



Unit Map 2013-2014

Green Brook Township School District

/ **Pre-Algebra Curriculum (D)** / Grade 7 (District Middle Curriculum)

Tuesday, August 27, 2013, 11:50AM

Green Brook Township
Public Schools

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

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 7, Mathematical Practice

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

- 1. Make sense of problems and persevere in solving them.
- 3. Construct viable arguments and critique the reasoning of others.
- 4. Model with mathematics.
- 7. Look for and make use of structure.

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.1a. Describe situations in which opposite quantities combine to make 0.
- 7.NS.1b. Understand $p + q$ as the number located a distance $|q|$ from p , in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.
- 7.NS.1c. Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.
- 7.NS.1d. Apply properties of operations as strategies to add and subtract rational numbers.
- 7.NS.2b. Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$. Interpret quotients of rational numbers by describing real-world contexts.
- 7.NS.3. Solve real-world and mathematical problems involving the four operations with rational numbers.

Description of Unit

Essential Questions

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 of operations and real numbers. Students will become proficient at 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.

- 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 better a problem's solution?

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 two parts: a number identified as the base and a number identified as 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 numbers 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. 	<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 quotient of two or more integers. • Use and identify problem-solving strategies to solve word problems. • Locate points on a coordinate plane. • Identify important points and quadrants on a coordinate plane. • Plot an ordered pair. • Write an open-ended response. • Evaluate an Extended Constructed Response using a rubric.

- 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 problem: Read and Understand, Make a Plan, Solve the Problem, and Look Back.
- An Extended Constructed Response involves, through written language, explaining one's mathematical thinking and justifying one's processes for solution.

Assessments

Daily Assessments

Formative: Instructional/Assessment Focus

Formative assessments, such as: Do Now, Ticket Out, Homework, 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 evaluate the following: 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 knoweldge of the material contained in Unit 1.

Open-Ended Individual Assignment

Summative: Other written assessments

Each student will be provided with his/her own open-ended response problem based on ability. This will be graded using the NJASK rubric.

Integer Alphabet

Formative: Personal Project

Students will create their name or a message utlizing the integer alphabet. They will then determine the sum of their name or message.

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. • Human Number Line: Provide each student with a rational number. The students will order themselves from least to greatest. They 	<p>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 over it. 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. The project also includes critical thinking questions. Link is attached.</p> <p>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 responses, they must support their rating. To complete the assignment, provide each student with their own open-ended question. This will be graded using the NJASK rubric. Level the open-ended questions based on students' ability.</p> <p>Operations Vocabulary: Use a graphic organizer on the SmartBoard to have students identify key vocabulary words associated with mathematical operations. Have students slide words into the correct place. To challenge students, leave the words out and have students complete the chart individually, then as a whole class.</p> <p>Addition/subtraction of Integer: Use two different visuals to help students identify the rules for adding and subtracting integers. Method 1: Utilize red and yellow algebra tiles. Method 2: Use a number line. Both methods can</p>

will provide a real world example that relates to their card. They will also determine any sets of numbers that provide an example of opposites or absolute values.

be demonstrated on the Smart Board. For advanced students, have them add/subtract three or more integers at a time or involve problems with addition and subtraction.

Order of

Operations: Have advanced students insert grouping symbols into equations to formulate true statements.

Problem Solving Activity: Place students in groups by ability and have them solve a word problem on a large poster board. Provide more than one option, allowing the students to select their problem. The students must identify the problem-solving strategy utilized and show all mathematical work necessary to solve the problem. Each group will present their results to the class.

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.

Integer Alphabet: Given an alphabet where each letter represents a different integer, the students will write their names and determine the sum. To challenge students, have them write their full name or a message that is at least four words in length.

 [rutgers_coordinate_wsht.doc](#)

<p>Integrated/Cross-Disciplinary Instruction</p>	<p>Resources</p>
<p>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>Smart Board NJ Extended Constructed Response Rubric Textbook pages 2-55 Student workbook Classzone.com: Practice, Activities, and Tutor.</p>

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Last Updated: Thursday, October 25, 2012, 10:07AM



Unit Map 2013-2014

Green Brook Township School District

/ **Pre-Algebra Curriculum (D)** / Grade 7 (District Middle Curriculum)

Tuesday, August 27, 2013, 11:50AM

Green Brook Township
Public Schools

Unit: Solving Algebraic Expressions and Equations (Week 4, 4 Weeks) 📅 📌

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 7, Mathematical Practice

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

- 7. Look for and make use of structure.
- 8. Look for and express regularity in repeated reasoning.

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

7.EE 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.3. Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.
- 7.EE.4. Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.
- 7.EE.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

In this unit, the students will use properties of addition and multiplication as well as the distributive property to evaluate

Essential Questions

- Why are equations and inequalities useful?

expressions and will identify the parts of an expression. Using inverse operations, students will simplify and write one, two, and multi-step equations having like terms and parentheses.

- 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

Students will know that:

- The Commutative Property allows you to change the position of the numbers in an expression when determining a sum or product.
- The Associative Property allows you to group the numbers together when determining a sum or 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.
- The Zero Property allows you to multiply any real number by zero and obtain a product of 0.
- Using 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 more than two operations.
- The perimeter of a geometric figure is obtained by adding numeric and variable expressions.

Skills

Students will be able to:

- Identify the distributive, associative, commutative, identify and zero properties in equations.
- Use the distributive property to simplify expressions and equations.
- Simplify expressions using like terms.
- Create expressions using their knowledge of perimeter (squares, rectangles, and triangles).
- Solve one-step equations using inverse operations.
- 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.
- Determine if a given solution is an answer to an equation.

Assessments

Daily 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.

Unit Quiz**Formative: Written Test**

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

Unit Test**Written Test**

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

Telescope Group Project**Formative: Personal Project**

Group project in which students will be assessed on their response to critical thinking questions regarding a class fundraiser to purchase a telescope. Groups will be formed according to the students' abilities.

Activities

- **Exploring multi-step equations:** Form a group of four students. There is no conversation during 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 and then pass the paper to the next person in the group. The student receiving the paper must review the work already performed, making corrections if necessary. Student 2 will then perform the next step in the equation and pass the paper to the third member of the group. Each person receiving the paper must first check the work done by the other 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.

Activities to Differentiate Instruction

- **Telescope Real Word Problems:** Students will choose 3 values from a deck of cards to determine the following: the initial amount of money their group has, the amount of money they will need to reach their goal, and the amount of money they will gain each week. They will then create an algebraic equation and answer corresponding questions. They will repeat this activity 3 times per group. Student groups will be based on students' abilities. (Provide leveled values for each group.)
- **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 will physically move to the proper place in the classroom. The teacher may provide students with specific cards based on their abilities. On a large post-it,

the students copy down their examples. As a whole class, determine if all the students are in their correct places.

- **Pennies Hands-on Investigation:** 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 determine the height of one penny, 50 pennies and 2050 pennies. They will then individually answer extension questions and make real world connections to the height of Mount Everest and the Empire State Building. Challenging/Extension open-ended response questions are provided for more advanced students, and one-on-one assistance is provided 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.

 [Penny Project](#)

<p>Integrated/Cross-Disciplinary Instruction</p>	<p>Resources</p>
<ul style="list-style-type: none"> • Temperature: Discuss the difference between Kelvin and Celsius scales to measure temperature. Provide background information and a formula to determine Kelvin temperatures given an equivalent Celsius temperature. Relate this to absolute value and absolute zero. To challenge students, have them determine a formula to convert from Kelvin to Celsius. 	<ul style="list-style-type: none"> -Mc Dougal Littel Text Book pages 62-129 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

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Unit Map 2013-2014

Green Brook Township School District

/ **Pre-Algebra Curriculum (D)** / Grade 7 (District Middle Curriculum)

Tuesday, August 27, 2013, 11:51AM

Green Brook Township
Public Schools

Unit: Decimals and Inequalities (Week 8, 2 Weeks) 📅 📄

New Jersey Core Curriculum Standards

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

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

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

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

Students will begin this chapter by comparing and ordering decimals. Students will then review how to perform mathematical operations involving decimals. Students will

Essential Questions

- Why are equations and inequalities useful?
- Why are there different types of numbers?

also begin writing, translating and graphing inequalities. They will use their knowledge of equations to solve inequalities. Finally, students will apply their knowledge of decimals to simplify equations and inequalities.

- How does comparing quantities describe the relationship between them?

Knowledge

Students will know that:

- An inequality is a statement formed by placing an inequality symbol between two expressions.
- Inequalities are formed using the $<$ and $>$ symbols.
- The solution for inequalities involving variables is the set of all numbers that produce a true statement when substituted for the variable.
- When performing the multiplication and division properties with inequalities, the direction of the inequalities symbol must be reversed when multiplying or dividing each side of an inequality by a negative number.
- Decimals relate to place value.

Skills

Students will be able to:

- 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 expressions involving decimals utilizing all operations.
- Solve algebraic equations involving decimals.

Assessments

Daily 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.

Unit Quiz

Formative: Written Test

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

Unit Test

Summative: Written Test

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

<p>Activities</p>	<p>Activities to Differentiate Instruction</p>
<p>School Play Project: Using a real-life situation, students will analyze the financial responsibilities involved in planning a school play. The students will pretend they are the supervisors of a school play committee and will decide to have three nights of performances. The income depends on the number of people who attend the play. Review the term "profit": the amount of income received from the performances minus the expenses. The expenses are refreshments, costumes and lighting. Students will use all concepts from chapters 1-3 to complete this project.</p>	<ul style="list-style-type: none"> • Place Value: Provide students with a graphic organizer and, as a whole class, complete the place values from millions to thousandths. Have students create different numbers and verbally identify them. • Ordering Decimals: Students will participate in an interactive Smartboard presentation focused on comparing and ordering decimals. Students will maneuver decimal points and insert zeros when necessary, utilizing a vertical format to order decimals. For advanced students, have them create a number line, identifying various rational numbers. • Matching Game (tactile and visual): Provide real-life examples of inequalities and have students match them with a verbal phrase. Students will graph the inequalities. • BRAIN GAME for advanced students: 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 the oldest and the youngest child in the group.
<p>Integrated/Cross-Disciplinary Instruction</p>	<p>Resources</p>
<p>Social Studies: Using their understanding of inequalities in mathematics, the students will explore how can this concept can apply to the real world. As a whole class, discuss inequalities that arise in America such as social or racial inequality.</p>	<p>Textbook pages 138-159 Chapter 3 Resource Book Smart Board Classzone</p>

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Atlas Version 7.2.6



Unit Map 2013-2014

Green Brook Township School District

/ **Pre-Algebra Curriculum (D)** / Grade 7 (District Middle Curriculum)

Tuesday, August 27, 2013, 11:51AM

Green Brook Township
Public Schools

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

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 7, Mathematical Practice

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

- 2. Reason abstractly and quantitatively.
- 4. Model with mathematics.
- 6. Attend to precision.

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

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

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

CommonCore: Mathematics, CommonCore: Grade 8, 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 (Greatest Common Factor), of numbers and monomials. Students simplify fractions and compare fractions using the LCD (Least Common Denominator). Students use the product of

Essential Questions

- Why are there different types of numbers?
- What can we learn from studying patterns?

powers and quotient of powers properties to simplify expressions. Finally, students write numbers in scientific notation.

- How does finding the common characteristics among similar problems and numbers help one to become a more efficient problem solver?
- How does comparing quantities describe the relationship between them?

Knowledge	Skills
<p>Students will know that:</p> <ul style="list-style-type: none"> • 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 number. • A fraction in simplest form has a numerator and denominator that 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 when multiplying powers with the same base, add their exponents. • The Quotient of Powers Property states that when dividing powers with the same base, subtract the exponent of the denominator from the exponent of the numerator. • For any nonzero number a, $a^0 = 1$. • 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 n is an integer. 	<p>Students will be able to:</p> <ul style="list-style-type: none"> • Write the prime factorization of a number using exponents. • Calculate the prime factorization of a number using a factor tree. • List the factors of 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. • Simplify zero exponents. • Multiply powers. • Write numbers in scientific notation with positive and negative exponents.

Assessments

Daily Formative Assessment

Formative: Instructional/Assessment Focus

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

Unit Quiz

Formative: Written Test

A teacher-constructed test in which students demonstrate their knowledge of:

- Prime and Composite numbers.
- Factoring whole numbers 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 their completion of unit study guide. Utilizing their color-coded study-guides, the teacher will group the students by ability and will provide necessary remediation.

My Special Number Project

Formative: Personal Project

My Special Number Chapter Project: The teacher will grade the project using a rubric to assess the students understanding of GCF and LCM.

Unit Test

Summative: Written Test

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

Pre-Test

Diagnostic: Benchmark Assessment

Students complete a pre-test on operations with fractions to determine their strengths and weaknesses relative to the unit content.

Activities	Activities to Differentiate Instruction
<ul style="list-style-type: none"> • Investigation of Prime and Composite Numbers: Use a visual chart of numbers (1-100) and determine if a number is prime or composite. Students will x-out composite numbers and circle prime numbers. Are there any patterns? • Fraction Scramble: Re-arrange the numerators and denominators of 5 fractions to make 5 new fractions. (Textbook page 192). • GCF VENN DIAGRAM: On the SmartBoard, display a Venn diagram with numbers or monomials displayed on the outside. Have students go to the board to input the numbers and monomials into their correct place to determine the common and non-common factors and variables. • Slide method for GCF: This is a more efficient method of finding the GCF, rather than having students list the factors. Demonstrate the method to the students and have them state why this method is more efficient. • 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: In pairs, students will make a poster based on the mathematical properties of their special number. • Scientific Notation: The students will complete a chart demonstrating the relationship between standard form, product form, and scientific notation. • Calculators: Utilize calculators to demonstrate the process of entering exponents. Show students the practicality of Scientific Notation (some numbers are too long for calculators to display or interpret). 	<p>Error Analysis (Advanced Activity): describe and correct the error in finding the LCM of two numbers. Example: 16 and 30. ($16 = 2 \times 2 \times 2 \times 2$ and $30 = 2 \times 3 \times 5$)</p> <p>Human Numberline Activity: Provide each students with a fraction written on a note card (multiples of 4). Utilizing their knowledge of equivalent fractions and LCD, they will order themselves from least to greatest. Challenge certain students by providing them with more difficult numbers. Accommodate students' needs by providing them with more common fractions with one or two digit bases.</p> <p>Equivalent Fractions/Ordering Fractions:</p> <ul style="list-style-type: none"> • Below/On-Level: Have students model fractions (fraction strips) to determine equivalent fractions. They will then answer critical thinking questions, ie.: What do you notice about the numerators and denominators of the equivalent fractions? List 3 more equivalent fractions for each original fraction. • Above Level: Have students list their daily activities in the form of a fraction (out of 24 hours). Then have the students order the fractions from least to greatest and convert to decimals. <p>TRAFFIC LIGHT: Students will self-assess their needs based on their completion of a unit study guide. They will color-code the guide (red= not confident, yellow= could use a little more help, green= understand). The teacher will group the students based on their needs and provide assistance and extra practice. Those who struggle with the following skills should work on the following problems: Factors- pg 210 (5-12) GCF- pg 211 (13-16) Equivalent Fractions- pg211 (17-24) LCM-pg212 (25-29) Exponents- pg212 (30-37) Scientific Notation - pg213 (42-47) ALL GROUPS WORK ON PAGE 210 #1-4</p>

Integrated/Cross-Disciplinary Instruction	Resources
<ul style="list-style-type: none"> 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 in a way that is visually pleasing to the audience. The use of factors is critical in determining such possible arrangements. Provide the students with the number of students in the school choir or band and have them create different ways to arrange the students. Are there any other factors we must keep in mind when arranging students? (ex: 1xn arrangement will be too wide) 	Textbook pages 168-215 Smart Board Workbook Calculators classzone

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Unit Map 2013-2014

Green Brook Township School District

/ **Pre-Algebra Curriculum (D)** / Grade 7 (District Middle Curriculum)

Tuesday, August 27, 2013, 11:51AM

Green Brook Township
Public Schools

Unit: Rational Numbers, Operations and Equations (Week 13, 4 Weeks)

New Jersey Core Curriculum Standards

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.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.
- 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

In this chapter, 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. Lastly, students will use their knowledge of rational numbers, equations, and inequalities to solve equations and inequalities involving rational numbers.

Essential Questions

- Why are equations and inequalities useful?
- Why are there different types of numbers?
- What can we learn from studying patterns?

Knowledge

Students will know that:

- 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 nonzero number, multiply by its reciprocal.

Skills

Students will be able to:

- Identify rational numbers and repeating and terminating decimals.
- Convert decimals to fractions and vice-versa
- Compare rational numbers from least to greatest.
- Write fractions and mixed numbers as improper fractions.
- Perform all operations with all types of fractions (mixed, improper, common denominators, unlike denominators)
- Solve equations with rational numbers
- Solve inequalities with rational numbers
- Graph inequalities with rational numbers.

Assessments**Pie in the Sky****Formative: Lab Assignment**

On graph paper, the students will make a grid with as many sections as they like. They will color in the segments on the grid that represent the current cloud coverage. The result is that each student creates his or her own fraction to describe the sky.

Then, repeat the opening motivation question:

- How would you describe the sky?
(Students should have fractions for answers, and the answers may vary because students may have filled in different numbers of blocks due to the fact that clouds are not easy to exactly measure. They should also have answers such as clear, scattered, broken, or overcast. Students may also describe the clouds in terms of the type of clouds—i.e., cumulous, cirrus, stratus.)
- What is the difference in how you described the sky before and how you describe it now?

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.

Tic Tac Toe Review

Diagnostic: Self Assessment

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

Mid-Term

Summative: Benchmark Assessment

Students will complete a teacher-constructed benchmark to assess their understanding of solving equations, expressions, and inequalities with rational numbers.

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.

Activities

- **FOLDABLE/Guided Notes:** The students will complete example problems as a class. Steps should be broken down and written in a foldable graphic organizer: 1. convert to improper fractions. 2. find a common denominator. 3. change the numerator. 4. perform the operation.
- **Graphing Calculators:** Students will learn how to insert and solve problems involving fractions utilizing graphing calculators and the TI 34.

Activities to Differentiate Instruction

Human Number Line Activity: Each student is given a fraction based on ability and must re-write it as a decimal. They then order the decimals from least to greatest. 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.

- **Recipe Activity:** Students will alter their own 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. Include examples and non-examples of each and have students plug in their own examples. Include key vocabulary terms, such as terminating and repeating decimals and rational numbers.

Above Level: Have students think critically and relate fractions to the stock exchange. Have them determine the overall profit or loss of sample 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 numerous partners.

Tic-Tac-Toe Self-Assessment: Students complete a unit review using tic-tac-toe boards. Each board will assess a different concept: \pm fractions, $\times \div$ fractions, equations and inequalities. Students will be grouped according to their self-assessed weaknesses.

Fractions and Equations: Advanced students use their knowledge of multi-step equations to solve problems involving fractions and the Distributive Property. Students must distribute or "clear" the fraction to solve the problem. Link attached.

 [challenge fractions.doc](#)

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 provides students with several means of communication (fractions and meteorological terms) to describe a meteorological situation. Prior to this lesson, a student may have looked up at the sky and said there are a lot of clouds in the sky. After the lesson, the student may look up realize that not only are there a lot of clouds in the sky, but that there is approximately 90 percent coverage or that the sky is overcast.</p>	<p>Classzone Smart Board Computers to conduct research for pricing of ingredients for the Recipe Project Graphing Calculators Textbook pages 216-263 Student Workbook Sciencelinks.com</p>

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Last Updated: Thursday, October 25, 2012, 12:02PM



Unit Map 2013-2014

Green Brook Township School District

/ **Pre-Algebra Curriculum (D)** / Grade 7 (District Middle Curriculum)

Tuesday, August 27, 2013, 11:52AM

Green Brook Township
Public Schools

Unit: Ratio, Proportion and Probability (Week 17, 4 Weeks) 📅 📌

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 7, Mathematical Practice

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

- 1. Make sense of problems and persevere in solving them.
- 5. Use appropriate tools strategically.
- 6. Attend to precision.

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

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

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

Description of Unit

In this unit, students calculate and interpret unit rates. Students will solve proportions using their knowledge of algebraic equations and the cross products property. Students identify corresponding side lengths and determine unknown side lengths of similar figures. Next, students will calculate distances utilizing scales and scale drawings. Finally, students find the probability of an event and use the counting principle to determine a total number of possibilities.

Essential Questions

- How does comparing quantities describe the relationship between them?
- How are ratios and proportions used to compare quantities?
- What makes something similar?
- How is the probability of event determined and described?

Knowledge	Skills
<p>Students will know that:</p> <ul style="list-style-type: none"> • 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 have 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. 	<p>Students will be able to:</p> <ul style="list-style-type: none"> • Write ratios in simplest form in three 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. • 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 figures using proportions. • Use proportions to solve problems involving indirect measurement. • Make a scaled drawing of an object using proportions. • Find the dimensions and the scale of a scale model by using proportions.

Assessments

Proportional Pencil Activity

Formative: Personal Project

Proportion Activity: Students will demonstrate their knowledge of proportions and scale models. They will be graded using a teacher-constructed rubric. Provide extension and conclusion questions.

Ratios and Rate Quiz

Formative: Written Test

A teacher-constructed quiz assessing the students' knowledge 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.

Google Earth

Formative: Lab Assignment

Google Earth Scale Project: The students will demonstrate their knowledge of calculating scales and solving proportions. The project will be graded using a teacher-constructed rubric.

In a more challenging version of the activity, students must create their own scale model drawing using the units provided. Link is attached.

Unit Test

Summative: Written Test

Students will complete a teacher-constructed unit test assessing all unit content.

Open Ended

Summative: Other written assessments

Students will complete an open-ended response on Unit Rates, which will be graded using the NJASK scoring rubric.

Daily 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.

Activities	Activities to Differentiate Instruction
<ul style="list-style-type: none"> • Comparing Rates: In partners, one student counts the number of times his/her heart beats in 10 seconds, while the other student counts the number of times his/her heart beats in 15 seconds. The "10 sec. person" multiplies his/her beats by 66, and the "15 sec. 	<p>Investigating Ratios and Rates: Construct a large chart with a column for each month of the year. Collect data on the date of each student's birthday (example: if your birthday was August 16, you would write a 16 under the month of August) and have students write ratios based on the data collected. Example: write a ratio of the number of students born on even-numbered</p>

person" multiplies his/her beats by 44. Who has the faster heart rate? How did the mathematical process help you compare the rates? Provide a given set of pulse rates and have the students individually determine 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, the height of their pencil, and the height of a doll (GI Joe, Barbie, etc.) they have brought to class. Using proportions, have the students determine an appropriate pencil height for the doll. Provide extension and conclusion questions.
- **Congruent Polygons:** Have students complete charts showing the corresponding parts of 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 calculate ratios and determine the distance between two places. Link is attached.

-  [Scale Drawing Project](#)
-  [Congruent & Similar.ppt](#)
-  [scale drawing notebook](#)

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:

On Level: Have students utilize unit rates to calculate other values. For example, if 4 apples cost \$2.50, how much would 7 apples cost?

Above Level: Provide 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 be aligned. Ensure that all problems result in whole numbers.

Above Level: Real-World Problem Solving -

Students determine the quantities of food and beverage to buy given a table of food items and the number of servings needed. This activity combines proportional reasoning with decimals.

Disney Map Fun: Provide students with maps of Disney World (Magic Kingdom, Animal Kingdom, MGM, and Epcot). 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. Take the students outside to 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 draw conclusions about the accuracy of Google Earth.

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

 [6.6 scale drwing project INC.doc](#)

 [Disney Map Fun.docx](#)

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 for a school play. 	Smart Board Links Power Point Links Google Earth Textbook pages 266-304 Student workbook Classzone

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Unit Map 2013-2014

Green Brook Township School District

/ **Pre-Algebra Curriculum (D)** / Grade 7 (District Middle Curriculum)

Tuesday, August 27, 2013, 11:52AM

Green Brook Township
Public Schools

Unit: Percents (Week 21, 3 Weeks) 📅 📄

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 7, Mathematical Practice

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

- 1. Make sense of problems and persevere in solving them.
- 2. Reason abstractly and quantitatively.
- 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 7, Ratios & Proportional Relationships

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

- 7.RP.2. Recognize and represent proportional relationships between quantities.
- 7.RP.2c. Represent proportional relationships by equations.
- 7.RP.3. Use proportional relationships to solve multistep ratio and percent problems.

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

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

- 7.NS.2d. Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.
- 7.NS.3. Solve real-world and mathematical problems involving the four operations with rational numbers.

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

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

- 7.EE.3. Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers

in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.

- 7.EE.4. Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.

Description of Unit	Essential Questions
<p>This unit begins with the exploration of the concept of percents. Students will learn how to convert between percents, decimals, and fractions. They will utilize the percent proportion to calculate the percent of a number, or find the percent from one number to another. Students will solve real-world problems involving percents and utilize the percent of change proportion. Next, 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 to simple and compound interest.</p>	<ul style="list-style-type: none"> • How will our previous knowledge of converting 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	Skills
<p>Students will know that:</p> <ul style="list-style-type: none"> • Percents are ratios whose denominator is one hundred. • To convert from a decimal to a percent, move the decimal point two places to the right. • To convert from a percent to a decimal, move the decimal point two places to the left. • There are two types of methods for solving proportion equations: $\text{is/of} = \text{percent}/100$ and $\text{part/whole} = \text{percent}/100$ (used with word problems). • A percent of change is calculated using the follow formula: $\text{change/original} = \text{percent}/100$. • One must simplify all fractions before solving a proportion. • Tax, tip, and percent increase are all markups and are added onto the original cost. • A discount is subtracted from the original cost. • Simple interest is interest based on the principle amount. • Compound interest is interest on the principle amount plus the interest. 	<p>Students will be able to:</p> <ul style="list-style-type: none"> • Convert between fractions, decimals, and percents. • Organize information from word problems and set up a percent proportion. • Solve proportions utilizing either the arrow method or the cross products method. • Calculate the percent increase or decrease from an original cost 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 determine the new price. • Calculate the simple or compound interest for a given situation, then determine the balance of the account.

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 during each lesson.

My Wish List

Formative: Other written assessments

This assessment will apply percents to the students' personal lives.

Shopping Activity

Formative: Self Assessment

Students will work with their peers to determine which store is offering the best deal on each item. Students will be heterogeneously grouped and assigned a specific store.

Percents Unit Quiz

Formative: Written Test

This unit quiz will assess the following skills/knowledge:

- Converting between percent, decimal, and fraction.
- Utilizing the percent proportion and solving real-world percent word problems.

Percent Poster

Formative: Other visual assessments

This percent poster will assess the students' knowledge of percent applications and their application to real-world situations (their store is going out of business).

Percent Stations

Formative: Self Assessment

The stations provide a self-assessment for the students to review all the concepts/skills covered in the unit.

Percents Unit Test

Summative: Written Test

This teacher-constructed unit test will assess all the unit content.

Activities	Activities to Differentiate Instruction
<ul style="list-style-type: none"> • My Wish List: Teacher-generated activity provides students with the opportunity to go on an imaginary shopping spree with an unlimited budget. Students are given a list of items, and they will be required to purchase at least five from the list. Students will calculate the tax and the shipping on their items utilizing the percent proportion. • Percent Poster: Teacher-generated project requires the students to manage a business that is being forced to close down. In the final days, the business will have a blow-out sale. Students will be required to either state the percent off for each item or to calculate the percent off. Whichever option the students choose, they will calculate the new price for each item and design an appropriate poster. Students will present their posters to the class. • Percent Stations: Teacher-generated stations review all of the concepts/skills covered in the unit. Students will be heterogeneously grouped and will check their solutions with members of their team. • Smartboard Presentations: Provide hands-on learning with percent proportions. Students will be able to guess what is hidden behind each category and volunteer to reveal if their predications are accurate. Each problem will be broken down into successive mathematical operations, and each word or phrase that is important will be high-lighted. 	<ul style="list-style-type: none"> • Lou Gehrig’s Farewell Address: Teacher-generated activity serves as remediation for students who have not mastered conversions of fractions and percents. In small groups, students calculate the percentage for each letter utilized in Lou Gehrig’s farewell address. • Shopping Activity: This activity (can be found in the activity generator) is completed in groups of 4. Students are presented with various items and their discount, stated as a percentage off, at four different stores. Students find the sale price at each store and determine the best deal. The stores will be assigned by ability level. • Smart Pal Reviews: A whole-class self-assessment: <ul style="list-style-type: none"> For visual learners, draw the “percent picture” which demonstrates the correct way to move the decimal point when converting from decimals to percents.. Provide calculators to assist students with advanced calculations. Provide completed study guides if needed. Introduce compound interest to students who have demonstrated mastery in percentages and simple interest.
Integrated/Cross-Disciplinary Instruction	Resources
<ul style="list-style-type: none"> • Sports: Apply percents to Lou Gehrig’s famous farewell address. Students will calculate the percentage for each letter utilized in Lou Gehrig’s farewell address. Provide a video clip of Lou Gehrig addressing the crowd at Yankee Stadium. 	<p>Spectrum Math (Grade 7) Pre-Algebra textbook and workbook Textbook pages 329-373 Punchline/Pizzazz worksheets (self correcting) Smartboard Lessons Kuta generated worksheets dealing with percents and percent applications</p>

- **Economics:** Students go on imaginary shopping trips to determine which store has the best deal, and/or the amount of money saved by shopping at a particular store.
- **Business:** Students construct a creative display, enticing people to shop at their store. Students write a paragraph describing why people should shop at their store and not at others. They should include the sales and discounts to promote their business.

My Shopping List activity directions
Teacher-generated directions for the percent poster project
Activity generator for the group shopping activity
Lou Gehrig's Farewell Address
Classzone

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Unit Map 2013-2014

Green Brook Township School District

/ **Pre-Algebra Curriculum (D)** / Grade 7 (District Middle Curriculum)

Tuesday, August 27, 2013, 11:53AM

Green Brook Township
Public Schools

Unit: Measurement, Area, and Volume (Week 24, 3 Weeks)  

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 7, Mathematical Practice

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

- 1. Make sense of problems and persevere in solving them.
- 4. Model with mathematics.
- 5. Use appropriate tools strategically.
- 8. Look for and express regularity in repeated reasoning.

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.

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

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

- 7.EE.3. Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.
- 7.EE.4. Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.

CommonCore: Mathematics, CommonCore: Grade 7, Geometry

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

- 7.G.3. Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.

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

- 7.G.4. Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.
- 7.G.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 introduces students to classification of triangles by both their side and angle measurements. Students also will learn the characteristics of polygons, specifically quadrilaterals. Students will utilize algebraic equations to calculate the measure of a quadrilateral's missing angle(s) or side length. Students utilize formulas to calculate the area of parallelograms, trapezoids, circles and irregular figures. Students also identify and name three-dimensional solids. Finally, students will calculate the surface area of rectangular prisms and cylinders and will determine the volume of prisms, pyramids, cones, and cylinders.

Essential Questions

- How can Geometry be useful in one's profession?
- How are we able to build upon our knowledge of equations and apply them to geometry?

Knowledge

Students will know that:

- A triangle can be classified by its angle measurements or by its side lengths.
- An equilateral triangle has all sides equal.
- An isosceles triangle has two equal sides.
- A scalene triangle has no equal sides.
- An acute triangle has all acute angles.
- An obtuse triangle has one angle that is greater than ninety degrees.
- A right triangle has one ninety degree angle.
- The sum of the angles measures in a triangle is 180 degrees.
- 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.

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.
- 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.
- Calculate the radius of a circle when given the diameter and vice a versa.
- Calculate the area of rectangles, squares, parallelograms, trapezoids, and circles.

- A square, rectangle, trapezoid, parallelogram, and rhombus are all quadrilaterals, but have different distinct characteristics.
- The sum of the angle measures in a quadrilateral is 360 degrees.
- The area of a figure is the amount of space it occupies.
- The area of an irregular figure, is the sum of the area of the regular figures it contains.
- 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.
- Solids are always classified based on the 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.
- Vertices are formed when edges come together to form a point.
- The surface area of any solid is simply the sum of all its faces.
- The volume of any solid is how much substance it can hold.

- Split up an irregular figure into regular shapes; add together the areas of all individual figures to find the total area of the irregular figure.
- Classify solids based on their bases.
- 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 provide review and remediation when necessary.

Polygon Drawing Activity

Formative: Self Assessment

This activity will assess the students' knowledge of the characteristics of polygons and their ability to follow a specific set of directions.

Old MacDonald's Farm

Formative: Other written assessments

This activity will assess the students' knowledge of how to calculate the area of both regular and irregular figures.

Area Unit Quiz

Formative: Written Test

This unit quiz will assess the concepts covered within the first half of the unit: calculating missing angles in triangles and quadrilaterals; calculating the area of 2-D shapes and irregular figures.

Unit Cubes Surface Area

Formative: Self Assessment

This activity introduces students to the literal meaning of surface area. Students will find the area of all the faces of a rectangular prism, then add them together to derive the surface area of the solid. A class discussion will help students notice a pattern in their calculations.

Reminder Posters

Formative: Self Assessment

These posters serve as a self-assessment for all unit content.

Area/Surface Area Unit Test

Summative: Written Test

This teacher-constructed test will assess all concepts relative to area.

Activities	Activities to Differentiate Instruction
<ul style="list-style-type: none"> • Polygon Drawing Activity: In this activity (from the McDougal 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 reinforce students' knowledge of shapes as well as their ability to closely follow the directions of their classmates. • Power Solids: Teacher-generated activity in which students utilize Power Solids to demonstrate the formation of a net and to determine the surface area and the volume of the shapes. They experiment to determine how many times it will take for a cone to fill a cylinder that has the same height and base. • Old MacDonald's Farm: Teacher-generated activity in which students use a map of Old MacDonald's Farm. Students are required to find the area of all the buildings on Old MacDonald's Farm (both regular and irregular). Students will be provided with a variety of critical thinking 	<ul style="list-style-type: none"> • Irregular Figures Activity: In this teacher-generated activity, students will construct an irregular figure. Students will find the area of three different shapes (provided by the teacher) and will arrange those shapes to create a new figure. Students will trace this figure on a separate sheet of paper. How can we find the area of this irregular figure? Students will draw lines to demonstrate the original regular figures, then use the three regular-figure areas to find the area of the irregular figure. • Reminder Posters: In groups, students will be assigned a particular concept. They will create a display explaining their topic, providing examples of how it's used or its purpose. • Unit Cubes Surface Area: In this teacher-generated activity, students utilize unit cubes to create a rectangular prism. Students trace all six faces of the rectangular prism, and calculate the area of each face. As a class,

questions that will alter some of the solutions that the students have calculated.

- **Smartboard Presentations:** Provide an interactive introduction to classifying solids by dragging them to their correct location. Students will demonstrate on the Smartboard how to break apart a figure into 2-D shapes in order to find the area of each shape and thus the area of the whole.

determine if any patterns associated with the various rectangular prisms exist. Together, discover the formula for calculating the surface area of a rectangular prism.

(Provide: Calculators to assist with large computations when calculating surface area and volume and NJASK reference sheets to assist students with the area formulas)

Integrated/Cross-Disciplinary Instruction	Resources
<ul style="list-style-type: none"> • Architecture: Relate the concepts of area and surface area to architecture and construction. Students will use their knowledge of cones and volume to discover which ice cream cone is the best for their money (which holds more ice cream). 	<p>Spectrum Math (Grade 7) Pre-Algebra textbook and workbook Textbook pages 511-567 Punchline/Pizzazz worksheets (self correcting) Smartboard Lessons Kuta worksheets for classifying 2-D and 3-D figures, finding missing angles in triangles and quadrilaterals, and calculating areas of figures. Old MacDonald's Farm map Basic shapes used to create the irregular figures Interconnecting unit cubes Power Solids NJ ASK reference sheets Activity generator for the polygon drawing activity Calculators Classzone</p>

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Unit Map 2013-2014

Green Brook Township School District

/ **Pre-Algebra Curriculum (D)** / Grade 7 (District Middle Curriculum)

Tuesday, August 27, 2013, 11:53AM

Green Brook Township
Public Schools

Unit: Angle Relationships and Transformations (Week 27, 2 Weeks)

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 7, Mathematical Practice

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

- 1. Make sense of problems and persevere in solving them.
- 2. Reason abstractly and quantitatively.
- 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 7, Expressions & Equations

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

- 7.EE.3. Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.
- 7.EE.4. Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.

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>In this unit, students identify and compare the different types of angle relationships. Students will learn how to utilize equations to determine the missing angle measures. They will classify the various angles formed when two angles are cut by a transversal, and will find the sum of the interior and the exterior angles of a polygon. Finally, the students will identify and utilize four types of transformations (translations, reflections, rotations, and dilations) and will relate the rules of transformations to the coordinate plane to determine new images.</p>	<ul style="list-style-type: none"> • How are mathematical concepts linked from unit to unit? • How can transformations be useful in business?
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, corresponding, alternate interior, alternate exterior, vertical, and supplementary angles are formed. • Adjacent angles are two congruent angles that share a common ray. • Polygons are formed by triangles. To find the interior measure of any polygon, find the sum of all the triangles. 	<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 there are parallel lines cut by a transversal. • Utilize their knowledge of identifying angle relationships to create an equation to find a missing angle measure. • Break a polygon apart using triangles to find the sum of its interior angles. • Calculate the sum of the interior angles of any n-sided polygon utilizing the formula. • Calculate the measure of an exterior angle in any regular n-sided polygon.

- The formula for the sum of the interior angles of a polygon is: $(n-2) * 180$.
- The sum of the exterior angles of any polygon is 360 degrees.
- 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 during class.

Interior Angles Exploratory Activity

Formative: Self Assessment

This self-assessment requires students to determine the pattern for calculating the sum of the interior angles of a polygon. Students will determine the formula for finding the sum of the interior angles of any n-sided polygon.

Angles Unit Quiz

Formative: Written Test

This quiz assess the following concepts: complementary angles, vertical angles, supplementary angles, angle sum, and transversals.

Human Crane Game

Formative: Dramatization

This activity assesses students' ability to comprehend verbal mathematical directions.

Transformations

Formative: Other written assessments

This comprehensive Smartboard activity assesses the application of transformations.

Angles and Transformations Unit Test

Summative: Written Test

This unit test assesses the concepts/skills included in the unit.

Activities	Activities to Differentiate Instruction
<ul style="list-style-type: none"> • Interior Angles Exploratory Activity: In this teacher-generated activity, students explore polygons to determine how many triangles they contain. Students will search for any patterns that occur, which will lead to discovery of the formula for finding the sum of the angles. • Transformations Smartboard: In this teacher-generated presentation, students learn the properties of transformations. Students manipulate objects based on the required transformation and determine if an algebraic rule exists to represent each transformation. 	<ul style="list-style-type: none"> • Human Crane Game: Teacher-generated, kinesthetic activity that begins by pairing students and naming one person the crane and the other person the operator. Students use directional and mathematical vocabulary to allow the crane to move (translate) and pick up a ball. To make this activity more challenging, the operator provides the directions algebraically. The activity can be modified to encompass reflections and rotations. • Transversal Cut-Out Activity: Teacher-generated activity encourages students to explore the relationship between angles formed by a transversal and congruency by manipulating angles that they cut from paper.
Integrated/Cross-Disciplinary Instruction	Resources
	<p>Spectrum Math (Grade 7) Pre-Algebra textbook and workbook Textbook pages 709-757 Punchline/Pizzazz worksheets (self correcting) Smartboard Lessons</p>

Kuta worksheets dealing with angle relationships and transformations
NJ ASK reference sheets
Teacher generated interior angles activity
Transversal cut-out activity
Calculators
Classzone

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Unit Map 2013-2014

Green Brook Township School District

/ **Pre-Algebra Curriculum (D)** / Grade 7 (District Middle Curriculum)

Tuesday, August 27, 2013, 11:53AM

Green Brook Township
Public Schools

Unit: Data Analysis/Probability & NJ ASK (Week 29, 4 Weeks) 📅 📄

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 7, Mathematical Practice

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

- 1. Make sense of problems and persevere in solving them.
- 2. Reason abstractly and quantitatively.
- 4. Model with mathematics.
- 5. Use appropriate tools strategically.
- 7. Look for and make use of structure.

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

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

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

7.SP Draw informal comparative inferences about two populations.

- 7.SP.3. Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability.
- 7.SP.4. Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.

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

- 7.SP.5. Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.

- 7.SP.6. Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability.
- 7.SP.7. Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.
- 7.SP.7a. Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events.
- 7.SP.7b. Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process.
- 7.SP.8. Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.
- 7.SP.8a. Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.
- 7.SP.8b. Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event.
- 7.SP.8c. Design and use a simulation to generate frequencies for compound events.

Description of Unit	Essential Questions
<p>In this unit, students explore data analysis and probability. They will learn single and compound probabilities, including dependent and independent events. They will utilize 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. At the conclusion of the unit, students will engage in NJASK stations to enhance and review concepts and skills learned throughout the year and to hone their test-taking strategies.</p>	<ul style="list-style-type: none"> • How do visual representations of data influence peoples' decision making? • How does probability affect the choices we make?
Knowledge	Skills
<p>Students will know that:</p> <ul style="list-style-type: none"> • In a stem and leaf plot, the stem is always the first digit 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 data for histograms (for example months in a year, miles walked, etc.) • A box and whisker plot breaks data into quartiles or quarters. 	<p>Students will be able to:</p> <ul style="list-style-type: none"> • Create and analyze various types of data displays including: stem and leaf plots, 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 a survey that includes biased and unbiased samples.

- The median, lower/upper quartile, and lower/upper extremes are information obtained from a box and whisker plot.
- Circle graphs are used to represent data that represents parts of a whole.
- To find the correct number of degrees represented by each section in a circle graph, a proportion comparing the part to the whole must be established.
- A biased sample is when only one demographic (only men, or only people aged 13) is included. An unbiased sample is when no selection discrimination occurs in a survey.
- Misleading graphs portray information in an inaccurate way that favors what the author wants you to think.
- Simple probability provides 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 the first probability does not affect the second probability. For example, flipping a coin; rolling a six on a number cube.
- Dependent probability occurs when the first probability **does** affect the second probability. For example, pulling a red marble from a bag and keeping it; pulling a yellow marble from the same bag.

- Conduct an unbiased survey, utilize an appropriate data display to show the results, and answer an open-ended question based on the data/survey.
- Differentiate between acceptable graphs and misleading graphs.
- Explain why a graph is considered to be misleading.
- 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.

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 during class.

M-A-T-H Probability

Formative: Self Assessment

Hands-on activity assessing students' understanding of experimental and theoretical probability.

M&M's Probability

Formative: Other written assessments

This hands-on activity will assess students' understanding of all forms of probability(singular, compound, theoretical, and experimental) and will review percents and proportions.

**Data Analysis and Probability Take Home Test
Summative: Written Test**

This teacher-constructed unit test will assess concepts/skills/knowledge of data displays and probability.

<p>Activities</p> <ul style="list-style-type: none"> • Probability Smartboard Presentation: Teacher-generated presentation provides hands-on experience with probability involving real-world activities, ie. rolling a die, flipping a coin, and choosing a card out of a deck. The students determine the theoretical probability for the occurrence of each event and compare the results to the experimental probability. • M-A-T-H Activity: This activity, from the activity generator, uses cut-out letters, M-A-T-H. Students choose ten cards, write down the "experimental" probabilities based upon their card selection. They also calculate the theoretical probabilities based upon the total number of cards for each letter. 	<p>Activities to Differentiate Instruction</p> <ul style="list-style-type: none"> • M & M's Activity: Teacher-generated activity in which students determine the probability of selecting each color of M & M from a given set. Students respond to questions involving compound probability. As an extension, include questions that consider the results when more yellow M&M's are added to the mix. • Experimental and Theoretical Probabilities: Teacher-generated activity in which students flip a counting chip (one side is red while the other side is yellow) a total of twenty times and record their results for each flip. Students practice converting the numbers to decimals and relate the results to probability.
<p>Integrated/Cross-Disciplinary Instruction</p> <ul style="list-style-type: none"> • Games of Chance: Relate the concepts of probability to games of chance. Discuss students' favorite board games and why the games are fair. Have students determine changes that could be made to make them un-fair. 	<p>Resources</p> <p>Spectrum Math (Grade 7) Pre-Algebra textbook and workbook Textbook pages 581-645 Punchline/Pizzazz worksheets (self correcting) Smartboard Lessons Kuta worksheets dealing with simple and compound probabilities M-A-T-H cards and directions M & M's (also directions) NJASK Stations Questions Activity Generator</p>

Calculators
Classzone

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Unit Map 2013-2014

Green Brook Township School District

/ **Pre-Algebra Curriculum (D)** / Grade 7 (District Middle Curriculum)

Tuesday, August 27, 2013, 11:54AM

Green Brook Township
Public Schools

Unit: Radicals and Systems of Measurement (Week 33, 3 Weeks)  

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 7, Mathematical Practice

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

- 1. Make sense of problems and persevere in solving them.
- 2. Reason abstractly and quantitatively.
- 5. Use appropriate tools strategically.
- 6. Attend to precision.

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.

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 develops the students' understanding of the fundamentals of square roots, including estimating a non-perfect square root. Students learn how to simplify radical expressions utilizing the order of operations, to solve equations involving exponents, and to identify and compare rational and irrational numbers. During the unit, students explore the Pythagorean Theorem and utilize the formula to determine the missing side lengths of a right triangle. Students utilize the customary and metric units of measurement and identify the most appropriate units of measure for a given situation. They also learn to convert between units of measure in both systems.</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 what profession(s) 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 of measurement?
Knowledge	Skills
<p>Students will know that:</p> <ul style="list-style-type: none"> • A perfect square is a square of any whole number. • To estimate the square root of a number, identify which two perfect squares it falls between and determine to which one it is closest. • When evaluating radical expressions, follow the order of operations and take the square root last. • To "undo" a variable raised to the second power in an equation, 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 a terminating decimal. • An irrational number cannot be written as a fraction and is a non-repeating/non-terminating decimal. • The Pythagorean Theorem can be used to find the measure of a missing side length in any right triangle. 	<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. • Build upon their knowledge of equations to solve an equation involving a variable being raised to the second power. • Identify whether a number is rational or irrational. • 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 a given situation. • Convert between different units of measure in the customary and metric systems. • Add and subtract units of measure in the customary system.

- The United States uses the customary system of measurement, while the rest of the world uses the metric system.
- When converting between different units in the metric system, move the decimal point left or right depending upon if the units are getting larger or smaller.
- One divides when converting from a small unit to a larger unit in the customary system.
- One multiplies 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 during class.

Pythagorean Theorem Stations

Formative: Other written assessments

These stations assess all learning regarding the Pythagorean Theorem and have students apply the Pythagorean Theorem to "real world" examples.

Radicals Unit Quiz

Formative: Written Test

This unit quiz will assess the students' knowledge and skills related to radicals and the Pythagorean Theorem.

Minch Activity

Formative: Self Assessment

The purpose of this activity is for students to have greater comprehension of the customary system. Students will utilize the creative ruler to measure various items around the classroom and use the data to respond to questions.

Math Olympics

Formative: Other written assessments

Students participate in "games" in which they must measure how far they've jumped or thrown an object. Students will add together everyone's measurements from their group.

Radicals and Measurement Unit Test**Summative: Written Test**

This unit test will assess the students' knowledge and application of the concepts and skills in the unit.

Activities	Activities to Differentiate Instruction
<ul style="list-style-type: none"> • Pythagorean Theorem Stations: Group-work activities in which students solve real-world problems utilizing the Pythagorean Theorem. • Math Olympics: Teacher-generated activity in which students compete in the "long jump" and "paper ball throwing" contests. In small groups, students measure the lengths of their jumps and throws and determine the total distance for their team. • Interactive Smartboard Presentations: Students use the Smartboard to classify and sort numbers as rational or irrational. Students use the Smartboard to assist with customary conversions and utilize a simple arm movement to determine if they need to multiply or divide when converting. 	<ul style="list-style-type: none"> • MINCH Activity: Teacher-generated activity in which students create their own "ruler" by folding and marking a sheet of paper a given number of times. After creating their rulers, students respond to questions requiring them to utilize their rulers to measure a variety of items and to simplify fractions in the answers. • When converting in the customary system, students learn the "hand motion" to symbolize when it is necessary to multiply or to divide. (If the initial unit is larger than the one converting to, outstretch your arms and then form a cross. This represents the multiplication sign. If the initial unit is smaller than the one converting to, cross your arms and move to an outstretched position. This represents the division sign).
Integrated/Cross-Disciplinary Instruction	Resources
<ul style="list-style-type: none"> • Physical Education: Students will compete in the Math Olympics and take measurements. • Architecture/Construction: Show clips from the Internet depicting engineering tasks and the importance of precise measurements. 	<p>Spectrum Math (Grade 7) Pre-Algebra textbook and workbook Textbook pages 453-475 Punchline/Pizzazz worksheets (self correcting) Smartboard Lessons Kuta worksheets dealing with radicals and measurement NJASK reference sheets Teacher-generated Math Olympics directions Pythagorean Theorem Real World Examples Calculators Classzone Engineering disaster video clips (why measurements are important)</p>

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Unit Map 2013-2014

Green Brook Township School District

/ **Pre-Algebra Curriculum (D)** / Grade 7 (District Middle Curriculum)

Tuesday, August 27, 2013, 11:54AM

Green Brook Township
Public Schools

Unit: Linear Functions and Final Exam (Week 36, 4 Weeks) 📅 📌

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 7, Mathematical Practice

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

- 1. Make sense of problems and persevere in solving them.
- 2. Reason abstractly and quantitatively.
- 5. Use appropriate tools strategically.
- 6. Attend to precision.
- 7. Look for and make use of structure.

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.2b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.

CommonCore: Mathematics, CommonCore: Grade 8, Functions

8.F Define, evaluate, and compare functions.

- 8.F.1. Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.
 - 8.F.3. Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.
- 8.F Use functions to model relationships between quantities.
- 8.F.4. Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.

- 8.F.5. Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.

Description of Unit	Essential Questions
<p>This unit explores the fundamentals of functions. Students utilize the vertical line test to determine if a set of information represents a function. They also determine the domain and the range of a set of data, given points on a graph and a set of ordered pairs. Students will learn how to determine if an ordered pair is a solution to an equation and will graph an equation using two methods: 1) create a table of values and write an equation in function form; 2) determine the x and y intercepts of an equation and plot them on a graph. The final skill presented in the unit is the calculation of slope using a graph and using the slope formula.</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? • Regarding the two ways to graph an equation, when is it practical to use each method?
Knowledge	Skills
<p>Students will know that:</p> <ul style="list-style-type: none"> • The word <i>linear</i> means line. • The word <i>domain</i> refers to the input and is represented by the x value in an ordered pair. • The word <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. • When graphing a set of data, a function will be represented when it passes the vertical line test. • 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. • When creating an x/y table to graph an equation, first write the equation in slope intercept form. 	<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 information represents a function. This also includes passing the vertical line test. • Manipulate an equation so 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 to graph it. • Calculate the slope of a line by using the mathematical formula or by observing the rise and run of the line.

- The x/y intercepts of the graph refer to the points at which the line intersects the x and y axes.
- To find the x intercept of an equation, substitute zero for the y value.
- To find the y intercept, substitute zero for the x value.
- The slope of a line refers to the relationship of the rise of a line to its run.
- Slope can be calculated mathematically by using the formula $(y_2 - y_1) / (x_2 - x_1)$.

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 during class.

Slope Buddy

Formative: Self Assessment

This self-assessment tests the students' ability to calculate the slope of a line by utilizing a graph or a mathematical formula.

Human Equations

Formative: Self Assessment

This assessment tests the students' ability to model equations.

Linear Equations Unit Test (Take Home)

Summative: Written Test

This unit test will assess the skills and knowledge contained in the linear equations unit.

Final Exam Review Stations

Formative: Other written assessments

These teacher-generated stations will review concepts and skills the students have learned throughout the year.

Pre-Algebra Final Exam

Summative: Benchmark Assessment

The Final Exam will assess all content in the Pre-Algebra course.

Activities

Activities to Differentiate Instruction

- **Slope Buddy:** Teacher-generated Smartboard presentation explores the different methods for determining slope. Students move a slope "buddy" up or down a line to represent a positive or a negative slope and utilize the Smartboard to draw triangles to represent the rise and the run of a line.
- **Store Activity:** Teacher-generated activity in which students write checks, create their own store, and shop at their classmates' stores. Students track their spending and income and balance a checkbook. They create a poster for their store that depicts the items and the cost per item for the merchandise they are selling.

- **Model Equations:** Teacher-generated activity in which students model equations on a coordinate grid that is constructed with tape on the floor of the classroom. Students physically move themselves to represent the slope of a given line. This activity can be modified to include solving a pair of systems of equations.

Integrated/Cross-Disciplinary Instruction	Resources
<ul style="list-style-type: none"> • Science: Model linear equations relate to scientific topics. Students will be responsible for determining which information relates to the slope (or the change), and what represents the y intercept (or the starting point). One example is to relate this to the growth of a pine tree and posing questions relating to how many years it would take to reach a certain height, or how tall it would be after a given number of years. • Physical Education: Students create and model a "human" equation. Each student represents a point on a given line. Students correctly place themselves on the line and transform the equation in slope intercept form. 	<p>Spectrum Math (Grade 7) Pre-Algebra textbook and workbook Textbook pages 385-409 Punchline/Pizzazz worksheets (self correcting) Smartboard Lessons Kuta worksheets dealing with graphing linear equations Writing checks class project directions Activity generator Calculators Classzone Football interception video clips to enhance the idea of x/y intercepts</p>

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