

**Randolph Township Schools
Randolph Middle School
Pre-Algebra 7 Curriculum**

*“In mathematics the art of posing a question must be held of higher value than solving it.”
-Georg Cantor*

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**Randolph Township Schools
Randolph Middle School
Pre-Algebra 7 Curriculum**

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**Randolph Township Schools
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Mission Statement

We commit to inspiring and empowering all students in Randolph schools to reach their full potential as unique, responsible and educated members of a global society.

**Affirmative Action Statement
Equality and Equity in Curriculum**

The Randolph Township School district ensures that the district's curriculum and instruction are aligned to the state's standards. The curriculum provides equity in instruction, educational programs and provides all students the opportunity to interact positively with others regardless of race, creed, color, national origin, ancestry, age, marital status, affectional or sexual orientation, gender, religion, disability or socioeconomic status.

N.J.A.C. 6A:7-1.7(b): Section 504, Rehabilitation Act of 1973; N.J.S.A. 10:5; Title IX, Education Amendments of 1972

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**EDUCATIONAL GOALS
VALUES IN EDUCATION**

The statements represent the beliefs and values regarding our educational system. Education is the key to self-actualization, which is realized through achievement and self-respect. We believe our entire system must not only represent these values, but also demonstrate them in all that we do as a school system.

We believe:

- The needs of the child come first
- Mutual respect and trust are the cornerstones of a learning community
- The learning community consists of students, educators, parents, administrators, educational support personnel, the community and Board of Education members
- A successful learning community communicates honestly and openly in a non-threatening environment
- Members of our learning community have different needs at different times. There is openness to the challenge of meeting those needs in professional and supportive ways
- Assessment of professionals (i.e., educators, administrators and educational support personnel) is a dynamic process that requires review and revision based on evolving research, practices and experiences
- Development of desired capabilities comes in stages and is achieved through hard work, reflection and ongoing growth

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Introduction

In Pre-Algebra 7 students will become familiar with pre-algebra topics such as equations, geometry, and proportional relationships. This course will ensure mastery of rigorous math problems, preparing students to enter algebra in their eighth-grade year. Methods and content include complex problem solving grounded in pre-algebra topics, such as relationships, expressions, and equations.

Furthermore, this course will make use of technology to analyze and present real data. Students are encouraged to incorporate their knowledge and interest in other disciplines into project work. In addition to gaining skills necessary to produce, analyze, model and draw conclusions from data, students are encouraged to develop skills required to persevere in problem solving, produce convincing oral and written mathematical arguments, and using appropriate terminology in a variety of settings. This course will be guided by the current New Jersey Learning Standards in Mathematics.

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Curriculum Pacing Chart**

SUGGESTED TIME ALLOTMENT	UNIT NUMBER	CONTENT - UNIT OF STUDY
10 weeks	I	The Number System
9 weeks	II	Expressions, Equations, & Inequalities
3 weeks	III	Rate, Ratios, & Proportional Relationships
5 weeks	IV	Angles, Lines, & Two-Dimensional Geometry
5 weeks	V	Area, Volume, & Surface Area
4 weeks	VI	Statistics & Probability

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Unit I: The Number System

STANDARDS / GOALS:	ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
<p>NJ 2016 SLS: Math 7.NS.A.1: Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers.</p>	<p>Real numbers are represented as points on an infinite line and are used to count measure, estimate, or approximate quantities.</p>	<p>How are numbers used in everyday life?</p>
<p>7.NS.A.1.A: Describe situations where opposite quantities combine to make 0.</p> <p>7.NS.A.1.C: Show that the distance between two rational numbers on the number line is the absolute value of their difference.</p>	<p>Real life word problems can be solved using mathematical operations and applied to rational numbers, including negative numbers.</p>	<p>How can a mathematical model aide in persevering when solving a real-world problem?</p>
<p>7.NS.A.1.D: Apply properties of operations as strategies to add and subtract rational numbers.</p>	<p><u>KNOWLEDGE</u> Students will know:</p>	<p><u>SKILLS</u> Students will be able to:</p>
<p>7.NS.A.2: Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.</p> <p>7.NS.A.2.A: Understand the rules for multiplying signed numbers and the distributive property.</p>	<p>Rational numbers can be identified and represented on a horizontal number line.</p> <p>Rational numbers can be written as fractions with integers as the numerator and the denominator (excluding zero in the denominator).</p>	<p>Plot rational numbers on the real number line between two integers.</p> <p>Express all rational numbers as fractions.</p>

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Unit I: The Number System

<p>7.NS.A.2.B: Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers is a rational number.</p> <p>7.NS.A.2.C: Apply properties of operations as strategies to multiply and divide rational numbers.</p> <p>7.NS.A.2.D: Convert a rational number to a decimal using long division and know that the decimal form terminates or repeats.</p> <p>7.NS.A.3: Solve real-world and mathematical problems involving the four operations with rational numbers.</p> <p>NJ 2016 SLS: Mathematical Practices MP1 Make sense of problems and persevere in solving them. MP2 Reason abstractly and quantitatively. MP3 Construct viable arguments and critique the reasoning of others. MP4 Model with mathematics. MP5 Use appropriate tools strategically. MP6 Attend to precision.</p>	<p>Absolute value is the measure of the distance from any rational or irrational number to zero on the number line.</p> <p>Rational numbers can be written as decimals that either terminate or repeat.</p> <p>The number line can be used to compare rational numbers.</p> <p>Mathematical operations can be performed on rational numbers.</p> <p>The distance between two integers can be modeled on the number line.</p> <p>Multiple operations can be performed on rational numbers.</p>	<p>Use the number line to model the absolute value of two rational numbers to determine which has a greater distance.</p> <p>Use the number line to model the absolute value of two rational numbers to determine which has a greater distance.</p> <p>Re-write any rational number into its decimal equivalent using the division algorithm.</p> <p>Illustrate the locations of rational numbers on the number line to indicate which is larger.</p> <p>Apply the rules of the four basic mathematical operations (addition, subtraction, multiplication, and division) on rational numbers.</p> <p>Construct a number line to illustrate the distance between two integers.</p> <p>Employ the order of operations to perform multiple operations on rational numbers.</p>
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Unit I: The Number System

<p>MP7 Look for and make use of structure. MP8 Look for and express regularity in repeated reasoning.</p> <p>NJ 2020 SLS: Career Readiness, Life Literacies, and Key Skills 9.2.8.CAP.20: Identify the items to consider when estimating the cost of funding a business.</p> <p>NJ 2016 SLS: Literacy in History, Social Studies, & Technical Subjects RST.6-8.4: Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context.</p> <p>NJ 2020 SLS: Computer Science and Design Thinking 8.1.8.AP.2: Create clearly named variables that represent different data types and perform operations on their values.</p>	<p>The distance between two integers can be modeled on the number line.</p> <p>Multiple operations can be performed on rational numbers.</p> <p>VOCABULARY: opposites, number line, fraction, terminating, repeating, precise, approximate, income, expenses, decimal,</p> <p>KEY TERMS: integers, rational number, irrational number, real number, complex fractions, least common denominator, additive inverse, zero pair, significant digits, bar notation, positive numbers, negative numbers, absolute value, whole numbers, order of operations, mixed number, improper fraction, simplest form, percent, tuition and fees, room</p>	<p>Illustrate the locations of rational numbers on the number line to indicate which is larger.</p> <p>Apply the rules of the four basic mathematical operations (addition, subtraction, multiplication, and division) on rational numbers.</p> <p>Construct a number line to illustrate the distance between two integers.</p> <p>Employ the order of operations to perform multiple operations on rational numbers.</p>
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Unit I: The Number System

	and board, work study, interest rate, interest fees	
<p>ASSESSMENT EVIDENCE: Students will show their learning by:</p> <ul style="list-style-type: none">• Articulating the knowledge of order of operations to solve problems with rational numbers• Applying properties of absolute value and rational numbers to model on a number line• Demonstrating understanding of key concepts by successfully completing a summative assessment at the culmination of a unit <p>KEY LEARNING EVENTS AND INSTRUCTION:</p> <ul style="list-style-type: none">• Teacher-led demonstration• Student-led modeling• Differentiated station groups• Small-group instruction		

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Unit I: The Number System

SUGGESTED TIME ALLOTMENT	10 weeks
SUPPLEMENTAL UNIT RESOURCES	<p>Required Resources: Math in Focus Singapore Math: Course 2 https://my.hrw.com/</p> <p>Suggested Resources: Big Ideas Red Accelerated Textbook www.bigideasmath.com/students Math in Focus Chapter Projects Number Line Creator http://theworksheetsonline.com/numline.html Worksheets http://www.kutasoftware.com/ www.mathblaster.com Illuminations Activities http://illuminations.nctm.org Brain Pop Videos http://www.brainpop.com/math/ Positive and Negative Integers in Golf video www.nbclearn.com/science-of-golf Interactive math practice www.ixl.com Absolute Value http://www.sheppardsoftware.com/mathgames/Numberballs_absolute_value/numberballsAS2_abs.htm</p>

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Unit I: The Number System

	Math Goodies Interactive Practice
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www.mathgoodies.com

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Unit II: Expressions, Equations, and Inequalities

STANDARDS / GOALS:	ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
<p>NJ 2016 SLS: Math 7.EE.A.1: Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.</p>	<p>Algebraic expressions containing rational numbers and multiple variables can be simplified, expanded, or factored to write equivalent expressions.</p>	<p>Do mathematical symbols model verbal expressions abstractly? Construct a viable argument?</p>
<p>7.EE.A.2: Understand that re-writing an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related.</p>	<p>Algebraic equations and inequalities can be used to model mathematical or real-world situations, and to find values of variables.</p>	<p>How can algebraic equations and inequalities be used to model, analyze, and solve real-world problems?</p>
<p>7.EE.B.3: Solve multi-step, real-life, and mathematical problems posed with positive and negative rational numbers in any form, using tools strategically.</p>	<p><u>KNOWLEDGE</u> Students will know:</p>	<p><u>SKILLS</u> Students will be able to:</p>
<p>7.EE.B.4: Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.</p>	<p>Algebraic expressions with fractional and decimal coefficients can be simplified.</p> <p>Algebraic expressions with fractional, decimal, and negative factors can be expanded.</p>	<p>Simplify algebraic expressions with multiple terms and variables by adding and subtracting like terms.</p> <p>Utilize the distributive property to create equivalent expressions.</p>

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Unit II: Expressions, Equations, and Inequalities

<p>7.EE.B.4.A: Solve word-problems by comparing an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach.</p> <p>7.EE.B.4.B: Graph the solution set of an inequality and interpret it in the context of a problem.</p> <p>NJ 2016 SLS: Mathematical Practices MP1 Make sense of problems and persevere in solving them. MP2 Reason abstractly and quantitatively. MP3 Construct viable arguments and critique the reasoning of others. MP4 Model with mathematics. MP5 Use appropriate tools strategically. MP6 Attend to precision. MP7 Look for and make use of structure. MP8 Look for and express regularity in repeated reasoning.</p> <p>NJ 2016 SLS: Literacy in History, Social Studies, & Technical Subjects RST.6-8.3: Follow precisely a multistep procedure when carrying out.</p>	<p>Algebraic expressions with two variables and negative terms can be factored.</p> <p>Verbal descriptions can be translated into algebraic expressions with multiple variables and parenthesis.</p> <p>Algebraic reasoning can be utilized to solve real-world problems.</p> <p>Equivalent equations are equations that have the same solution.</p> <p>Algebraic equations with one or more variables can be solved by balancing.</p> <p>Real-world problems can be solved algebraically with equations or inequalities.</p> <p>Algebraic inequalities can be solved by balancing.</p>	<p>Identify and apply the greatest common factor to create equivalent expressions.</p> <p>Convert verbal descriptions into algebraic expressions with one or more variables.</p> <p>Demonstrate multiple methods (models, diagrams, tables, and expressions) in order to solve real-world problems.</p> <p>Recognize whether a pair of equations is equivalent.</p> <p>Solve multi-step algebraic equations with variables on one side or both sides.</p> <p>Create algebraic equations and inequalities in order to solve a real-world problem.</p> <p>Solve multi-step algebraic inequalities with variables on one or both sides.</p>
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Unit II: Expressions, Equations, and Inequalities

<p>RST.6-8.4: Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context experiments, taking measurements, or performing technical tasks.</p> <p>NJ 2020 SLS: Computer Science and Design Thinking</p> <p>8.2.8.ED.3: Develop a proposal for a solution to a real-world problem that includes a model</p>	<p>Solution sets of algebraic inequalities can be graphed on a number line.</p> <p>VOCABULARY: constant, variable, numerical term, simplify, translate, balancing, expand, substitute</p> <p>KEY TERMS: coefficient, expression, algebraic term, like terms, factors, equivalent equations, solution set, equivalent inequalities, shaded circle, open circle, bar model, greatest common factor, operation symbol, commutative property, distributive property, equation, inequality, isolate</p>	<p>Graph solution sets of algebraic inequalities using empty or shaded circles and arrows.</p>
<p>ASSESSMENT EVIDENCE: Students will show their learning by:</p> <ul style="list-style-type: none"> • Articulating and writing algebraic expressions, equations, and inequalities that represent real-world scenarios • Demonstrating understanding of key concepts by successfully completing a summative assessment at the culmination of the unit <p>KEY LEARNING EVENTS AND INSTRUCTION:</p> <ul style="list-style-type: none"> • Teacher-led demonstration • Student-led modeling • Differentiated station activities • Small-group instruction 		

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Unit II: Expressions, Equations, and Inequalities

SUGGESTED TIME ALLOTMENT	9 weeks
SUPPLEMENTAL UNIT RESOURCES	<p>Required Resources: Math in Focus Singapore Math: Course 2 https://my.hrw.com/</p> <p>Suggested Resources: Big Ideas Red Accelerated Textbook www.bigideasmath.com/students Math in Focus Chapter Projects Worksheets http://www.kutasoftware.com/ www.mathblaster.com Illuminations Activities http://illuminations.nctm.org Brain Pop Videos http://www.brainpop.com/math/ Interactive math practice www.ixl.com STEM Worksheets www.superteacherworksheets.com Interactive math practice www.ixl.com Electronic Flashcards on solving inequalities http://www.quia.com/jfc/906428.htm</p>

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Unit II: Expressions, Equations, and Inequalities

	<p>Inequality game involving word problems http://www.math-play.com/Inequality-Game.html</p> <p>Tic –Tac- Toe inequalities and equations http://www.education.com/activity/article/tic-tac-equations/</p> <p>Students must solve equations and find pairs of equations that "match" http://www.bbc.co.uk/education/mathsfile/shockwave/games/equationmatch.html</p>
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Unit III: Rates, Ratios, & Proportional Relationships

STANDARDS / GOALS:	ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
<p>NJ 2016 SLS: Math 7.RP.A.1: Compute unit rates associated with ratios of fractions, including ratios of lengths, areas, and other quantities measured in like or different units.</p>	<p>Two quantities that are in a proportional relationship can be used to solve real-world and mathematical problems.</p>	<p>When is it appropriate to use proportional reasoning to solve real-world problems?</p>
<p>7.RP.A.2: Recognize and represent proportional relationships between quantities. 7.RP.A.2.A: Decide whether two quantities are in a proportional relationship.</p>	<p>Ratios and proportional relationships are used to express how quantities are related and how quantities change in relation to each other.</p>	<p>How does recognizing patterns and structure between quantities help describe the relationship between them?</p>
<p>7.RP.A.2.B: Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.</p>	<p><u>KNOWLEDGE</u> Students will know:</p>	<p><u>SKILLS</u> Students will be able to:</p>
<p>7.RP.A.2.C: Represent proportional relationships by equations.</p>	<p>Unit rates can be used to compare two quantities with two different units.</p> <p>Unit rates can be used to solve real-world problems.</p>	<p>Examine unit rates to solve problems including unit pricing and constant speed.</p> <p>Calculate unit rates in order to determine speed, distance, or time.</p>
<p>7.RP.A.2.D: Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation.</p>	<p>Sales tax, interest, and commission are real-world applications of percent.</p>	<p>Apply percent and problem-solving skills to solve real-world problems.</p>

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Unit III: Rates, Ratios, & Proportional Relationships

<p>7.RP.A.3: Use proportional relationships to solve multi-step ratio and percent problems.</p> <p>8.EE.B.5: Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.</p> <p>8.EE.B.6: Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b.</p> <p>NJ 2016 SLS: Mathematical Practices MP1 Make sense of problems and persevere in solving them. MP2 Reason abstractly and quantitatively. MP3 Construct viable arguments and critique the reasoning of others. MP4 Model with mathematics.</p>	<p>Percent of change can be expressed as percent increase or percent decrease.</p> <p>Unit rates can be represented as a constant of proportionality (e.g. $\frac{y}{x} = k$).</p> <p>Direct proportions can be interpreted using a graph.</p> <p>Direct proportions can be used to solve real-world problems.</p> <p>Inverse proportions can be represented as a constant of proportionality (e.g. $xy = k$).</p> <p>Inverse proportions can be interpreted using a graph.</p> <p>Inverse proportions can be used to solve real-world problems.</p> <p>Proportional relationships can be graphed as a straight line through the origin.</p>	<p>Calculate the percent of increase or decrease to solve real-world problems.</p> <p>Identify unit rates as direct proportions.</p> <p>Utilize a graph in order to interpret direct proportions.</p> <p>Create direct proportional relationships to solve real-world problems.</p> <p>Identify inverse proportions using the constant of proportionality.</p> <p>Utilize a graph in order to interpret inverse proportions.</p> <p>Create inverse proportional relationships to solve real-world problems.</p> <p>Interpret the slope of a line as the unit rate in a real-world scenario.</p>
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Unit III: Rates, Ratios, & Proportional Relationships

<p>MP5 Use appropriate tools strategically. MP6 Attend to precision. MP7 Look for and make use of structure. MP8 Look for and express regularity in repeated reasoning.</p> <p>NJ 2020 SLS: Career Readiness, Life Literacies, and Key Skills</p> <p>9.1.8.CDM.2: Demonstrate an understanding of the terminology associated with different types of credit (e.g., credit cards, installment loans, mortgages, lines of credit) and compare and calculate the interest rates associated with each.</p> <p>9.1.8.FI.4: Analyze the interest rates and fees associated with financial products.</p> <p>9.1.8.CDM.3: Compare and contrast loan management strategies, including interest charges and total principal repayment costs.</p> <p>9.1.8.FP.6: Compare and contrast advertising messages to understand what they are trying to accomplish.</p>	<p>Proportional relationships can be represented in different ways.</p> <p>Straight lines that do not pass through the origin are not proportional.</p> <p>Slope m is the same between any two points on a line.</p> <p>VOCABULARY: rate, speed, average speed, interest, interest rate</p> <p>KEY TERMS: ratio, unit rate, proportion, cross products, coordinates, graph, balance, liability (debt), sales tax, commission, markup, discount, direct proportion, constant of proportionality, inverse proportion</p>	<p>Compare proportional relationships in different forms.</p> <p>Derive the equation of a line in the form $y=mx+b$.</p> <p>Apply the concept of similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane.</p>
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Unit III: Rates, Ratios, & Proportional Relationships

<p>NJ 2016 SLS: Literacy in History, Social Studies, & Technical Subjects</p> <p>WHST.6-8.2.D: Use precise language and domain-specific vocabulary to inform about or explain the topic.</p> <p>WHST.6-8.1.B: Support claim(s) with logical reasoning and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources.</p>		
<p>ASSESSMENT EVIDENCE: Students will show their learning by:</p> <ul style="list-style-type: none">• Illustrating knowledge of direct and inverse proportional relationships by graphing them• Applying properties of direct and inverse proportion to solve real-world problems• Demonstrating understanding of key concepts by successfully completing a summative assessment at the culmination of the unit <p>KEY LEARNING EVENTS AND INSTRUCTION:</p> <ul style="list-style-type: none">• Teacher led demonstration• Student led modeling• Differentiated station activities• Small group instruction		

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Unit III: Rates, Ratios, & Proportional Relationships

SUGGESTED TIME ALLOTMENT	3 weeks
SUPPLEMENTAL UNIT RESOURCES	<p>Required Resources: Math in Focus Singapore Math: Course 2 https://my.hrw.com/</p> <p>Suggested Resources: Big Ideas Red Accelerated Textbook www.bigideasmath.com Math in Focus Chapter Projects Comparing Ratios http://www.figurethis.org/challenges/c25/challenge.htm Worksheets http://www.kutasoftware.com/ www.mathblaster.com Brain Pop Videos http://www.brainpop.com/math/ Rational Numbers and Proportions Activity http://illuminations.nctm.org/LessonDetail.aspx?id=L284 Proportion Game http://www.arcademicskillbuilders.com/games/dirt-bike-proportions/dirt-bikeproportions.html Power point downloads Ratios, Proportions, Units rates http://math.pppst.com/ratio-proportion-percent.html my.hrw.com Interactive math practice www.ixl.com</p>

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Unit III: Rates, Ratios, & Proportional Relationships

	STEM Worksheets
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	www.superteacherworksheets.com
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Unit IV: Angles, Lines, & Two-Dimensional Geometry

STANDARDS / GOALS:	ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
<p>NJ 2016 SLS: Math 7.G.A.1: Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.</p>	<p>Angles formed on a straight line, and by parallel lines and a transversal, have specific properties that are useful in solving problems.</p>	<p>How can properties be used to prove relationships between lines and angles?</p>
<p>7.G.A.2: Draw (with technology, with ruler and protractor as well as freehand) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.</p>	<p>Triangles and quadrilaterals can be constructed using a compass, a protractor, and a straight edge.</p>	<p>How can you determine what tools are appropriate for geometric constructions?</p>
	<p><u>KNOWLEDGE</u> Students will know:</p>	<p><u>SKILLS</u> Students will be able to:</p>
<p>7.G.B.5: Use facts about supplementary, complimentary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.</p>	<p>Angle relationships can be identified as complementary, supplementary, or adjacent angles.</p> <p>Angle relationships can be used to find unknown angle measurements.</p>	<p>Identify angle relationships as complementary, supplementary, or adjacent angles.</p> <p>Calculate the value of an unknown angle using angle relationships.</p>
<p>8.G.A.3: Describe the effects of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.</p>	<p>Properties of angles at a point can be used to find unknown angle measurements.</p>	<p>Calculate the value of unknown angles using angles at a point.</p>

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Unit IV: Angles, Lines, & Two-Dimensional Geometry

<p>NJ 2016 SLS: Mathematical Practices MP1 Make sense of problems and persevere in solving them. MP2 Reason abstractly and quantitatively. MP3 Construct viable arguments and critique the reasoning of others. MP4 Model with mathematics. MP5 Use appropriate tools strategically. MP6 Attend to precision. MP7 Look for and make use of structure. MP8 Look for and express regularity in repeated reasoning.</p> <p>NJ 2016 SLS: Literacy in History, Social Studies, & Technical Subjects RST.6-8.3: Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.</p> <p>NJ 2020 SLS: Computer Science and Design Thinking 8.2.8.ED.3: Develop a proposal for a solution to a real-world problem that includes a model.</p>	<p>Properties of vertical angles can be used to find unknown angle measurements.</p> <p>Angle bisectors divide angles into two equal parts.</p> <p>Perpendicular bisectors of a line segment always pass through the midpoint of the segment at a right angle.</p> <p>Triangles can be constructed when three of its measures are given.</p> <p>A given set of measurements can be used to determine whether a unique triangle, more than one triangle, or no triangle can be drawn.</p> <p>Quadrilaterals can be constructed using a compass, ruler, and a protractor.</p> <p>Scale factor is the ratio of the length in a drawing to the corresponding length in the actual figure.</p>	<p>Calculate the value of unknown angles using vertical angles.</p> <p>Identify and construct an angle bisector using appropriate tools.</p> <p>Define and construct perpendicular bisectors.</p> <p>Construct triangles with three given measurements.</p> <p>Conclude whether a unique triangle, more than one triangle, or no triangle can be drawn from a given set of measurements.</p> <p>Recognize and use the appropriate tools to construct quadrilaterals.</p> <p>Calculate the scale factor using corresponding lengths in drawings and actual figures.</p>
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Unit IV: Angles, Lines, & Two-Dimensional Geometry

	<p>Scale drawings can be used to solve problems involving scale drawings of geometric figures.</p> <p>Transformations result in figures that are either congruent or similar to the original figure.</p> <p>VOCABULARY: scale, scale factor, vertex, straight lines, parallel lines, perpendicular lines, ratio, compass, ruler, protractor, diagonal</p> <p>KEY TERMS: complementary angles, supplementary angles, adjacent angles, vertical angles, transversal, alternate exterior angles, alternate interior angles, corresponding angles, bisector, bisect, perpendicular bisector, included side, included angle, interior angle, exterior angle, isosceles triangle, equilateral triangle, quadrilateral</p>	<p>Utilize the scale factor to relate the length in a drawing to the length of the actual figure.</p> <p>Recognize the effects of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.</p>
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**Randolph Township Schools
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Unit IV: Angles, Lines, & Two-Dimensional Geometry

ASSESSMENT EVIDENCE: Students will show their learning by:

- Applying knowledge of angle relationships to determine unknown values
- Utilizing tools to construct diagrams with specified measurements
- Demonstrating understanding of key concepts by successfully completing a summative assessment at the culmination of the unit

KEY LEARNING EVENTS AND INSTRUCTION:

- Teacher-led demonstration
- Student-led modeling
- Differentiated station activities
- Small-group instruction

**Randolph Township Schools
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 Pre-Algebra 7 Curriculum**

Unit IV: Angles, Lines, & Two-Dimensional Geometry

SUGGESTED TIME ALLOTMENT	5 weeks
SUPPLEMENTAL UNIT RESOURCES	<p>Required Resources: Math in Focus Singapore Math: Course 2 https://my.hrw.com/</p> <p>Suggested Resources: Big Ideas Red Accelerated Textbook www.bigideasmath.com/students Math in Focus Chapter Projects Worksheets http://www.quia.com/jfc/906428.htm www.mathmix.com http://www.kutasoftware.com/ www.mathblaster.com Illuminations Activities http://illuminations.nctm.org Brain Pop Videos http://www.brainpop.com/math/ Interactive math practice www.ixl.com STEM Worksheets www.superteacherworksheets.com 3-D Geometry shapes and Nets Math in Focus Chapter Projects</p>

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Unit V: Area, Volume, & Surface Area

STANDARDS / GOALS:	ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
<p>NJ 2016 SLS: Math 7.G.A.1: Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.</p>	<p>The area of a polygon can be found by dividing it into smaller shapes and then adding the area of those shapes.</p>	<p>What methods could be used most efficiently to simplify finding the area of a composite figure?</p>
<p>7.G.A.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.</p>	<p>A circle is a geometric figure that has many useful applications in the real world.</p>	<p>How is everyday life impacted by circles?</p>
<p>7.G.B.4: Know the formulas for the area and circumference of a circle and use them to solve problems.</p>	<p><u>KNOWLEDGE</u> Students will know:</p>	<p><u>SKILLS</u> Students will be able to:</p>
<p>7.G.B.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.</p>	<p>Characteristics of basic geometric shapes can be used to find the area of composite figures.</p> <p>Circumference is the measurement of the distance around a circle.</p> <p>The area of a circle can be found using the formula $A = \pi r^2$.</p>	<p>Subdivide composite figures into basic geometric shapes in order to find the total area.</p> <p>Calculate the circumference of circles, semicircles, and quarter circles using different values of pi.</p> <p>Calculate the area of circles, semicircles, and quarter circles using different values of pi.</p>

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Unit V: Area, Volume, & Surface Area

<p>7.G.B.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.</p> <p>8.G.C.9: Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.</p> <p>NJ 2016 SLS: Mathematical Practices</p> <p>MP1 Make sense of problems and persevere in solving them.</p> <p>MP2 Reason abstractly and quantitatively.</p> <p>MP3 Construct viable arguments and critique the reasoning of others.</p> <p>MP4 Model with mathematics.</p> <p>MP5 Use appropriate tools strategically.</p> <p>MP6 Attend to precision.</p> <p>MP7 Look for and make use of structure.</p> <p>MP8 Look for and express regularity in repeated reasoning.</p>	<p>Properties of circles and composite figures can be used to solve real-world problems.</p> <p>Properties of prisms can be used to find volume and surface area.</p> <p>Properties of circles can be used to find the volume of cones, cylinders, and spheres.</p> <p>A cross section is the intersections of a solid and a plane.</p> <p>Formulas for the volumes (cones, cylinders, and spheres).</p> <p>VOCABULARY: area, height, base, center, arc, semicircle, cylinder, cone, quadrant, sphere, hemisphere, plane, cross section, similarity, volume, square pyramid, triangular pyramid, triangular prism</p>	<p>Apply properties of circles and composite figures to solve real-world problems.</p> <p>Apply properties of prisms to solve real-world problems.</p> <p>Transfer understanding of circles to solve real-world problems with cones, cylinders, and spheres.</p> <p>Identify the basic geometric shape created by a cross section of a solid.</p> <p>Apply the formulas for the volumes of cones, cylinders, and spheres to solve real-world and mathematical problems.</p>
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Unit V: Area, Volume, & Surface Area

<p>NJ 2016 SLS: Literacy in History, Social Studies, & Technical Subjects WHST.6-8.2.D: Use precise language and domain-specific vocabulary to inform about or explain the topic.</p> <p>RST.6-8.4: Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context.</p> <p>RH.6-8.7: Integrate visual information (e.g., in charts, graphs, photographs, videos, or maps) with other information in print and digital texts.</p> <p>NJ 2020 SLS: Computer Science and Design Thinking 8.2.8.ED.3: Develop a proposal for a solution to a real-world problem that includes a model.</p>	<p>KEY TERMS: composite solids, diameter, radius, radii, circumference, lateral surface, slant height, statement of congruence, pi, surface area, net</p>	
<p>ASSESSMENT EVIDENCE: Students will show their learning by:</p> <ul style="list-style-type: none"> • Deriving formulas for area and circumference using relationship between dimensions • Applying properties of geometric shapes to calculate surface area and volume • Demonstrating understanding of key concepts by successfully completing a summative assessment at the culmination of a unit 		

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Unit V: Area, Volume, & Surface Area

KEY LEARNING EVENTS AND INSTRUCTION:

- Teacher-led demonstration
- Student-led modeling
- Differentiated station groups
- Small-group instruction

**Randolph Township Schools
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 Pre-Algebra 7 Curriculum**

Unit V: Area, Volume, & Surface Area

SUGGESTED TIME ALLOTMENT	5 weeks
SUPPLEMENTAL UNIT RESOURCES	<p>Required Resources: Math in Focus Singapore Math: Course 2 https://my.hrw.com/</p> <p>Suggested Resources: Big Ideas Red Accelerated Textbook www.bigideasmath.com/students Worksheets www.mathmix.com http://www.kutasoftware.com/ www.mathblaster.com Illuminations Activities http://illuminations.nctm.org Brain Pop Videos http://www.brainpop.com/math/ Math in Focus – Singapore Math Textbook Interactive math practice www.ixl.com STEM Worksheets www.superteacherworksheets.com 3-D Geometry shapes and nets “Moving day” activity http://www.learningresources.com/text/pdf/8521book.pdf Finding surface area and volume activity http://illuminations.nctm.org/LessonDetail.aspx?ID=U166</p>

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Unit V: Area, Volume, & Surface Area

	Slicing Three-Dimensional Figures – interactive website
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	http://www.learner.org/courses/learningmath/geometry/session9/part_c/index.html
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Unit VI: Statistics & Probability

STANDARDS / GOALS:	ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
<p>NJ 2016 SLS: Math</p> <p>7.SP.A.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.</p> <p>7.SP.A.2: Use data from a random sample to draw inferences about a population with an unknown characteristic of interest.</p>	<p>Measures of central tendency and measures of variation are used to draw conclusions about populations.</p>	<p>How can statistics be used to reason quantitatively and make decisions about populations?</p>
<p>7.SP.B.3: Informally assess the degree of visual overlap of two numerical data distributions with similar variability, measuring the difference between the centers by expressing it as a multiple of a measure of variability.</p>	<p>Events happen around you every day, some more likely than others. You can use probability to describe how likely an event is to occur.</p>	<p>How does the study of probability integrate the study of statistics?</p>
	<p><u>KNOWLEDGE</u> Students will know:</p>	<p><u>SKILLS</u> Students will be able to:</p>
	<p>Stem-and-leaf plots can be used to collect and organize large amounts of data for analyzing.</p> <p>Box plots can be used to indicate quartiles and interquartile ranges.</p>	<p>Create a stem-and-leaf plot to represent data.</p> <p>Draw conclusions and solve problems involving stem-and-leaf plots.</p> <p>Create box plot to represent data.</p>

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Unit VI: Statistics & Probability

<p>7.SP.B.4: Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.</p> <p>7.SP.C.5: Understand that the probability of a chance event is a number between zero and one that expresses the likelihood of an event occurring.</p> <p>7.SP.C.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.</p> <p>7.SP.C.7: Develop a probability model and use it to find probabilities of events.</p> <p>7.SP.C.8: Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.</p>	<p>Samples can be used to study or analyze the members of a larger population.</p> <p>Statistics from a sample can be used to make inferences about a population.</p> <p>Comparative inferences can be made about two populations using two sets of sample statistics.</p> <p>The concepts of outcomes, events, and sample space can be applied to everyday life.</p> <p>Probability can be used to determine the likelihood of an event.</p> <p>Venn diagrams can be used to illustrate events and their relationships.</p> <p>Probability can be used to solve real-world problems.</p> <p>Relative frequencies as probabilities can be interpreted to make predictions.</p>	<p>Apply random sampling methods and simulate a random sampling process.</p> <p>Draw conclusions about a population based on the statistics of a sample.</p> <p>Compare inferences about two populations using the same measure of variation.</p> <p>Describe and apply the concepts of outcomes, events, and sample space.</p> <p>Calculate the probability of an event.</p> <p>Construct and interpret Venn diagrams.</p> <p>Solve real-world problems involving probability using multiple methods.</p> <p>Predict probability of an event from relative frequencies.</p>
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Unit VI: Statistics & Probability

<p>7.SP.C.8.A: Understand that the probability of a compound event is the fraction for outcomes in the sample space for which the compound event occurs.</p> <p>7.SP.C.8.B: Represent sample spaces for compound events using methods such as organized lists, tables, and tree diagrams.</p> <p>7.SP.C.8.C: Design and use a simulation to generate frequencies for compound events.</p> <p>NJ 2016 SLS: Mathematical Practices MP1 Make sense of problems and persevere in solving them. MP2 Reason abstractly and quantitatively. MP3 Construct viable arguments and critique the reasoning of others. MP4 Model with mathematics. MP5 Use appropriate tools strategically. MP6 Attend to precision. MP7 Look for and make use of structure. MP8 Look for and express regularity in repeated reasoning</p>	<p>In a long-run chance process, relative frequency resembles theoretical probability more closely.</p> <p>Probability of outcomes of events can be written as a uniform or a nonuniform probability model.</p> <p>Probability models can be used to predict outcomes in real life.</p> <p>A compound event consists of two or more simple events occurring together or one after another.</p> <p>Possibility diagrams can be used to find the probability of compound events.</p> <p>The multiplication and addition rules of probability can be used to solve problems involving independent events.</p>	<p>Compare long-run relative frequencies to related theoretical probabilities.</p> <p>Illustrate outcomes of events of uniform or nonuniform probability models through multiple representations.</p> <p>Predict outcomes of real-life events using probability models.</p> <p>Understand and represent compound events using multiple representations.</p> <p>Construct and utilize possibility diagrams to find the probability of compound events.</p> <p>Differentiate between the multiplication and addition rules of probability to calculate the probability of independent events.</p>
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Unit VI: Statistics & Probability

<p>NJ 2020 SLS: Career Readiness, Life Literacies, and Key Skills 9.1.8.FP.6: Compare and contrast advertising messages to understand what they are trying to accomplish.</p> <p>9.1.8.FP.7: Identify the techniques and effects of deceptive advertising.</p> <p>9.4.8.TL.1: Construct a spreadsheet in order to analyze multiple data sets, identify relationships, and facilitate data-based decision-making.</p> <p>NJ 2016 SLS: Literacy in History, Social Studies, & Technical Subjects WHST.6-8.1.B: Support claim(s) with logical reasoning and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources.</p> <p>RH.6-8.7: Integrate visual information (e.g., in charts, graphs, photographs, videos, or maps) with other information in print and digital texts.</p>	<p>For dependent events, the occurrence of one event will affect the probabilities of one event.</p> <p>VOCABULARY: outcome, Venn diagram, mean, median, mode, range, frequency table, dot plot, inference, event, probability, fair, dependent events, population, sample, sample size</p> <p>KEY TERMS: stems, leaves, outlier, stem-and-leaf plot, random sample, unbiased sample, biased sample, simple random sampling, stratified sampling, systematic sampling, sample space, mutually exclusive, complementary events, compliment, relative frequency, observed frequency, experimental probability, theoretical probability, probability model, probability distribution, uniform probability model, nonuniform probability model, compound event, simple event, possibility diagram, tree diagram, independent events, multiplication rule of probability, addition rule of probability, measure of variation, quartiles, interquartile range, box plot, mean absolute deviation</p>	<p>Implement the rules of probability to solve problems with dependent events.</p>
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Unit VI: Statistics & Probability

<p>NJ 2020 SLS: Computer Science and Design Thinking 8.1.8.DA.1: Organize and transform data collected using computational tools to make it usable for a specific purpose.</p>		
<p>ASSESSMENT EVIDENCE: Students will show their learning by:</p> <ul style="list-style-type: none">• Selecting and constructing appropriate displays to summarize data• Drawing conclusions about a population based on the statistics of a sample• Implementing the rules of probability to solve problems• Demonstrating understanding of key concepts by successfully completing a summative assessment at the culmination of the unit <p>• KEY LEARNING EVENTS AND INSTRUCTION:</p> <ul style="list-style-type: none">• Teacher-led demonstration• Student-led modeling• Differentiated station activities• Small-group instruction		

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Pre-Algebra 7 Curriculum**

Unit VI: Statistics & Probability

SUGGESTED TIME ALLOTMENT	4 weeks
SUPPLEMENTAL UNIT RESOURCES	<p>Required Resources: Math in Focus Singapore Math: Course 2 https://my.hrw.com/</p> <p>Suggested Resources: Big Ideas Red Accelerated Textbook www.bigideasmath.com/students Worksheets http://www.kutasoftware.com/ www.mathblaster.com Illuminations Activities http://illuminations.nctm.org Choice Vs. Chance Activity http://illuminations.nctm.org/LessonDetail.aspx?id=L248 Interactive Spinners http://www.shodor.org/interactivate/activities/AdjustableSpinner/ Comparing Probabilities (good visual) http://www.shodor.org/interactivate/activities/CrazyChoicesGame/ Probability of Simple events http://www.math-play.com/Probability-Game.html Probability Games http://classroom.jc-schools.net/basic/math-prob.html Probability Activities http://www.math.wichita.edu/history/activities/prob-act.html#prob1 Spin the virtual spinner and watch the graph grow. http://www.mathsonline.co.uk/nonmembers/resource/prob/spinners.html</p>

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APPENDIX A

Math in Focus: Singapore Math by Marshall Cavendish ISBN: 978-0-547-56098-4

Math in Focus Activity Book ISBN: 978-0-547-57898-9

Math in Focus Singapore Online Resources

Math in Focus Singapore Exam View

Math in Focus Singapore Activity Book

Math in Focus Singapore Brain @ Work

Math in Focus Singapore Enrichment

Math in Focus Singapore Activity Book

Math in Focus Singapore Vocabulary Review

Math in Focus Singapore Reteach

Math in Focus Singapore Spanish Edition

Big Ideas Math Textbook ISBN: 978-1-60840-231-1

Explorations in Core Math for Common Core Grade 7 ISBN: 978-0-547-87643-6

Holt Mathematics Course 2 Textbook ISBN: 0-03-092946-6

Holt Mathematics Grade 7 Textbook for Common Core ISBN: 978-0-547-64727-2

Mastering the Common Core in Mathematics Grade 7 Textbook ISBN: 978-1-59807-339-3

Glencoe Math Course 7 Textbook ISBN: 978-0-07661-929-0

Clarifying Expectations for Teachers & Students by McGraw Hill for Grade 8 Common Core ISBN: 978-007-662900-8

Partnership for Assessment of Readiness for College and Careers - <http://www.parcconline.org/>

Common Core State Standards Initiative - <http://www.corestandards.org/>

Study Island www.studyisland.com

Khan Academy Videos www.khanacademy.org

OneDrive Shared Document www.onedrive.com