<u>Polynomials</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									

Last Updated: Friday, October 26, 2012, 10:39AM



Unit Map 2013-2014

Green Brook Township School District

/ **Pre-Algebra Curriculum (D)** / Grade 6 (District Middle Curriculum)

Tuesday, August 27, 2013, 12:01PM

Green Brook Township
Public Schools

Unit: Variables, Expressions, and Integers (Week 1, 3 Weeks)  

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 6, 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.
- 3. Construct viable arguments and critique the reasoning of others.
- 4. Model with mathematics.

CommonCore: Mathematics, CommonCore: Grade 6, The Number System

6. NS Compute fluently with multi-digit numbers and find common factors and multiples.

- 6.NS.2. Fluently divide multi-digit numbers using the standard algorithm.

6.NS Apply and extend previous understandings of numbers to the system of rational numbers.

- 6.NS.5. Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.
- 6.NS.6a. Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., $-(-3) = 3$, and that 0 is its own opposite.
- 6.NS.6b. Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.
- 6.NS.6c. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.
- 6.NS.7. Understand ordering and absolute value of rational numbers.
- 6.NS.7b. Write, interpret, and explain statements of order for rational numbers in real-world contexts.
- 6.NS.7c. Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation.
- 6.NS.7d. Distinguish comparisons of absolute value from statements about order.

- 6.NS.8. Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.

CommonCore: Mathematics, CommonCore: Grade 6, Expressions & Equations

6.EE Apply and extend previous understandings of arithmetic to algebraic expressions.

- 6.EE.1. Write and evaluate numerical expressions involving whole-number exponents.
- 6.EE.2. Write, read, and evaluate expressions in which letters stand for numbers.
- 6.EE.2a. Write expressions that record operations with numbers and with letters standing for numbers.
- 6.EE.2b. Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity.
- 6.EE.2c. Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).
- 6.EE.3. Apply the properties of operations to generate equivalent expressions.
- 6.EE.4. Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them).

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.1. Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.
- 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.

Description of Unit

This unit will focus on the basics of Algebra through the forming of algebraic expressions and equations. Students will evaluate expressions and perform operations on real numbers using order of operations. They will use a problem-solving plan and equations to solve real-world problems involving order and real numbers. Students will become proficient at

Essential Questions

- What makes a strategy for computing effective and efficient?
- What is meant by equality?
- How is thinking algebraically different from thinking arithmetically?
- How does explaining my process help me to understand a problem's solution better?

comparing and ordering real numbers and will learn how to plot points and use the coordinate grid. The students will learn how to write and analyze an Extended Constructed Response (Open Ended Response) utilizing the rubric from the NJASK.

Knowledge	Skills
<p>Students will know that:</p> <ul style="list-style-type: none"> • A numerical expressions consists of numbers and operations. • A variable expression consists of numbers, variables, and operations. • A power is a result of repeated multiplication of the same factor. • A power can be written in a form that has has two parts: a number called a base and a number called the exponent. • The order of operations must be used to evaluate expressions involving more than one operation. • Integers are positive and negative whole numbers that continue without end in both directions. • Positive integers are greater than zero, and negative integers are less than zero. • Absolute value of a number is its distance from zero on a number line. • Two numbers are opposite if they have the same absolute value. • The mean, median, mode, and range are useful ways to evaluate a data set. • A coordinate plane is formed by the intersection of a horizontal number line called the x-axis and a vertical number line called the y-axis. The axes divide the plane into four quadrants. • Each point in a coordinate plane is represented by an ordered pair. • There are four steps to solving a word problem: Read and Understand, Make a Plan, Solve the Problem, and Look Back. 	<p>Students will be able to:</p> <ul style="list-style-type: none"> • Identify and utilize key mathematical vocabulary associated with mathematical operations and algebraic expressions. • Evaluate variable expressions and equations. • Translate variable expressions and equations. • Write exponents as a product of multiplication. • Solve equations using the order of operations and grouping symbols. • Order integers from least to greatest. • Determine the absolute value of a number. • State the opposite of a number. • Add and subtract two or more integers. • Determine the product and the quotient of two or more integers. • Use and identify problem-solving strategies to solve word problems. • Determine the mean/median/mode/range of a data set involving integers. • Locate points on a coordinate plane. • Identify important parts and quadrants on a coordinate plane. • Plot an ordered pair. • Utilize a rubric to write an open-ended response. • Evaluate an Extended Constructed Response.

- An Extended Constructed Response involves explaining one's mathematical thinking and justifying one's process through written language.

Assessments

Daily Formative Assessment

Formative: Other written assessments

Formative assessments, such as: Do Now Assignments, Homework Assignments, Tickets to Leave, and Communicators, will provide daily data for teachers.

Unit 1 Quiz

Formative: Written Test

This quiz will assess the students' ability to compare and order integers and to evaluate the follow: algebraic expressions, exponents, numeric expressions involving the order of operations, and absolute value.

Unit 1 Test

Summative: Written Test

A teacher-constructed test assessing the students' understanding of variables, expressions, and integers.

Open-Ended Partner Activity

Formative: Self Assessment

Students will critique their own work with a partner. Together they will evaluate their Extended Constructed Responses using a rubric. The open-ended response may be linked to any topic in Unit 1.

Pre-Test

Diagnostic: Benchmark Assessment

Students will complete a Pre-Test to determine their knowledge of the material contained in Unit 1.

Integer Message

Formative: Personal Project

Students will create a message utilizing the integer alphabet. They will determine the sum of their message.

Human Number Line

Formative: Other visual assessments

Provide each student with a rational number. The students will order themselves from least to greatest. They will provide a real-world example that relates to their number. They will also determine any sets of numbers that provide an example of opposites or absolute values.

Open Ended -Individual Assignment**Summative: Other written assessments**

Each student will be provided their own open-ended task based on ability. This will be graded using the NJASK scoring rubric.

Activities	Activities to Differentiate Instruction
<ul style="list-style-type: none"> • Order of Operations: "I Have, Who Has": Students will play a game which involves oral comprehension of the order of operations. To differentiate, write the problems on the board as the students say them aloud. • Coordinate Plane Battle Ship: Each student is given two sets of coordinate planes. On one plane, they will plot their ships. On the other, they will mark their opponents hits/misses. • Order of Operations: Students will develop their own pneumatic device for solving problems involving order of operations. • Integers: Create a foldable as a visual study guide to help students understand how to add, subtract, multiply, and divide integers. • Integer Message: Students will create a message utilizing the integer alphabet. They will determine the sum of their message. 	<ul style="list-style-type: none"> • Coordinate Plane and Maps: Each student will be provided with a map of the Rutgers Campus or any real-world map. Each map must have a coordinate plane drawn on top. The students must locate buildings/objects on their map utilizing coordinates. (Have lower level students start by locating coordinate points and quadrants.) To challenge students, have them work backwards. Given a location, find the coordinate point and also provide critical thinking questions. Link is attached. Open-Ended : After reviewing the NJASK Rubric, provide students with examples of Extended Constructed Responses. In small groups have them determine the numeric rating the response would earn using the NJ scoring rubric. Provide students with signs to hold up (0-3). Once the students have rated the response, they must support their rating. To complete the assignment, provide each student with their own open ended. This will be graded using the NJASK rubric. Level the open ended questions based on students' ability. Operations Vocabulary: Use a graphic organizer to have students identify key vocabulary words associated with mathematical operations. Chart should be on Smart Board. Have words on the side of chart and have students slide them into correct place. Have students creatively think of some on their own. To challenge students, leave the words out and have students complete the chart individually, then as a whole class. Addition/Subtraction of Integer: use two different visuals to help students identify the rules for adding and subtracting integers. The first way is to utilize red and yellow algebra tiles. The other way is to use a number line. Both can be set up on the Smart Board and students can move spaces on the number line or add/subtract algebra tiles. For advanced students, have them add/subtract three or more integers at a time or combine problems with addition and subtraction.

	<p>Order of Operations: Have advanced students insert grouping symbols into equations to make them true.</p> <p>Problem-Solving Activity: Place students in groups by ability and have them solve a word problem on large poster board. Provide more than one option per group, allowing the students to select their problem. The problem in each group will be chosen based on the students' ability group. The students must identify the problem-solving strategy they chose, and show all the work necessary to solve the problem. Each group will present its results to the class.</p> <ul style="list-style-type: none"> • Coordinate Plane Graphic Organizer: Provide students with a horizontal number line. Have them place a vertical number line through the horizontal number line to create a coordinate plane. Have students label the coordinate plane with key vocabulary terms.
<p>Integrated/Cross-Disciplinary Instruction</p> <p>Science (Volcanoes): Discuss the concept of sea level correlating to zero. Below sea level correlates with negative numbers, while above sea level correlates with positive integers. Provide students with statistics on numerous volcanoes throughout the world. How can an underwater volcano be growing? Would the top of the volcano be approaching or getting farther away from the surface? The students will order the volcanoes from least to greatest and determine which has the greatest absolute value.</p>	<p>Resources</p> <ul style="list-style-type: none"> • Workbook • NJ Extended Construction Response Rubric • Pre-Algebra Mc Dougal Littell Text Book pages 4-59. • Classzone.com: Practice, Activities, and Tutor.

[<< Previous Year](#)

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Atlas Version 7.2.6



Unit Map 2013-2014

Green Brook Township School District

/ **Pre-Algebra Curriculum (D)** / Grade 6 (District Middle Curriculum)

Tuesday, August 27, 2013, 12:02PM

Green Brook Township
Public Schools

Unit: Solving Algebraic Equations (Week 4, 3 Weeks)

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 6, The Number System

6.NS Apply and extend previous understandings of numbers to the system of rational numbers.

- 6.NS.7a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.

CommonCore: Mathematics, CommonCore: Grade 6, Expressions & Equations

6.EE Apply and extend previous understandings of arithmetic to algebraic expressions.

- 6.EE.2b. Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity.
- 6.EE.4. Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them).

6.EE Reason about and solve one-variable equations and inequalities.

- 6.EE.5. Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.
- 6.EE.6. Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.
- 6.EE.7. Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p , q and x are all nonnegative rational numbers.
- 6.EE.8. Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.

6.EE Represent and analyze quantitative relationships between dependent and independent variables.

- 6.EE.9. Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the

independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation $d = 65t$ to represent the relationship between distance and time.

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

7.EE Use properties of operations to generate equivalent expressions.

- 7.EE.1. Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
- 7.EE.2. Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related.

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

- 7.EE.4a. Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p , q , and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach.

Description of Unit	Essential Questions
<p>In this unit, the students will use the properties of addition and multiplication as well as the distributive property to evaluate expressions. They will identify the parts of an expression. Using inverse operations, students will simplify and write one, two, and multi-step equations having like terms, parentheses, and variables on both sides.</p>	<ul style="list-style-type: none"> • Why are equations and inequalities useful? • How do the properties contribute to algebraic understanding? • How can expressions and equations be used to represent practical problems symbolically? • How is thinking algebraically different from thinking arithmetically?
Knowledge	Skills
<p>Students will know that:</p> <ul style="list-style-type: none"> • The Commutative Property allows you to change the position of numbers when finding a sum or a product. • The Associative Properties allows you to group numbers together when finding a sum or a product. • The Identity Property states that when 0 is added to any number, or when any number is multiplied by 1, the result is identical to the original number. 	<p>Students will be able to:</p> <ul style="list-style-type: none"> • Identify the distributive, associative, commutative, identity and zero properties in equations. • Use the distributive property to simplify expressions and equations. • Simplify expressions using like terms. • Create expressions using knowledge of area and perimeter of squares, rectangles, and triangles. • Solve one-step equations using inverse operations.

- The Zero Property allows you to multiply any real number by zero and obtain a product of 0.
- The Distributive Property allows you to multiply two addends by the same number $(x(y+z) = xy + xz)$.
- The parts to a variable expression are: coefficient, constant, and like terms.
- Like terms must have identical variables and exponents.
- An equation is a mathematical sentence formed by placing an equal sign between two expressions.
- Inverse Operations are operations that undo themselves ie.: addition and subtraction.
- A one-step equation involves one operation, a two-step equation involves two operations, and a multi-step equation involves three or more operations.
- The perimeter of a geometric figure is obtained by adding numeric and variable expressions.
- The area of a geometric figure is obtained by multiplying numeric and variable expressions.

- Solve two-step equations using the distributive property and inverse operations.
- Evaluate word problems involving one- and two-step equations.
- Solve multi-step equations using like terms, the distributive property and inverse operations.
- Solve equations with variables on both sides using like terms, the distributive property and inverse operations.
- Determine if a given solution is an answer to an equation.

Assessments

Daily Formative Assessments

Instructional/Assessment Focus

Formative assessments, such as: Do Now Assignments, Homework Assignments, Tickets to Leave, and Communicators, will provide daily data for teachers.

Small Business Income

Summative: Written Report

Textbook Alternate Assessment: The students will be given a table of net income for a small retail business. They will determine the overall profit or loss for the year and relate these terms to positive and negative numbers. The students will determine the average per year, utilize an algebraic equation to determine the change between a given number of years, and use the information to make conclusions about the success of the business.

Quiz 1

Formative: Other written assessments

The students will demonstrate their understanding of: identifying and utilizing properties, identifying the parts of expressions, simplifying expressions involving like terms, and the Distributive Property.

Solving Algebraic Equations and Expressions Test

Summative: Written Test

Teacher-constructed assessment in which the students will demonstrate their understanding of all the objectives in the Solving Algebraic Equations and Expressions Unit.

Pennies Investigation

Formative: Lab Assignment

Chapter 2 Project/Investigation in which students will measure the height of pennies and relate the measurements to the height of real-world structures using equations, short answer, and open-ended responses to questions.

Telescope Project.

Formative: Lab Assignment

Chapter 3 Cooperative Project: Utilizing specific amounts provided by the teacher, the students will determine how long they will have to save money to reach their goal. This will assess their understanding of evaluating expressions and solving equations.

Quiz 2

Formative: Written Test

Teacher-constructed assessment in which students will demonstrate their understanding of simplifying expressions and solving one- and two-step equations involving the Distributive Property.

Activities	Activities to Differentiate Instruction
<ul style="list-style-type: none"> • Exploring Multi-Step Equations: Form a group of four students. There is no talking in this game. One person in the group will be handed a piece of paper with an equation printed on the top. That student will perform one step in solving the equation, then pass the paper to the next person in the group. The student receiving the paper must review the work already done and make corrections if necessary. He/She then performs the next step in solving the equation and passes the paper to a third member of the group. Each person receiving the paper must first check the work done by prior group members and then perform an additional step. The person holding the paper when the equation is completely solved brings the paper to the front of the room. When all groups have finished, the final solvers write the solution on the board. The starting position rotates with each new equation. • Telescope Real-Word Problems: Students will choose from a deck of cards to determine the money they have, how much they will save each week, and the total amount they will need. Using these numbers, they will create 	<ul style="list-style-type: none"> • Properties Note Card Activity: sections of the classroom will be labeled with one of the properties. Students will be given note cards with an example of the property and they will move to the proper place in the classroom. The teacher may provide students with specific cards based on their abilities (provide more advanced students with more challenging equations in which the property is not easily determined). On a large post-it, the students may copy down their examples. As a whole class, determine if all the students are in their correct places. • Pennies Hands-on Investigation (pg.114): the students will measure the height of 10 pennies to indirectly determine the height of one penny. They will use the given verbal model to write an expression to solve for any given number of pennies. Students will then use the equation to solve the equation for one penny, 50 pennies and 2050 pennies. They will then individually answer extension question and make real world connections to the height of Mount Everest and

algebraic equations and answer corresponding questions to determine how different starting values and weekly rates alter their total or final sum. They will repeat this activity 3 times per group. Once students have finished, they will discuss the results as a whole class and how different numbers may affect their final solutions.

the Empire State Building. Challenging/Extension open-ended response questions are provided for more advanced students. Teachers may provide one-on-one assistance to struggling students. Link attached.

- **Algebra Tiles:** Students will use manipulatives to model one- and two-step equations involving multiplication and addition. They will then use inverse operations to solve the problems. For more advanced students, provide examples in which the equation requires **multiplication and subtraction**. The teacher may also provide examples in which the students have to add like terms before performing inverse operations.

 [Pennies project](#)

Integrated/Cross-Disciplinary Instruction	Resources
<ul style="list-style-type: none"> • Temperature: Discuss the difference between Kelvin and Celsius scales to measure temperature. Provide background information and the formula for how to find Kelvin temperatures given an equivalent Celsius temperature. Relate this to absolute value and absolute zero. To challenge students, have them determine a formula to go from Kelvin to Celsius. 	<ul style="list-style-type: none"> -Mc Dougal Little Text Book pages 62-137 and Workbook -Algebra Tiles -Graphing Calculators -Information on Kelvin and Celsius temperatures. -Chapter 3 Alternate Assessment/Math Journal: Small Business Income -Chapter 3 Cooperative Project

[<< Previous Year](#)

Last Updated: Monday, October 15, 2012, 10:41AM



Unit Map 2013-2014

Green Brook Township School District

/ **Pre-Algebra Curriculum (D)** / Grade 6 (District Middle Curriculum)

Tuesday, August 27, 2013, 12:28PM

Green Brook Township
Public Schools

Unit: Decimals and Inequalities (Week 7, 3 Weeks) 📅 📄

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 6, The Number System

6. NS Compute fluently with multi-digit numbers and find common factors and multiples.

- 6.NS.3. Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

6.NS Apply and extend previous understandings of numbers to the system of rational numbers.

- 6.NS.7a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.
- 6.NS.7b. Write, interpret, and explain statements of order for rational numbers in real-world contexts.

CommonCore: Mathematics, CommonCore: Grade 6, Expressions & Equations

6.EE Reason about and solve one-variable equations and inequalities.

- 6.EE.5. Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.
- 6.EE.8. Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.

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

7.EE Use properties of operations to generate equivalent expressions.

- 7.EE.1. Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.

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.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.

<p>Description of Unit</p>	<p>Essential Questions</p>
<p>Students will begin this chapter by comparing and ordering decimals. Students will then review how to perform mathematical operations involving decimals. Students will also begin writing, translating and graphing inequalities. They will use their knowledge of equations to solve the inequalities. Finally, students will use their knowledge of decimals to simplify equations and inequalities.</p>	<ul style="list-style-type: none"> • Why are equations and inequalities useful? • Why are there different types of numbers? • How does comparing quantities describe the relationship between them?
<p>Knowledge</p>	<p>Skills</p>
<p>Students will know that:</p> <ul style="list-style-type: none"> • An inequality is a statement formed by placing an inequality symbol between two expressions. • Inequalities are written using the $<$ and $>$ symbols. • The solution of an inequality with a variable is the set of all numbers that produce a true statement when substituted for the variable. • When using the multiplication and division properties of inequalities, one must reverse the direction of the inequality symbol when multiplying or dividing each side of an inequality by a negative number. • Decimals relate to place value. 	<p>Students will be able to:</p> <ul style="list-style-type: none"> • Graph inequalities on a number line. • Write inequalities using variables, numbers, and operations. • Translate inequalities into verbal phrases. • Solve inequalities utilizing inverse operations. • Compare and order decimals utilizing the place value system. • Round decimals to the nearest place value given. • Simplify expression involving decimals utilizing all operations. • Solve algebraic equations involving decimals.
<p><u>Assessments</u></p>	
<p>Daily Formative Assessments Formative: Instructional/Assessment Focus Formative assessments, such as: Do Now Assignments, Homework Assignments, Tickets to Leave, and Communicators, will provide daily data for teachers.</p> <p>Quiz Formative: Written Test</p>	

A teacher-constructed assessment in which students will compare, order, round and solve expressions involving decimals.

Test

Summative: Written Test

A teacher-constructed test in which students will demonstrate all the concepts learned in the Inequalities and Decimals Unit.

School Play Project

Summative: Personal Project

Chapter 3 Textbook Project: Students will use all concepts from chapters 1-3 to complete this project. The students are graded using a rubric.

Activities

- **School Play Project:** Using a real-life situation, students will analyze the financial aspects of a school play. They will pretend they are the supervisor of a school play committee, and there will be three nights of performances. The income depends on the number of people who attend the play, and the expenses are refreshments, costumes and lighting. Students will use all concepts from chapter 1-3 to complete this project.

Activities to Differentiate Instruction

- **Decimals:** Students will participate in an interactive Smartboard presentation dealing with comparing and ordering decimals. Students will work at the Smartboard at various times to line up the decimal points and to insert zeros utilizing a vertical format. For advanced students, have them create a number line and place various decimals on it.
- **Matching Game (tactile and visual):** provide real-life examples of inequalities. Students will match the verbal phrase to the graph to the expression. For advanced students, have them create their own verbal inequality to match a graph and vice versa.
- **BRAIN GAME for advanced students (textbook page 148):** students will complete a brain game in which they are given information about the ages of 6 children. They must then use inequalities to determine who is the oldest and the youngest in the group.

Integrated/Cross-Disciplinary Instruction

- **Social Studies:** Using their understanding of inequalities in mathematics, how can this apply to the real world?

Resources

Textbook pages 138-159
Chapter 3 Resource Book

Discuss inequalities that arise in America such as social or racial inequality.

Smart Board
Classzone

[<< Previous Year](#)

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Unit Map 2013-2014

Green Brook Township School District

/ Pre-Algebra Curriculum (D) / Grade 6 (District Middle Curriculum)

Tuesday, August 27, 2013, 12:29PM

Green Brook Township
Public Schools

Unit: Fractions, Factors and Exponents (Week 10, 3 Weeks)  

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 6, The Number System

6. NS Compute fluently with multi-digit numbers and find common factors and multiples.

- 6.NS.4. Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor.

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

8.EE Work with radicals and integer exponents.

- 8.EE.1. Know and apply the properties of integer exponents to generate equivalent numerical expressions.
- 8.EE.4. Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.

Description of Unit

In this chapter, students find factors, including the GCF, of numbers and monomials. Students simplify fractions and compare fractions using the LCD. Students use the product of powers and quotient of powers properties to simplify expressions. Students rewrite expressions containing negative or zero exponents using only positive exponents. Finally, students write and evaluate numbers in scientific notation

Essential Questions

- Why are there different types of numbers?
- What can we learn from studying patterns?
- How does finding the common characteristics among similar problems and numbers help to become a more efficient problem solver?
- How does comparing quantities describe the relationship between them?

Knowledge

Skills

Students will know that:

- A composite number is a whole number that is greater than 1 and has more than two whole number factors.
- A prime number is a whole number that is greater than 1 and has exactly two whole number factors, 1 and itself.
- Writing a number in its prime factorization is writing a number as a product of prime numbers.
- The greatest common factor is the largest factor shared by two or more numbers.
- Equivalent fractions are two fractions that represent the same numbers.
- A fraction is in simplest form when its numerator and its denominator are relatively prime.
- The least common multiple is the smallest multiple shared by two or more numbers.
- The least common denominator of two or more fractions is the least common multiple of the denominators.
- The Product of Powers Property states that to multiply powers with the same base, add their exponents.
- The Quotient of Powers Property states that to divide powers with the same base, subtract the exponent of the denominator from the exponent of the numerator.
- For any nonzero number a , $a^0=1$.
- For any nonzero number a and any integer n , $a^{-n}= 1/a^n$
- A number is written in scientific notation if it has the form of $c \times 10^n$ where c is greater than or equal to 1 and less than 10, and n is a whole number

Students will be able to:

- Write prime factorizations of a number using exponents.
- Calculate the prime factorization of a number using a factor tree.
- List the factors a monomial (numbers and variables.)
- Find the GCF of two or more whole numbers and monomials.
- Identify prime and composite numbers.
- Write fractions in simplest form.
- Identify equivalent fractions.
- Find multiples and least common multiples of numbers and monomials.
- Determine the least common denominator to organize fractions.
- Simplify powers of integers and monomials.
- Find the product and quotient of powers.
- Write negative exponents in fraction form.
- Simplify zero exponents.
- Multiply powers.
- Write numbers in scientific notation with positive and negative exponents.
- Simplify products with scientific notation.
- Use the properties of exponents to perform operations on numbers written in scientific notation.

Assessments

Daily Assessment

Instructional/Assessment Focus

Formative assessments, such as: Do Now Assignments, Homework Assignments, Tickets to Leave, and Communicators, will provide daily data for teachers.

Factors, Fractions and Exponents Quiz

Formative: Written Test

Students will demonstrate their knowledge of:

- Identifying if a number is prime or composite
- Factoring whole number and monomials
- Determining the GCF of whole numbers and monomials
- Writing fractions in simplest form
- Finding the LCM of numbers and monomials
- Finding equivalent fractions

Traffic Light

Formative: Self Assessment

Students will self assess their needs based on a unit study guide. They will color code the guide (red= not confident; yellow= could use a little more help; green= understand). Based on the sections they struggle with, the teacher will group the students to work on extra practice and provide help.

My Special Number

Formative: Personal Project

My Special Number Chapter Project: students will make a poster with a partner based on the mathematical properties of their special number.

Factors, Fractions and Exponents Test

Summative: Written Test

Teacher-constructed test in which students will demonstrate their knowledge of all objectives in the unit.

Fractions Pre Assessment

Diagnostic: Written Test

Have students complete a pre-test on operations with fractions to determine their strengths and weaknesses for the following unit.

Activities	Activities to Differentiate Instruction
<ul style="list-style-type: none"> • Investigation of Prime and Composite Numbers: use visual chart of numbers 1-100 and determine if a number is prime or composite (numbers 1-100). Cross out composite numbers and circle prime numbers. Do you see any patterns? 	<ul style="list-style-type: none"> • Error Analysis (Advanced Activity): describe and correct the error in finding the LCM of two numbers. Example: 16 and 30. ($16 = 2 \times 2 \times 2$ and $30 = 2 \times 3 \times 5$. so the LCM = $2 \times 2 \times 2 \times 2 \times 3 \times 5$) • Human Number Line Activity: give each students a note card with a fraction (multiples of 4. Using

- **Fraction Scramble:** rearrange the numerators and denominators in 5 fractions to make 5 new fractions. Textbook page 192.
- **GCF VENN DIAGRAM:** On the SmartBoard, display a Venn Diagram with two numbers or monomials in each. Have students go to the board to display the common and non-common factors and variables.
- **Slide Method for GCF:** Instead of having students list the factors of each number, a more efficient method is the Slide Method. Demonstrate each method to students, and have them pick the one they find the most useful.
- **Finding Rules of Exponents:** Have students complete a chart to determine the pattern/rules for multiplying and dividing exponents. Textbook page 193
- **My Special Number Chapter Project:** students will make a poster with a partner based on the mathematical properties of their special number.
- **Scientific Notation:** Have students complete a chart of examples demonstrating the relationship between standard form, product form, and scientific notation.
- **Calculators:** Utilize calculators to demonstrate the process of entering exponents. Also, show students the practicality of Scientific Notation (some numbers are too long for calculators to display or interpret).

their knowledge of equivalent fractions and LCD, have them order themselves from least to greatest. Challenge certain students by providing them with more complex numbers. This activity can be accommodated for less-advanced students by providing them with more common fractions with one or two digit bases.

• **Equivalent Fractions/Ordering Fractions:**

-**Below/On-Level:** Have students use area models to visualize and to demonstrate equivalent fractions and to order fractions from least to greatest.

-**Above Level:** Have students list the activities they complete during the day as a fraction of 24 hours. Then have the students order the fractions and covert to decimals.

- **TRAFFIC LIGHT: Students will self assess Unit Study Guide:** Students will self assess their needs based off of a unit study guide. They will color code the guide (red= not confident, yellow= could use a little more help, green= understand). Based on the sections they struggle with, the teacher will group the students to work on extra practice and provide help.

In groups, those who struggle with the following sections work on the designated problems:

Section 1- pg 210 (5-12)

Section 2- pg 211 (13-16)

Section3- pg211 (17-24)

Section 4-pg212 (25-29)

Section 5 and 6- pg212 (30-41)

Section - pg213 (42-47)

ALL GROUPS WORK ON PAGE 210 #1-4

**Teacher walks around and observes groups to make sure they are on task an receiving correct answer.

Integrated/Cross-Disciplinary Instruction	Resources
	Textbook pages 168-215 Smart Board

- **Instrumentals:** When performing in the choir or band, the instructor/conductor must decide how to arrange the band/choir members on the stage or risers so that their placement is visually pleasing to the audience. The use of factors is critical to determining such possible arrangements. Provide the students with the number of students in our choir or band. Have them create different ways to arrange the students. Are there any other factors to keep in mind when arranging students? (ex: 1 x n arrangement will be too wide)

Workbook
Calculators
classzone

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Unit Map 2013-2014

Green Brook Township School District

/ **Pre-Algebra Curriculum (D)** / **Grade 6 (District Middle Curriculum)**

Tuesday, August 27, 2013, 12:41PM

Green Brook Township
Public Schools

Unit: Rational Numbers, Operations and Equations (Week 13, 3 Weeks) 📅 📄

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 6, The Number System

6.NS Apply and extend previous understandings of multiplication and division to divide fractions by fractions.

- 6.NS.1. Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem.

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.1. Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.
- 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.

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

7.EE Use properties of operations to generate equivalent expressions.

- 7.EE.1. Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
- 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.

<ul style="list-style-type: none"> • 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. 	
Description of Unit	Essential Questions
<p>In this unit, students will begin by writing, comparing, and ordering rational numbers. They will then add and subtract fractions, including mixed numbers and variable expressions, first with the same denominator and then with different denominators. Next, students will multiply and divide fractions, mixed numbers and variable expressions. Students will use the multiplicative inverse to solve equations with fractional coefficients. Lastly, students will use their knowledge of rational numbers, equations, and inequalities to solve equations and inequalities involving rational numbers.</p>	<ul style="list-style-type: none"> • Why are equations and inequalities useful? • Why are there different types of numbers? • What can we learn from studying patterns?
Knowledge	Skills
<p>Students will know that:</p> <ul style="list-style-type: none"> • A rational number is a number that can be written as a quotient of two integers. • To add and subtract fractions you will need a common denominator. • To add or subtract fractions with the same denominator, write the sum or difference of the numerators over the same denominator. • The product of two or more fractions is equal to the product of the numerators over the product of the denominators. • To divide by any non-zero number, multiply by its reciprocal. • The product of a number and its multiplicative inverse is 1. 	<p>Students will be able to:</p> <ul style="list-style-type: none"> • Identify rational numbers and repeating and terminating decimals. • Convert decimals to fractions and fractions to decimals. • Order rational numbers from least to greatest. • Write fractions and mixed numbers and improper fractions. • Perform all operations with all types of fractions (mixed, improper, common denominators, unlike denominators). • Perform all operations with algebraic fractions. • Use the multiplicative inverse to solve equations. • Solve equations with rational numbers. • Solve inequalities with rational numbers. • Graph inequalities with rational numbers.
Assessments	
Fractions and Science	

Formative: Lab Assignment

Students will use graph paper to make a grid with as many sections as they like. Then they will color in the segments that represent cloud coverage in the sky. The result is that each student creates his or her own fraction to describe the sky. Using their drawing students will answer the following questions:

- How would you describe the sky?

(Students should have fractions for answers, which may vary since students may have filled in different numbers of blocks, and because clouds are not always easy to exactly measure. They should also have answers such as clear, scattered, broken, or overcast. Students may also describe the sky in terms of the type of clouds—i.e., cumulous, cirrus, stratus.)

Unit Quiz**Formative: Written Test**

Students will complete a teacher-constructed unit quiz assessing their understanding of the following:

- Converting fractions to decimals
- Converting decimals to fractions
- Adding and subtracting fractions with common denominators
- Adding and subtracting fractions with uncommon denominators.
- Simplifying variable expressions involving fractions.
- Solving fractions involving variables.

Tic Tac Toe Review**Formative: Self Assessment**

Students will complete unit review using tic tac toe boards. Each board will have a different concept: $+/-$ fractions, x/\div fractions, equations and inequalities. Students will be grouped according to their self-assessed weaknesses.

Recipe**Formative: Personal Project**

Using their own personal recipes, students will expand and reduce their recipes to feed different amounts of people. They will also determine the amount of money they will spend based on their ingredients. Students will utilize the Internet to find pricing. A rubric will be utilized to grade the assessment.

Unit Test**Summative: Written Test**

Students will complete a teacher-constructed unit test to determine their understanding of the objectives covered in the unit.

Daily Formative Assessments**Formative: Instructional/Assessment Focus**

Formative assessments, such as: Do Now Assignments, Homework Assignments, Tickets to Leave, and Communicators, will provide daily data for teachers.

Benchmark Assessment**Summative: Benchmark Assessment**

Students will complete a benchmark (mid-term) developed by the Mathematics Department to assess their mastery of the objectives covered since the beginning of the year. Benchmark may take the place of the unit test.

 Benchmark

Activities	Activities to Differentiate Instruction
<ul style="list-style-type: none"> • Foldable/Guided Notes: students complete example problems as a class. Break solutions down into steps and write in foldable graphic organizer: 1. covert to improper fractions. 2. find a common denominator. 3. change numerator. 4. perform the operation • Graphing Calculators: students will learn how to insert and solve problems with fractions on graphing calculators and TI 34 calculators. • Recipe Activity: using their personal recipes, students will expand and reduce their recipes to feed different amounts of people. They will complete their projects on poster board. • Numbers Venn Diagram: complete a Venn Diagram to show the comparison between rational numbers, integers and whole numbers. Provide examples and have students include their own examples. Include key vocabulary words: terminating and repeating decimals and rational numbers. 	<ul style="list-style-type: none"> • Human Number Line Activity: Each students is given a fraction based on ability and must re-write the fraction in decimals. Then all students must order their decimals from least to greatest. Provide students with different fractions based on ability. For more advanced students, provide negative fractions, mixed numbers, etc. • Adding/Subtracting Fractions: Lower Level: work with students on adding two and three fractions at a time with different denominators. On Level: have students add and subtract positive and negative fractions. Above Level: have students think critically and relate fractions to the stock exchange. Have them determine overall profit or loss of several stocks using fractions. • Inequalities Activity:(group by ability) create your own two-step inequality with fractions, switch with a partner to solve. Then check each other's work. Repeat with two different partners. • Tic-Tac-Toe Self-Assessment: students will complete a unit review using tic-tac-toe boards. Each board will have a different concept: +/- fractions, x/÷ fractions, equations and inequalities. Students will be grouped according to their self- assessed weaknesses.

- **Operations with fractions:** Have advanced students use their knowledge of order of operations to solve multi-step arithmetic problems involving fractions

Integrated/Cross-Disciplinary Instruction	Resources
<p>Science: This activity reviews fractions in the context of clouds, demonstrating how math and science work together. By using math and science to describe clouds, the lesson gives students several means of communication (fractions and meteorological terms) to describe a meteorological situation. Whereas a student may have looked up at the sky before the lesson and said there are a lot of clouds in the sky, after the lesson, the student may look up and think that not only are there a lot of clouds in the sky, but also that it is about 90 percent covered and/or that it is overcast.</p> <p> Linking fractions to Science</p>	<p>Smart Board Computers to conduct research for pricing of ingredients for the Recipe Project Graphing Calculators Textbook pages 216-263 Student Workbook Sciencelinks.com Classzone</p>

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Unit Map 2013-2014

Green Brook Township School District

/ Pre-Algebra Curriculum (D) / Grade 6 (District Middle Curriculum)

Tuesday, August 27, 2013, 12:53PM

Green Brook Township
Public Schools

Unit: Ratio, Proportion and Probability (Week 16, 3 Weeks) 📅 📌

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 6, Ratios & Proportional Relationships

6.RP Understand ratio concepts and use ratio reasoning to solve problems.

- 6.RP.1. Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.
- 6.RP.2. Understand the concept of a unit rate a/b associated with a ratio $a:b$ with $b \neq 0$, and use rate language in the context of a ratio relationship.
- 6.RP.3. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.
- 6.RP.3b. Solve unit rate problems including those involving unit pricing and constant speed.

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.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.3. Use proportional relationships to solve multistep ratio and percent problems.

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.

Description of Unit

In this unit, students find and interpret a unit rate. Students solve proportions using their knowledge of algebraic equations and the cross products property. Students identify corresponding side lengths of similar figures and determine unknown side lengths of similar figures. Students find distances using scales and scale drawings. Finally,

Essential Questions

- How does comparing quantities describe the relationship between them?
- How are ratios and proportions used to compare quantities?
- What makes things similar?

students determine the probability of an event and use the counting principle to count possibilities.

- How is the probability of event determined and described?

Knowledge

Students will know that:

- A ratio uses division to compare two quantities of the same unit.
- One can write the ratio of two quantities, a and b, where b is not equal to 0, in three ways: a to b, a:b, and a/b.
- Equivalent ratios are two ratios that have the same value.
- A rate is a ratio of two quantities measured in different units.
- A proportion is an equation that states that two ratios are equal.
- A cross product is the product of the numerator of one ratio and the denominator of the other ratio.
- If the cross products are equal, the ratios are equal.
- Two figures are similar if they have the same shape, but not necessarily the same size.
- Two figures are congruent if they are the same shape and the same size.
- Corresponding parts of figures are sides or angles that have the same relative position.
- One can use similar figures to find lengths that are difficult to measure directly.
- A scale gives the relationship between a drawing/model and the actual figure.

Skills

Students will be able to:

- Write ratios in simplest form 3 different ways.
- Order ratios from least to greatest.
- Write equivalent ratios or rates.
- Find a unit rate.
- Solve a proportion using equivalent fractions.
- Solve a proportion using an algebraic equation.
- Solve proportions using cross products.
- Solve proportions involving rational numbers.
- Identify and name geometric concepts (point, lines, rays, segment, angles, planes).
- Identify similar and congruent figures.
- Name corresponding angles and sides.
- Find the ratio of lengths of corresponding sides.
- Find an unknown side length in similar figure using proportions.
- Use proportions to solve indirect measurement.
- Make a scaled drawing of an object using proportions.
- Find the dimensions and scale of a scale model using proportions.

Assessments

Proportional Pencil Activity

Formative: Personal Project

Proportion Activity: have students measure their own height and the height of their pencil. Then have students bring in a doll (GI Joe, Barbie, etc.). Have the students measure the height of the figure and using proportions have them determine an appropriate pencil height for the doll. Provide extension and conclusion questions.

Ratios and Rates Quiz

Formative: Written Test

Students will complete a teacher-constructed quiz assessing their knoweldege of :

- writing ratios
- writing ratios in simplest form
- writing equivalent ratios
- solving proportions (involving multi-step equations)
- finding unit rates
- solving word problems involving proportions

Unit Test

Summative: Written Test

Students will complete a teacher-constructed unit test assessing all objectives in the unit.

Google Earth

Formative: Lab Assignment

Google Earth Scale Project: GRADE USING A RUBRIC .

As a whole class, tour Google Earth and find Green Brook Middle School. Once the image is located, find the basketball court behind the school. Determine the scale that is used and create a proportion to find the "estimated" length and width of the court. Then have the students go outside and measure the actual length and width of the court. Allow the students to work in partners and use various measurement tools (ruler, yard stick, measuring tape). Have the students convert to a more appropriate unit and have them draw conclusions about the accuracy of Google Earth.

A more challenging version of the activity, in which students must create their own scale model drawing using the units provided, is attached to the link.

Unit Rate Open Ended

Formative: Other written assessments

Students will complete an open-ended question on Unit Rates. Assessment will be graded using the NJASK rubric.

Daily Formative Assessments

Formative: Suggested Instructional/Assessment Strategies

Formative: Instructional/Assessment Focus

Formative assessments, such as: Do Now Assignments, Homework Assignments, Tickets to Leave, and Communicators, will provide daily data for teachers.

Activities	Activities to Differentiate Instruction

- **Comparing Rates:** Have students work in partners. Have one student count the number of times his/her heart beats in 10 seconds. Have the other students count the number of times his/her heart beats in 15 seconds. Have the 10 sec. person multiply the beats by 66, and have the 15 sec. person multiply the beats by 44. Who has the faster heart rate? How did this help compare the rates? Provide a given set of pulse rates and have the students determine on their own which is the greater pulse rate. Ensure that they have different time intervals so the students have to determine an equivalent base.
- **Proportion Activity:** have students measure their own height and the height of their pencil. Then have students bring in a doll (GI Joe, Barbie, etc.). Have the students measure the height of the figure and using proportions have them determine an appropriate pencil height for the doll. Provide extension and conclusion questions.
- **Congruent Polygons:** have students complete charts showing the corresponding parts between congruent polygons. Link is attached.
- **Scale Drawing Notebook:** print out slides for students to follow along at their seats. Students can use rulers while a volunteer uses the virtual ruler on the Smart notebook to find ratios and to determine the distance between two places. Link is attached.

 [congruent and similar polygons](#)

 [Scale Drawing Notebook](#)

 [Google Earth](#)

- **Investigating Ratios and Rates:** Make a big chart with a column for each month of the year. Collect data on the date of each student's birthday (if your birthday was August 16, you would write a 16 under the month of August). Then have students write ratios based on the information given. Example: write a ratio of the number of students born on even-numbered dates to the number of students born on odd-numbered dates. To challenge students, have them determine which ratios are less than one or greater than one. Have them create their own examples.

- **Unit Rate Open-Ended:**

On level: have students determine unit rates and calculate other values. For example, if 4 apples cost \$2.50, how much would 7 apples cost.

Above Level: Give three different rates and have students determine which would be the better buy.

- **Proportion Word Problems:**

On Level/Below Level: Ensure that when setting up the word problems students use the units associated with each problem. In doing so, they can see that each set of units should line up. Ensure that all problems result in whole numbers.

Above Level: 6.3 Real-World Problem Solving. Have students determine how much food and beverage to buy given a table of food and amount of servings needed. This activity combines proportional reasoning with decimals.

- **Disney Map Fun:** Provide students with maps from Disney World (Magic Kingdom, Animal Kingdom, MGM, and Epcot). Have them use a ruler and the maps to answer questions involving scale models. Extension and enrichment questions are provided for advanced students. Link is attached.
- **Google Earth Scale Project:** As a whole class, tour Google Earth and find Green Brook Middle School. Once the image is located, find the basketball court behind the

school. Determine the scale that is used and create a proportion to find the "estimated" length and width of the court. Then have the students go outside and measure the actual length and width of the court. Allow the students to work with partners and use various measurement tools (ruler, yard stick, measuring tape). Have the students convert to a more appropriate unit and have them draw conclusions about the accuracy of Google Earth.

A more challenging version of the activity, in which students must create their own scale model drawing using the units provided, is attached.

-  [Disney Map Fun](#)
-  [Google Earth - both versions](#)

Integrated/Cross-Disciplinary Instruction	Resources
<ul style="list-style-type: none"> • Theater/Performing Arts: In the alternate, more challenging, version of the Google Earth project, the students are asked to arrange props on a stage (stage right and stage left) for a school play. 	Smart Board Links Power Point Links Google Earth Textbook pages 266-304 Student workbook Classzone

[<< Previous Year](#)

Last Updated: Wednesday, September 26, 2012, 9:04AM



Unit Map 2013-2014

Green Brook Township School District

/ **Pre-Algebra Curriculum (D)** / **Grade 6 (District Middle Curriculum)**

Tuesday, August 27, 2013, 12:54PM

Green Brook Township
Public Schools

Unit: Percents (Week 19, 3 Weeks) 📅 📄

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 6, 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.
- 4. Model with mathematics.
- 7. Look for and make use of structure.
- 8. Look for and express regularity in repeated reasoning.

CommonCore: Mathematics, CommonCore: Grade 6, Ratios & Proportional Relationships

6.RP Understand ratio concepts and use ratio reasoning to solve problems.

- 6.RP.1. Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.
- 6.RP.3c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.

CommonCore: Mathematics, CommonCore: Grade 6, Expressions & Equations

6.EE Reason about and solve one-variable equations and inequalities.

- 6.EE.6. Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.

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.3. Use proportional relationships to solve multistep ratio and percent problems.

Description of Unit

Essential Questions

This unit will begin with students exploring the meaning of percents. Students will learn how to convert between percents, decimals, and fractions. From there, students will be introduced to the percent proportion. This will allow students to calculate the percent of a number, or find the percent of one number to another. From there, students will “real world” problems involving percents. Next, students will be introduced to the percent of change proportion. Students will be able to build upon their knowledge of the percent proportion and apply it to finding the percent of change. Then students will explore percent applications to find the sale price of an item, or how much an item will cost after tax. Lastly, students will have a brief introduction of simple and compound interest. Students will learn how to find the interest gained then find the balance of their account.

- How will our previous knowledge regarding converting between fractions and decimals help us with percents?
- In what ways in our everyday lives do we encounter percents?
- Why is it imperative to have a strong foundation in proportions when dealing with percents?

Knowledge

Students will know that:

- Percents are really a ratio whose denominator is one hundred.
- To convert from a decimal to a percent you move the decimal point two places to the right.
- To convert from a percent to a decimal you move the decimal point two places to the left.
- There are two proportions we use when dealing with percents: $\text{is/of} = \text{percent}/100$ and $\text{part/whole} = \text{percent}/100$ (used with word problems).
- When using the percent equation, the percent must always be converted to a decimal.
- When finding the percent by which something changed, you use the percent of change proportion, which is: $\text{change/original} = \text{percent}/100$.
- When solving all proportions it is beneficial to simplify the ratios first.
- Tax, tip, and percent increase all refer to markups. (When students find the change they should know to add to the original cost.)

Skills

Students will be able to:

- Convert between fractions, decimals, and percents.
- Organize information from a given problem and set up a percent proportion.
- Solve proportions utilizing either the arrow method or cross products method.
- Calculate the percent increase or decrease from the original total to the new total.
- Apply their knowledge of the percent proportion to solving percent application problems.
- Calculate the tax, tip, or discount for a given situation and calculate the new price.
- Calculate the simple or compound interest for a given situation and calculate to find the balance of the account.

- Discount and percent off refer to discounts. (When students find the change they should know to subtract from the original cost.)
- Simple interest is interest based on your principle amount.
- Compound interest is interest on your principle along with any previously earned interest.

Assessments

Do Now Exercises

Diagnostic: Suggested Instructional/Assessment Strategies

The purpose of these do now exercises is to review and remediate when necessary the concepts learned during class.

My Wish List

Formative: Other written assessments

This assessment will link the concept of percent applications to the students' lives.

Shopping Activity

Formative: Self Assessment

The purpose of this shopping activity is for students to work with their peers to determine which store is offering the best deal on each item. Students will be heterogeneously grouped and assigned a particular store.

Percent Unit Quiz

Formative: Written Test

This unit quiz will include skills and knowledge from the first half of the unit including: converting among percent, decimal, and fraction, utilizing the percent proportion, and solving real-world percent word problems.

Percent Poster

Summative: Other visual assessments

This percent poster will have students utilize percent applications and apply them to a real-world situation (a store is going out of business).

Smart Pal Reviews

Formative: Other written assessments

These Smart pal reviews provide a whole-class assessment. Data will be used for determining remediation or challenge required.

Percents Unit Test

Summative: Written Test

This unit test will include all skills/concepts from the unit.

Activities	Activities to Differentiate Instruction
<ul style="list-style-type: none"> • My Wish List: this teacher-generated activity provides students with the opportunity to go on an imaginary shopping spree with an unlimited budget. Students will be given a list of items from which they must select five to purchase. Students will be required to calculate the tax on their items by utilizing the percent proportion and to calculate the shipping based on their total cost. • Percent Poster: this teacher-generated project will require students to manage a business that is forced to close down. In the final days, the business will have a blow-out sale. Students will be required to state or to calculate the percent off for each item. Whichever option the students choose, they will calculate the new price of each item. Students will present their posters to the class. • Restaurant Activity: this activity is taken from the resource book. Students will go on an imaginary “date” with a fellow classmate. They will select one appetizer, two entrées, and one dessert from a menu. After totaling their dinner cost, students will calculate two different tips (15% & 20%). Students will complete the activity with several different partners. • Smartboard Presentations: 1) When learning about the percent proportion, students will guess what “hides” behind each category. Students will come up to the Smartboard and reveal whether or not their predictions are correct. 2) While working with percent word problems, the Smartboard will be used to “dissect” each problem and highlight words or phrases that are important for solving each problem. 	<ul style="list-style-type: none"> • Shopping Activity: this activity comes from the activity generator. Students will be divided into groups of four. Students will be presented with various items and the discounts for those items at four different stores. Students find the price of the item at each of the four stores. The students will be assigned stores by ability level. Points will be awarded for the students to correctly identify which store has the best deal. • Smart Pal Reviews: these Smart pal reviews provide a whole-class assessment with leveled questions for various abilities. • Percent Foul Shots: in this teacher-generated activity, students take turns shooting a given number of foul shots. Students will then compare how many shots they made to the total number of shots. Students will present this information as a fraction, a decimal, and a percent. Students will construct a proportion to predict how many shots they would make if they shot 75 times. • Students who master the percent proportion may utilize the percent equation. • Provide calculators to assist students with larger calculations. • Provide completed study guides as needed.
Integrated/Cross-Disciplinary Instruction	Resources
<ul style="list-style-type: none"> • Economics: relate the concept of percents to shopping discounts. Have students go on imaginary shopping trips 	<p>Spectrum Math (Grade 6) Pre-Algebra textbook and workbook</p>

to find out which store has the best deal, or how much money can be saved by shopping at a particular store.

- **Business:** have students create an “eye-catching” display to make people want to shop at their store. Also have students write a paragraph as to why people should want to shop at their store, and what types of deals and discounts their store offers.

Textbook pages 329-373

Punchline/Pizzazz worksheets (self correcting)

Smartboard Lessons

Kuta generated worksheets dealing with percents and percent applications

My Shopping List activity directions

Teacher generated directions for the percent poster project.

Activity generator for the group shopping activity

Classzone

[<< Previous Year](#)

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Unit Map 2013-2014

Green Brook Township School District

/ **Pre-Algebra Curriculum (D)** / Grade 6 (District Middle Curriculum)

Tuesday, August 27, 2013, 12:54PM

Green Brook Township
Public Schools

Unit: Measurement, Area, and Volume (Week 22, 3 Weeks)  

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 6, Mathematical Practice

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

- 4. Model with mathematics.
- 5. Use appropriate tools strategically.
- 7. Look for and make use of structure.
- 8. Look for and express regularity in repeated reasoning.

CommonCore: Mathematics, CommonCore: Grade 6, The Number System

6. NS Compute fluently with multi-digit numbers and find common factors and multiples.

- 6.NS.3. Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

CommonCore: Mathematics, CommonCore: Grade 6, Expressions & Equations

6.EE Apply and extend previous understandings of arithmetic to algebraic expressions.

- 6.EE.2c. Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).

CommonCore: Mathematics, CommonCore: Grade 6, Geometry

6.G Solve real-world and mathematical problems involving area, surface area, and volume.

- 6.G.1. Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.
- 6.G.2. Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = l w h$ and $V = b h$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.

- 6.G.3. Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.
- 6.G.4. Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.

CommonCore: Mathematics, CommonCore: Grade 7, Geometry

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.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.

Description of Unit

This unit begins with the classification of triangles by their side and angle measures. Students then will find the missing angle measures of triangles by constructing an equation that is equal to 180 degrees. Students also will learn about the characteristics of polygons, the difference between convex and concave, and the specific characteristics of certain quadrilaterals. Students will find the missing angle measures of a quadrilateral by constructing an equation that is equal to 360 degrees. Students will learn the formulas for calculating the area of parallelograms, trapezoids, and circles. After finding the areas of "regular" figures, students will be introduced to finding the areas of irregular figures. To conclude the unit, students will be introduced to three-dimensional solids. Students will classifying solids, calculate the surface areas of rectangular prisms and cylinders, and find the volume of prisms, pyramids, cones, and cylinders.

Essential Questions

- In what jobs or professions would you use the concepts of geometry, and how would you use them?
- How are we able to build upon our knowledge of equations and apply them to geometry?

Knowledge

Students will know that:

- There are three ways to classify a triangle by its sides: equilateral (all sides are equal), isosceles (two equal sides), and scalene (no sides are equal).

Skills

Students will be able to:

- Classify a triangle based on its side lengths or angle measures.
- Calculate the missing angle in a triangle by setting up an equation whose sum is 180.

- There are three ways to classify a triangle by its angles: acute (all angles are less than ninety degrees), obtuse (one angle is greater than ninety degrees), and right (one angle is exactly ninety degrees).
 - The angles in a triangle always add up to one-hundred-eighty degrees.
 - In order to find a missing angle in a triangle, you set up a linear equation whose sum is 180.
 - A polygon is any closed figure that contains three or more sides.
 - A concave polygon has an indented side, while a convex polygon does not.
 - A quadrilateral is any four-sided figure.
 - A square, rectangle, trapezoid, parallelogram, and rhombus are all quadrilaterals, but each has distinct characterizations.
 - The area of a figure is the amount of space it occupies.
 - In order to find the area of an irregular figure, one must break the figure down into shapes for which the area can be calculated.
 - A circle is a figure in which all points on the outside are the same distance away from the center.
 - Nets are a 2-D representation of a 3-D object.
 - A solid is always classified according to its base(s).
 - Solids have faces, edges, and vertices.
 - The face of a solid is one of its sides.
 - An edge is where two faces come together.
 - The vertices are where the edges come together to form a point.
 - The surface area of any solid is the sum of all its faces.
 - The volume of any solid is how much it can hold.
- Calculate the missing side length of a triangle by setting up an equation whose sum is equal to the perimeter.
 - Classify a quadrilateral based on specifics about its shape.
 - Calculate the missing angle in a quadrilateral by setting up an equation whose sum is equal to 360.
 - Identify parts of a circle, and calculate the radius when given the diameter and vice a versa.
 - Calculate the area of rectangles, squares, parallelograms, trapezoids, and circles.
 - Split up an irregular figure into shapes that we can calculate the area of. Students will then add together the areas of all individual figures to find the total area of the irregular figure.
 - Classify solids based on their bases. This also means being able to classify a solid based on its net.
 - Calculate the surface area and volume of solids.

Assessments

Do Now Exercises

Diagnostic: Instructional/Assessment Focus

The purpose of these do now exercises is to review and remediate when necessary the concepts learned in each lesson.

Polygon Drawing Activity

Formative: Self Assessment

This activity will test to see if students understand the characteristics that detail a particular shape. The evaluation also is dependent upon the students following directions very closely.

Area Unit Quiz

Formative: Written Test

This unit quiz will include all of the concepts from the first half of the unit. The focus of this quiz will be on finding missing angles in triangles and quadrilaterals, finding the area of 2-D shapes, and finding the area of irregular figures.

Playground Activity

Formative: Other written assessments

Students will demonstrate their knowledge gained in this unit in a real-world application. They will determine how much material they will need to construct a playground of their own design.

Smart Pal Reviews

Formative: Other written assessments

These Smart pal reviews will assess the students' skills and knowledge of the unit content.

Area/Surface Area Unit Test

Summative: Written Test

This test will assess all content in the unit.

Activities	Activities to Differentiate Instruction
<ul style="list-style-type: none"> • Polygon Drawing Activity: in this activity taken from the activity generator, students will utilize their knowledge of triangles and quadrilaterals to give directions to their classmates to reproduce a given figure. This activity will assess and reinforce students' knowledge of shapes as well as their ability to closely following the directions of their classmates. • Power Solids: in this teacher-generated activity, students will utilize the power solids, which provide a net that fits inside its 3-D solid representation, to classify, determine surface area, and find the volume of 3 -D shapes. • Smartboard presentations: provide hands-on learning of geometry concepts. Students utilize the Smartboard to classify solids by dragging them to their correct location. Students will also be able to break apart an 	<ul style="list-style-type: none"> • Playground Architect: in this activity taken from the resource book, students will construct a new playground at school. Students will work together as a team to determine how much material is needed and how much the materials will cost. Completing these calculations will serve as a review of skills and knowledge in the unit. • Unit Cubes Surface Area: in this teacher-generated activity, students utilize unit cubes to create a rectangular prism. Students will trace on paper all six faces of the rectangular prism and will find the area of each face. As the class identifies patterns, it will lead to the discovery of the formula for finding the surface area of a rectangular prism. • Completed study guides as needed. • Group work utilizing heterogeneous grouping.

irregular figure into shapes of which one can calculate the area.

- **Smart pal Review** sessions provide a whole class review of the unit content and help students self-assess their weaknesses.

- Calculators to assist with large calculations when finding surface area and volume.
- Individual NJASK reference sheets to assist students with the formulas.

Integrated/Cross-Disciplinary Instruction	Resources
<ul style="list-style-type: none"> • Engineering: students will follow directions for constructing a school playground, which will integrate geometry and engineering skills. 	Spectrum Math (Grade 6) Pre-Algebra textbook and workbook Textbook pages 511-567 Punchline/Pizzazz worksheets (self correcting) Smartboard Lessons Kuta generated worksheets dealing with classifying both 2-D and 3-D figures, finding missing angles in triangles and quadrilaterals, and calculating areas of figures. Playground engineering directions taken from the resource book Interconnecting unit cubes Power Solids NJ ASK reference sheets Activity generator for the polygon drawing activity Calculators Classzone

[<< Previous Year](#)

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Unit Map 2013-2014

Green Brook Township School District

/ **Pre-Algebra Curriculum (D)** / Grade 6 (District Middle Curriculum)

Tuesday, August 27, 2013, 12:54PM

Green Brook Township
Public Schools

Unit: Angle Relationships and Transformations (Week 25, 2 Weeks) 📅 📄

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 6, 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.
- 4. Model with mathematics.
- 5. Use appropriate tools strategically.
- 7. Look for and make use of structure.
- 8. Look for and express regularity in repeated reasoning.

CommonCore: Mathematics, CommonCore: Grade 6, The Number System

6.NS Apply and extend previous understandings of numbers to the system of rational numbers.

- 6.NS.8. Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.

CommonCore: Mathematics, CommonCore: Grade 7, Geometry

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

- 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.

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.2. Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.
- 8.G.3. Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.

- 8.G.4. Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.
- 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.

Description of Unit	Essential Questions
<p>This unit begins with the identification of the differences between complementary and supplementary angles. Students will learn how to write and solve equations for these angles where the sum is equal to 90 or 180. Students will be introduced to the concept of parallel lines with transversals. Students also be introduced to the formula for finding the sum of the interior angles of a polygon and will learn how to find the measure of an exterior angle in a regular polygon. The unit also will focus on the four types of transformations (translations, reflections, rotations, and dilations). Students will utilize the coordinate grid along with the rules of transformations to find an image after a given transformation.</p>	<ul style="list-style-type: none"> • How are mathematical ideas related and intertwined among units? • In what jobs or occupations is it important to have knowledge of transformations?
Knowledge	Skills
<p>Students will know that:</p> <ul style="list-style-type: none"> • Complementary angles have a sum of ninety degrees. • Supplementary angles have a sum of one-hundred-eighty degrees. • Supplementary angles form a straight line when placed together. • When a transversal cuts across two parallel lines, "special angles" are formed. These special angles are: corresponding, alternate interior, alternate exterior, vertical, and supplementary. • Any polygon can be reduced to a group of triangles. To find the sum of its angles, add together the sum of all the triangles. • The formula for the sum of the interior angles of a polygon is: $(n-2) * 180$. 	<p>Students will be able to:</p> <ul style="list-style-type: none"> • Apply their knowledge of solving equations to finding the missing angle when given a pair of complementary or supplementary angles. • Identify the relationship of angles when parallel lines are cut by a transversal. • Utilize their knowledge of angle relationships to create an equation to find a missing angle measure. • "Break apart" a polygon using triangles to find the sum of its interior angles. • Calculate the sum of the interior angles of any n sided polygon by utilizing the formula. • Calculate the measure of an exterior angle in any regular n sides polygon.

- The sum of the exterior angles of any polygon is 360 degrees.
- The formula for the measure of an exterior angle of a regular polygon is $((n-2) * 180) / n$.
- There are four types of transformations that create an image of the original figure.
- A translation is when you slide or move a figure, and it produces an image that is congruent to the original figure.
- A reflection is a transformation in which you flip an object across a line, and it produces an image that is congruent to the original figure.
- A rotation is a transformation in which you turn an object, and it produces an image that is congruent to the original figure.
- A dilation is a transformation in which you shrink or expand an object, and it produces an image that is similar to the original figure.
- All transformations can be applied utilizing a coordinate grid, or a "rule" can be performed on all sets of ordered pairs of the object.

- Perform multiple transformations on any object using the coordinate grid.
- Discover the image points of an object after a given transformation by following mathematical rules.

Assessments

Do Now Exercises

Diagnostic: Instructional/Assessment Focus

The purpose of these do now exercises is to review and remediate when necessary the concepts learned in the unit.

Interior Angles Exploratory Activity

Formative: Self Assessment

The purpose of this activity is to determine if the students can discover a pattern on their own for finding the sum of the interior angles of a polygon. Students will extrapolate the formal formula for finding the sum of the interior angles of any n-sided polygon.

Angles Challenge Activity

Formative: Other written assessments

Given parallel lines cut by multiple transversals, students will find all missing angle measures.

Angles Unit Quiz

Formative: Written Test

The angles unit quiz will contain all skills/knowledge included in the first half of the unit. These concepts include: complementary angles, vertical angles, supplementary angles, angle sum, and transversals.

Human Crane Game

Formative: Dramatization

This activity will require students to follow directions for translating from one location to another. This will be accomplished by verbal/mathematical directions.

Transformations Smartboard

Formative: Other written assessments

This comprehensive Smartboard lesson will include all information related to transformations. Students will graph the resulting image after a given transformation.

Angles and Transformations Unit Test

Summative: Written Test

This unit test will include all skills/concepts from the unit.

Activities	Activities to Differentiate Instruction
<ul style="list-style-type: none"> • Interior Angles Exploratory Activity: in this teacher-generated activity, students practice "breaking up" polygons to see how many triangles they contain. Students will identify patterns associated with all the sides of the polygons and the number of triangles formed, which will lead to the formal formula. Students will be challenged to find the sum of the interior angles of any n-sided polygon. • Transformations Smartboard: in this teacher-generated presentation, students will engage in hands-on learning of the properties of transformations. Utilizing the Smartboard, students will turn and flip the objects based upon the transformation required. Students will formulate an algebraic rule to represent each the transformation. • Smart pal review games provide review for lines, angles, and object transformations. • Group stations can be utilized to review the four types of transformations. 	<ul style="list-style-type: none"> • Human Crane Game: this teacher-generated activity provides a kinesthetic approach to transformations. Students work with a partner and one person is the crane while the other person is the operator. Students initially use words to describe which ways to move or translate to make the crane pick up the ball. To make this activity more challenging, the operator states the directions algebraically to symbolize which way the crane should move to pick up the ball. This can also be modified to include reflections and rotations. • Angle Relationships Challenge Activity: students work in groups to find the missing angles on a paper in which multiple lines are cut by multiple transversals. • Completed study guides as needed. • NJASK reference sheet for the angle formulas. • Heterogeneous grouping to encourage peer interaction. • Spinning review to demonstrate what an object looks like after 90, 180, and 270-degree rotations, both clockwise and counterclockwise.

Integrated/Cross-Disciplinary Instruction	Resources
<ul style="list-style-type: none"> • Physical Education: The kinesthetic activities included in this unit connect with skills in physical education. 	Spectrum Math (Grade 6) Pre-Algebra textbook and workbook Textbook pages 709-757 Punchline/Pizzazz worksheets (self correcting) Smartboard Lessons Kuta generated worksheets dealing with angle relationships and transformations NJASK reference sheets Teacher generated interior angles activity Angle relationships activity worksheet Calculators Classzone

[<< Previous Year](#)

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Unit Map 2013-2014

Green Brook Township School District

/ **Pre-Algebra Curriculum (D)** / Grade 6 (District Middle Curriculum)

Tuesday, August 27, 2013, 12:55PM

Green Brook Township
Public Schools

Unit: Data Analysis and Probability (Week 27, 3 Weeks) 📅 📌

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 6, 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.
- 4. Model with mathematics.
- 5. Use appropriate tools strategically.
- 7. Look for and make use of structure.

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

6.SP Develop understanding of statistical variability.

- 6.SP.1. Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.
- 6.SP.2. Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.
- 6.SP.3. Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.

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.
- 6.SP.5. Summarize numerical data sets in relation to their context, such as by:
 - 6.SP.5a. Reporting the number of observations.
 - 6.SP.5b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
 - 6.SP.5c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.
 - 6.SP.5d. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.

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 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.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.

Description of Unit

In this unit, students will study data analysis and probability. Students will use bar graphs, line graphs, line plots, stem-and-leaf plots, box-and-whisker plots, and histograms to display and analyze the distribution of the values in a data set. They will learn to distinguish each type of graph and determine the best graph to use when representing a specific type of data. Students will be introduced to basic and compound probability, including compound probabilities involving dependent and independent events. Lastly, students will learn the difference between permutations and combinations and how to use them to calculate the number of ordering possibilities.

Essential Questions

- How do visual representations of data influence people’s decision making?
- How does probability affect the choices we make?
- How is it possible to determine whether a situation is represented by a permutation or a combination?

Knowledge

Students will know that:

Skills

Students will be able to:

- In a stem and leaf plot, the stems are always the first digits in a number, while the leaf is always the last digit (ones place).
- Histograms are similar to bar graphs, but there are no gaps in the data for histograms (for example months in a year, miles walked, etc.)
- A box-and-whisker plot breaks data into quartiles or quarters.
- The information contained in a box-and-whisker plot includes: median, lower/upper quartile, and lower/upper extremes.
- Circle graphs are used to represent data that represents parts of a whole.
- In order to find the correct number of degrees represented by each section in a circle graph, a proportion must compare the part to the whole.
- A biased sample is when only one demographic (only men, or only people aged 13) are surveyed. An unbiased sample is when there is no discrimination of those surveyed.
- Misleading graphs portray information in an inaccurate way that favors what the author wants you to think.
- Simple probability involves the favorable outcomes out of the total outcomes.
- Probability can be represented by a fraction, a decimal, or a percent.
- Theoretical probability is what should happen, and experimental probability is what actually happens after conducting a test.
- Independent probability occurs when your first probability does not affect your second probability. For example, flipping a coin, then rolling a six on a number cube.
- Dependent probability occurs when your first probability **does** affect your second probability. For example, pulling a red marble from a bag, keeping it, then pulling a yellow marble.
- A permutation occurs when the order in which something happens matters. For example, placing first or second in a race.
- A combination occurs when the order does not matter. For example, a teacher chooses three people to be in a

- Create and analyze various types of data displays including: stem-and-leaf charts, histograms, box-and-whisker plots, and circle graphs.
- Create a proportion to determine how many degrees should be represented by a section in a circle graph.
- Conduct both biased and unbiased samples for a survey question.
- Conduct an unbiased survey, utilize an appropriate data display to show the results, and answer an open-ended question based on the survey.
- Differentiate and support the criteria for appropriate graphs and misleading graphs.
- Represent a probability as a fraction, a decimal, and a percent.
- Distinguish between theoretical probabilities and experimental probabilities.
- Construct a multiplication statement and solve to find compound probabilities of both independent and dependent events.
- Identify whether a situation involves the use of a permutation or a combination.
- Utilize a calculator to determine the total number of outcomes for a given situation (involving permutations and combinations).

group. It does not matter who was chosen first or who was chosen second because they are still in the same group.

Assessments

Do Now Exercises

Formative: Instructional/Assessment Focus

The purpose of these do now exercises is to review and remediate when necessary the concepts and skills learned throughout the unit.

Survey Project

Formative: Personal Project

This project will involve students constructing a survey question, obtaining an unbiased sample, and displaying their results with an appropriate data display.

Data Analysis Unit Quiz

Formative: Written Test

This unit quiz will include all concepts/skills/knowledge related to data analysis, including creating and interpreting data displays.

M&M's Probability

Formative: Other written assessments

In this activity, students respond to questions based upon the colors of M&M's he/she received. This activity reviews singular and compound probability, percents and proportions.

Permutations and Combinations

Formative: Other written assessments

In this assessment, students will differentiate between permutations and combinations.

Data Analysis/Probability Unit Test

Formative: Written Test

This unit test will include all content/skills included in the unit.

Activities

- **Survey Project:** in this teacher-generated activity, students will construct their own survey question and then utilize an unbiased sampling method to gather data. Students will choose an appropriate data display

Activities to Differentiate Instruction

- **M & M's Activity:** in this teacher-generated activity, each student will receive a handful of M & M's. Students will find the probability of selecting each color

and create a circle graph to show the results of their survey. Students will complete an open-ended response based on their survey.

- **Probability Smartboard Presentation:** in these teacher-generated presentations, students will have first-hand experience with probabilities. Students will be rolling a die, flipping a coin, and choosing a card from a deck. After conducting the trials, students will find the theoretical probability of each event occurring and cross-check to see if it matches the experimental probability.
- **Permutations and Combinations Card Activity:** in this teacher-generated activity, students will write each of the letters R-A-C-E on four index cards. Students will work with a partner to make in one minute as many three letter words as possible from the 4 letters. This activity serves as an informal introduction to permutations in which the order items are in matters.
- Smart pal review games dealing with data displays and probability will be utilized.

of M & M if they were placed in a bag. Students will answer compound probability questions relative to the M & M's. As a portion of this activity, students will also review the process of converting a fraction to a decimal.

- **Experimental and Theoretical Probabilities:** in this teacher-generated activity, students will receive a counting chip (one side is red and the other is yellow). Students will flip the chip a total of twenty times and record their results. The trials will be converted to decimals, which will ultimately be recorded as probability.
- Completed study guides as needed.
- Heterogeneous grouping to promote peer interaction.
- Calculators to assist with probability calculations.

Integrated/Cross-Disciplinary Instruction	Resources
<ul style="list-style-type: none"> • Marketing/Research: students will complete a survey activity in which they conduct an unbiased survey of their classmates. Students will create a data display to show the results of their survey. • Games of Chance: this activity will help students relate the concepts of probability to games of chance. Discuss how the games are fair and what changes might be made to make the games unfair. 	<p>Spectrum Math (Grade 6) Pre-Algebra textbook and workbook Textbook pages 581-645 Punchline/Pizzazz worksheets (self correcting) Smartboard Lessons Kuta generated worksheets dealing with simple and compound probabilities Teacher-generated directions for the survey project Directions for the permutations and combinations activity M & M's Calculators Classzone</p>

[<< Previous Year](#)

Last Updated: Wednesday, September 26, 2012, 9:06AM



Unit Map 2013-2014

Green Brook Township School District

/ **Pre-Algebra Curriculum (D)** / Grade 6 (District Middle Curriculum)

Tuesday, August 27, 2013, 12:55PM

Green Brook Township
Public Schools

Unit: Radicals, Systems of Measurement, NJASK (Week 30, 4 Weeks)  

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 6, 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.
- 5. Use appropriate tools strategically.
- 6. Attend to precision.
- 8. Look for and express regularity in repeated reasoning.

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 Work with radicals and integer exponents.

- 8.EE.2. Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational.

CommonCore: Mathematics, CommonCore: Grade 8, Geometry

8.G Understand and apply the Pythagorean Theorem.

- 8.G.6. Explain a proof of the Pythagorean Theorem and its converse.
- 8.G.7. Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.

- 8.G.8. Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.

Description of Unit	Essential Questions
<p>This unit will introduce square roots. Students will learn how to simplify radical expressions by utilizing the order of operations and multiplication. They also will learn how to solve equations that include exponents. This will lead directly to the introduction of the Pythagorean Theorem. Students will utilize the Pythagorean Theorem to find the missing length of the hypotenuse and any leg. Also included in this unit will be the study of rational and irrational numbers and systems of measurement (customary and metric). Students will learn how to identify which unit of measure is the most appropriate for a given situation and how to convert among different units of measure within the same system. Time at the end of the unit will be utilized to review/prepare for the NJASK.</p>	<ul style="list-style-type: none"> • How do we build upon previously-learned topics, such as equations and order of operations, and apply them to radicals? • In which professions is it imperative to have a strong foundation in measuring skills? • Why do you believe the United States is the only country in the world to still use the customary system
Knowledge	Skills
<p>Students will know that:</p> <ul style="list-style-type: none"> • A perfect square is a square of any whole number. • A square root is equal to a number squared that is equal to the number under the radical symbol. • To estimate the square root of a number, you identify which two perfect squares the number falls between and select the one that is closest. • When evaluating radical expressions, you follow the order of operations and determine the square root last. • In order to “undo” a variable raised to the second power in an equation, you must take the square root of both sides of the equation. • A rational number is any number that can be written as a fraction, and is either a repeating or terminating decimal. • An irrational number cannot be written as a fraction, and is a non-repeating/non-terminating decimal. • You can simplify a radical by changing it to a multiplication statement. 	<p>Students will be able to:</p> <ul style="list-style-type: none"> • Evaluate and estimate the square root of a number. • Apply their knowledge of order of operations to evaluate a radical expression. • Solve an equation involving a variable raised to the second power. • Identify whether a number is rational or irrational. • Simplify a radical by changing it to a multiplication statement. • Solve to find the missing side length in a right triangle by utilizing the Pythagorean Theorem. • Identify which unit of measure is the most appropriate for any given situation. • Convert among different units of measure in the customary and metric systems. • Add and subtract units of measure in the customary system.

- The Pythagorean Theorem can be used to find the measure of a missing side length in any right triangle.
- In the United States, we use the customary system of measurement; all other countries use the metric system.
- When converting among different units in the metric system, you move the decimal point left or right.
- You divide when converting from a small unit to a larger unit in the customary system.
- You multiply when converting from a large unit to a smaller unit in the customary system.

Assessments

Do Now Exercises

Diagnostic: Instructional/Assessment Focus

The purpose of these do now exercises is to review and remediate when necessary the concepts learned throughout the unit.

Pythagorean Theorem Stations

Formative: Other written assessments

By completing the activities in these stations, students will apply the Pythagorean Theorem to real-world problems.

Radicals Unit Quiz

Formative: Written Test

This unit quiz will focus on radicals and the Pythagorean Theorem.

Jeopardy NJASK Review

Formative: Self Assessment

This review game will serve as a review of grade-level content to prepare students for the NJASK.

Math Olympics

Formative: Other written assessments

This assessment will require students to participate in "games" in which they must measure how far they've jumped or thrown an object. Students will add together the results from everyone in their group.

Radicals and Measurement Unit Test

Summative: Written Test

This unit test will include all unit content.

Store Activity

Formative: Personal Project

For this project, students will record and balance funds in a checkbook, budget their money, and shop.

Activities	Activities to Differentiate Instruction
<ul style="list-style-type: none"> • Math Olympics: in this teacher-generated activity, students will compete in the “long jump” and “paper ball throw”. In groups of three, students will be responsible for measuring the lengths of their teammates’ jumps and throws. Using the data collected, students will complete a worksheet. • Store Activity: in this teacher-generated activity, students will learn about writing checks and maintaining a checkbook, creating their own store, and shopping at their classmates’ stores. Students will create a poster for their store that shows the items they are selling and the cost per item so that classmates can plan their shopping experiences. • Interactive Smartboard presentations will address radicals and the Pythagorean Theorem. Students will also use the Smartboard to classify numbers as rational or irrational by dragging them to the correct column. Students will also see the different ways to change a radical to a multiplication statement. • Smart pal review games will review square roots, Pythagorean Theorem, and measurement. 	<ul style="list-style-type: none"> • MINCH Activity: in this teacher-generated activity, students review simplifying fractions as they create their own “ruler” by folding a sheet of paper a given number of times. Students mark their paper rulers with the appropriate units (1/4, 3/8, etc). Students respond to questions requiring them to utilize their rulers to measure a variety of items. • When converting in the customary system, students will learn the “hand motions” to symbolize when they would multiply and when they would divide. • Jeopardy NJASK Review: in this teacher-generated review game, students work in groups to answer questions about concepts they’ve learned throughout the year. • Completed study guides as needed. • Calculators to provide assistance with large calculations. • Individual NJASK reference sheets for assistance with customary conversion factors.
Integrated/Cross-Disciplinary Instruction	Resources
<ul style="list-style-type: none"> • Physical Education: students compete in Math Olympics and measure their jumps and throws. • Architecture/Construction: connections to accurate measurements; Internet video clips of engineering disasters. 	<p>Spectrum Math (Grade 6) Pre-Algebra textbook and workbook Textbook pages 453-475 Punchline/Pizzazz worksheets (self correcting) Smartboard Lessons Kuta generated worksheets dealing with radicals and measurement NJASK reference sheets Teacher generated math Olympics directions Directions for the store activity Pythagorean Theorem Real World Examples</p>

| Calculators
| Classzone
| Engineering disaster video clips (why measurements are
| important)

[<< Previous Year](#)

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Unit Map 2013-2014

Green Brook Township School District

/ **Pre-Algebra Curriculum (D)** / Grade 6 (District Middle Curriculum)

Tuesday, August 27, 2013, 12:56PM

Green Brook Township
Public Schools

Unit: Linear Functions and Final Exam (Week 34, 4 Weeks)

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 6, 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.
- 6. Attend to precision.
- 7. Look for and make use of structure.

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

8.EE Understand the connections between proportional relationships, lines, and linear equations.

- 8.EE.5. Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.
- 8.EE.6. Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b .

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.

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.

<ul style="list-style-type: none"> • 8.F.2. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change. • 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. 	
<p>Description of Unit</p> <p>In this unit, students will be introduced to the concept of functions and will learn how to determine if a set represents a function by utilizing the vertical line test. Students will also learn how to determine the domain and range of a data set, how to determine if an ordered pair is a solution to an equation, how to create a table of values and how to write an equation in function form. Students also will learn how to find the x and y intercepts of an equation, which leads to the introduction of the concept of slope. Students will find slope by using a graph and by using the formula and will write equations in slope intercept form. With these skills, students will solve systems of equations and inequalities by graphing.</p>	<p>Essential Questions</p> <ul style="list-style-type: none"> • How is change represented mathematically? • How are we building upon concepts from previous units and applying them to linear functions? • When is it practical to use each of the three methods to graph an equation?
<p>Knowledge</p> <p>Students will know that:</p> <ul style="list-style-type: none"> • The word <i>linear</i> literally means line. • The term <i>domain</i> refers to the input, and is represented by the x value in an ordered pair. • The term <i>range</i> refers to the output, and is represented by the y value in an ordered pair. • For a set of data to represent a function, there can be one and only one output for every input. • The Vertical Line test is used to determine if a set of data is a function. If a ruler is held vertically over the coordinate plane, and the line intersects the ruler more than once at any given value of x, the graph is not a function. • Slope intercept form refers to an equation that is solved for y. 	<p>Skills</p> <p>Students will be able to:</p> <ul style="list-style-type: none"> • Classify the domain and range in a given set of data. • Identify whether or not a set of data represents a function. (includes passing the vertical line test) • Manipulate an equation so that it is written in slope intercept form. • Create an x/y table to graph a linear equation. • Calculate the x and y intercepts of a linear equation and graph it. • Calculate the slope of a line by using the mathematical formula or by observing the rise and run of the line. • Identify the slope and y intercept of a line by correctly writing it in slope intercept form. • Graph a line that is in slope intercept form by plotting the y intercept and using the slope to plot the remaining points.

- When creating an x/y table to graph an equation, write the equation in slope intercept form.
- The x/y intercepts of a graph refer to the points at which a line intersects the x and y axes.
- To find the x intercept of an equation, insert zero for the y value.
- To find the y intercept of an equation, insert zero for the x value.
- The slope of a line refers to the relationship of the rise to the run of the line.
- Slope can be calculated mathematically by using the formula $(y_2 - y_1) / (x_2 - x_1)$.
- When a line is in slope intercept form ($y = mx + b$), m represents the slope and b represents the y intercept.
- When graphing a line that is in slope intercept form, plot the y intercept first, then plot three other points based on the slope of the line.
- The solution to a system of equations is the point at which the two lines intersect. (To check the answer, insert the ordered pair into the original equations).
- Parallel lines have the same slope, but different y intercepts.
- Perpendicular lines have slopes that are negative reciprocals and a different y intercept.
- When graphing a system of inequalities, shade the region that results in a true response when inserting an ordered pair.

- Write equations of lines that are parallel or perpendicular to the original line.
- Solve a system of equations by graphing.

Assessments

Do Now Exercises

Diagnostic: Instructional/Assessment Focus

The purpose of these do now exercises is to review and remediate when necessary the concepts/skills learned throughout the unit.

Linear Functions Unit Quiz

Formative: Written Test

This unit quiz will include: functions, x/y tables, and x/y intercepts.

Waterpark Activity

Formative: Other written assessments

In this assessment, students will apply their skills and knowledge relative to linear functions to solve a real- world problem.

Linear Functions Unit Test

Summative: Written Test

This unit test will include all skills/knowledge associated with linear functions.

Pre-Algebra Final Exam

Summative: Benchmark Assessment

The Final Exam will assess all of the skills/concepts/knowledge the students have learned throughout the Pre-Algebra course.

<p>Activities</p> <ul style="list-style-type: none"> • Slope Intercept Form Introductory: in this activity taken from the activity-generator, students will apply their knowledge of creating x/y tables to discover a pattern with the y intercept and the slope. Students will determine that when an equation is in slope intercept form, the "m" represents the slope of the line while the "b" represents the y intercept. • Slope Buddy: in this teacher-generated Smartboard presentation, students will learn about slope through graphing and the mathematical formula. Students will move "slope buddy" up or down a line to represent a positive or a negative slope. Students will utilize the Smartboard to draw triangles to represent the rise and the run of a line. • Systems of Inequalities: in this teacher-generated activity, students follow a series of steps to discover how to solve and to graph a system of inequalities and will answer questions based on their discoveries. • Interactive Smartboard presentations will show students how to write equations, graph a line, and solve a system of equations. • Smart pal review games focus on graphing equations and placing equations in slope intercept form. 	<p>Activities to Differentiate Instruction</p> <ul style="list-style-type: none"> • Waterpark Activity: in this teacher-generated activity, students decide which admission plan for a waterpark is the "best deal". Students work in groups to answer questions that will require students to graph a set of linear equations. Challenge questions will be introduced for advanced students. • Model Equations: in this teacher-generated activity, students model various equations on a coordinate grid created with tape on the floor. Students move themselves to represent the slope of the given line. This activity can also be modified to include solving a pair of systems of equations. • Final Exam Review Stations: students complete teacher-generated questions to review concepts/skills/knowledge learned throughout the year. • Provide completed study guides as needed. • Provide calculators to assist with calculations.
<p>Integrated/Cross-Disciplinary Instruction</p>	<p>Resources</p>

- **Science:** Model linear equations that relate to science topics, such as the growth of a pine tree. Students will solve to find how many years it will take to reach a certain height, how tall it would be after a given number of years, etc.
- **Physical Education:** have students create and graph a "human" equation.

Spectrum Math (Grade 6)
Pre-Algebra textbook and workbook
Textbook pages 385-447
Punchline/Pizzazz worksheets (self correcting)
Smartboard Lessons
Kuta generated worksheets dealing with graphing linear equations and solving a system of equations
Slope intercept form activity directions
Waterpark activity questions
Activity generator
Calculators
Classzone
Football interception video clips to enhance the concept of x/y

[<< Previous Year](#)

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Unit Map 2013-2014

Green Brook Township School District

/ Pre-Algebra Curriculum (D) / Grade 6 (District Middle Curriculum)

Tuesday, August 27, 2013, 12:56PM

Green Brook Township
Public Schools

Unit: Polynomials (Week 38, 2 Weeks) 📅 📌

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 6, Mathematical Practice

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

- 2. Reason abstractly and quantitatively.
- 8. Look for and express regularity in repeated reasoning.

CommonCore: Mathematics, CommonCore: Grade 6, Expressions & Equations

6.EE Apply and extend previous understandings of arithmetic to algebraic expressions.

- 6.EE.2b. Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity.
- 6.EE.3. Apply the properties of operations to generate equivalent expressions.

CommonCore: Mathematics, CommonCore: HS: Algebra, Arithmetic with Polynomials & Rational Functions

A-APR Perform arithmetic operations on polynomials.

- A-APR.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.

Description of Unit

In this unit, students will be introduced to polynomials. Students will classify and state the degree of polynomials. They will learn how to place polynomials in ascending and descending order and how to add and subtract polynomials by combining like terms and by the column method. Students also will learn to multiply and divide polynomials.

Essential Questions

- Why is important to have a strong foundation in integer rules before learning about polynomials?
- What visual aides are available to assist in multiplying polynomials?

Knowledge

Skills

Students will know that:

- A monomial refers to a single term; a binomial refers to two terms; and a trinomial refers to three terms.
- The degree of a polynomial is the degree of the largest term.
- When placing polynomials in descending order, order the terms beginning with the largest exponent.
- When adding or subtracting polynomials, either combine the like terms, or use the column method.
- When multiplying a monomial and a bi/trinomial, utilize the distributive property. When multiplying with exponents you must **add** the exponents together.
- When multiplying two binomials, set up a Punnett Square or utilize the FOIL method.
- When dividing polynomials, expand the problem into multiple division problems; then follow the rules of exponents for dividing with exponents.

Students will be able to:

- Classify a polynomial as a monomial, binomial, or trinomial.
- Discover the degree of the polynomial by finding the term with the largest exponent.
- Order polynomials in either ascending or descending order.
- Add or subtract polynomials.
- Multiply polynomials (monomial to bi/trinomial and binomial to a binomial).
- Simplify a polynomial expression by dividing.

Assessments

Do Now Exercises

Diagnostic: Instructional/Assessment Focus

The purpose of these do now exercises is to review and remediate when necessary the concepts/skills/knowledge learned throughout the unit.

Polynomials Geometry

Formative: Other written assessments

This assessment will require students to apply their knowledge of geometry to polynomials. Students will simplify expressions for the perimeter and the area of geometric figures.

Polynomial Posters

Formative: Other written assessments

Students will work in groups to create a poster that represents a specific concept related to polynomials. The students will present the poster to the class. All posters will be displayed.

Unit Test

Summative: Written Test

Students will be assessed on the skills/concepts/knowledge in this unit.

Activities	Activities to Differentiate Instruction
<ul style="list-style-type: none"> • Polynomials Puzzle: in this activity taken from the activity generator, in pairs, students will simplify polynomial expressions by using FOIL. Students will match puzzle pieces depicting the simplified expression and the original expression. • Interactive Smartboard presentations will include polynomial operations and classifications. Students will manipulate various polynomials and place them in the correct classification. Students will also combine various monomials that are considered "like terms" and will manipulate polynomial expressions to add or subtract. • Smart pal review games will include all types of polynomial operations. 	<ul style="list-style-type: none"> • Polynomial Geometry: in this worksheet, students will be challenged to apply the concept of geometry to polynomials. Students will write and simplify expressions for the area or perimeter of geometric figures. • Small group sessions to review polynomial concepts.
Integrated/Cross-Disciplinary Instruction	Resources
<ul style="list-style-type: none"> • Science: compare the Punnett Square used to multiply binomials to the one they have utilized in science class. 	<p>Spectrum Math (Grade 6) Pre-Algebra textbook and workbook Textbook pages 651-673 Punchline/Pizzazz worksheets (self correcting) Smartboard Lessons Kuta generated worksheets dealing with polynomial operations Polynomial puzzle directions and game pieces Polynomial Geometry worksheet Calculators Classzone</p>

[<< Previous Year](#)

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