Randolph Township Schools
Randolph Middle School

Grade 7 Accelerated Mathematics Curriculum

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

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Curriculum Developed
July 2014
Curriculum Revised
July 2016
Board APPROVAL Date

Randolph Township Schools
Department of Science, Technology, Engineering, and Mathematics
Grade 7 Accelerated Mathematics

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Randolph Township Schools

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.

Randolph Township Schools
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

RANDOLPH TOWNSHIP BOARD OF EDUCATION
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

Randolph Township Schools
Department of Science, Technology, Engineering, and Mathematics
Introduction

Randolph Township Schools is committed to excellence. We believe that all children are entitled to an education that will equip them to become productive citizens of the 21st century. We believe that an education grounded in the fundamental principles of science, technology, engineering, and math (STEM) will provide students with the skills and content necessary to become future leaders and lifelong learners.

A sound STEM education is grounded in the principles of inquiry, rigor, and relevance. Students will be actively engaged in learning as they use real-world STEM skills to construct knowledge. They will have ample opportunities to manipulate materials and solve problems in ways that are developmentally appropriate to their age. They will work in an environment that encourages them to take risks, think critically, build models, observe patterns, and recognize anomalies in those patterns. Students will be encouraged to ask questions, not just the "how" and the "what" of observed phenomena, but also the "why". They will develop the ability, confidence, and motivation to succeed academically and personally.

STEM literacy requires understandings and habits of mind that enable students to make sense of how our world works. As described in Project 2061's *Benchmarks in Science Literacy, The Standards for Technological Literacy,* and *Professional Standards for Teaching Mathematics,* literacy in these subject areas enables people to think critically and independently. Scientifically and technologically literate citizens deal sensibly with problems that involve mathematics, evidence, patterns, logical arguments, uncertainty, and problem-solving.

Grade 7 Accelerated Mathematics
Introduction

The purpose of Grade 7 Accelerated Math is to provide students with a solid foundation in the concepts necessary for the building of a strong mathematical understanding. Students will be shown the essential components including, but not limited to, operations with rational numbers and complex problem solving grounded in pre-algebra topics such as exponents, multi-step equations, linear representations and the discovery and application of the Pythagorean Theorem. Further topics include the study and application of two- and three-dimensional geometry as well as statistics and probability analysis.

In Grade 7 Accelerated Math, students will produce, analyze, model and draw conclusions from data. In addition, students are encouraged to not only develop skills required to persevere in problem solving but also to apply those skills in real-world settings. They will produce convincing oral and written mathematical arguments, using appropriate terminology in a variety of settings.

Students enrolled in the accelerated course must solidly evidence conceptual understanding, knowledge of procedural skills, fluency, and ability to apply mathematics. Content at this level is fast paced and rigorous with a focus on greater problem complexity. As such, mastery of prerequisite material must be present for success at this level.

Upon completion of this course, students will be prepared with the proper skills and understanding for the transition into Algebra I.

RANDOLPH TOWNSHIP SCHOOL DISTRICT
Curriculum Pacing Chart
Grade 7 Accelerated Mathematics

SUGGESTED TIME ALLOTMENT	UNIT NUMBER	CONTENT - UNIT OF STUDY
8 weeks	I	The Number System
14 weeks	II	Algebraic Expressions and Equations
5 weeks	III	Angles, Lines, and Two-Dimensional Geometry
4 weeks	IV	Three-Dimensional Geometry
5 weeks	V	Statistics and Probability

RANDOLPH TOWNSHIP SCHOOL DISTRICT
Grade 7 Accelerated Mathematics
UNIT I: The Number System

<table>
<tr><td rowspan="6">STANDARDS / GOALS:

<u>Mathematics</u>

7.NS.A.1 Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers.

7.NS.A.1.A Describe situations where opposite quantities combine to make 0.

7.NS.A.1.C Show that the distance between two rational numbers on the number line is the absolute value of their difference.

7.NS.A.1.D Apply properties of operations as strategies to add and subtract rational numbers.

7.NS.A.2 Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.

7.NS.A.2.A Understand the rules for multiplying signed numbers and the distributive property.

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.

7.NS.A.2.C Apply properties of operations as strategies to multiply and</td><td>ENDURING UNDERSTANDINGS</td><td>ESSENTIAL QUESTIONS</td></tr>
<tr><td>Real numbers are represented as points on an infinite line and are used to count measure, estimate, or approximate quantities.</td><td>• How can I represent and solve problems involving the multiplication and division of rational numbers using a variety of models?</td></tr>
<tr><td>Real life word problems can be solved using mathematical operations and applied to rational numbers, including negative numbers.</td><td>• How can a mathematical model aide in persevering when solving a real-world problem?</td></tr>
<tr><td>KNOWLEDGE</td><td>SKILLS</td></tr>
<tr><td>Students will know:

Rational numbers can be identified and represented on a horizontal number line.

Rational numbers can be written as fractions with integers as the numerator and the denominator (excluding zero in the denominator).

Absolute value is the measure of the distance from any rational or irrational number to zero on the number line.</td><td>Students will be able to:

Plot rational numbers on the real number line between two integers.

Express all rational numbers as fractions.

Use the number line to model the absolute value of two rational numbers to determine which has a greater distance.</td></tr>
</table>

divide rational numbers. **7.NS.A.2.D** Convert a rational number to a decimal using long division and know that the decimal form terminates or repeats. **7.NS.A.3** Solve real-world and mathematical problems involving the four operations with rational numbers. **<u>Mathematical Practices</u>** **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. **<u>CCSS.ELA-Science & Technical</u>** WHST.6-8.1.B WHST.6-8.1.C RST.6-8.3 RST.6-8.4 RST.6-8.7 RST.6-8.9 RST.6-8.10 **<u>Speaking and Listening</u>** SL.7.1 SL.7.1.C	Rational numbers can be written as decimals that either terminate or repeat. The number line can be used to compare rational numbers. Mathematical operations can be performed on rational numbers. The distance between two integers can be modeled on the number line. Multiple operations can be performed on rational numbers. **VOCABULARY:** Integers, Rational Number, Irrational Number, Real Number, Terminating Decimal, Repeating Decimal, Complex Fraction, Additive Inverse, Bar Notation, Associative Property **KEY TERMS:** Opposites, Number Line, Fraction, Least Common Denominator, Zero Pair, Approximate, Absolute Value	Re-write any rational number into its decimal equivalent using the division algorithm. Illustrate the locations of rational numbers on the number line to indicate which is larger. Apply the rules of the four basic mathematical operations (addition, subtraction, multiplication, and division) on rational numbers. Construct a number line to illustrate the distance between two integers. Employ the order of operations to perform multiple operations on rational numbers.

SL.7.1.D SL.7.3 SL.7.4 **Technology Literacy** 8.1.8.A.5 8.1.8.E.1 **Science** MS-PS1 MS-PS2 MS-ESS2		

ASSESSMENT EVIDENCE: Students will show their learning by:

- Math in Focus Chapter Assessments
- Teacher Created mid-chapter assessments
- Benchmark Assessments

KEY LEARNING EVENTS AND INSTRUCTION:

- Brain @ Work
- Unit Project – "Career Project"

RANDOLPH TOWNSHIP SCHOOL DISTRICT
Grade 7 Accelerated Mathematics
Unit I: The Number System

SUGGESTED TIME ALLOTMENT	CONTENT-UNIT OF STUDY	SUPPLEMENTAL UNIT RESOURCES
8 Weeks	**Unit I – The Number System** • Operations with Integers • Rational Numbers on the Number line • Rational Numbers as Decimals • Operations with Rational Numbers • Application of Real-World Scenarios	Math in Focus Chapter Projects Math in Focus – Singapore Math Textbook Number Line Creator http://themathworksheetsite.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 Math Goodies Interactive Practice www.mathgoodies.com

RANDOLPH TOWNSHIP SCHOOL DISTRICT

Grade 7 Accelerated Mathematics

UNIT II: Algebraic Expressions and Equations

<table>
<tr><td rowspan="6">STANDARDS / GOALS:

<u>Mathematics</u>

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

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.

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.

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.

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.

7.EE.B.4.B Graph the solution set of an inequality and interpret it in the context of a problem.

7.RP.A.2 Recognize and represent</td><td>ENDURING UNDERSTANDINGS</td><td>ESSENTIAL QUESTIONS</td></tr>
<tr><td>Algebraic expressions containing rational numbers and multiple variables can be simplified, expanded, or factored to write equivalent expressions.</td><td>• Do mathematical symbols model verbal expressions abstractly? Construct a viable argument.</td></tr>
<tr><td>Algebraic equations and inequalities can be used to model mathematical or real-world situations, and to find values of variables.</td><td>• How can algebraic equations and inequalities be used to model, analyze, and solve real world problems?</td></tr>
<tr><td>KNOWLEDGE</td><td>SKILLS</td></tr>
<tr><td>Students will know:

Exponential notation can be used to represent repeated multiplication of a factor.

Exponential notation can be used to write the prime factorization of a number.

Mathematical operations can be performed on expressions written in exponential notation.</td><td>Students will be able to:

Expand and evaluate expressions in exponential notation.

Write the prime factorization of a number using exponential notation.

Apply the mathematical operations of multiplication and division to simplify expressions in exponential notation.</td></tr>
</table>

proportional relationships between quantities. **7.RP.A.2.B** Identify the constant of proportionality in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. **7.RP.A.2.C** Represent proportional relationships by equations. **8.EE.A.1** Know and apply the properties of integer exponents to generate equivalent numerical expressions **8.EE.B.5** Graph proportional relationships, interpreting the unit rate as the slope of a graph. **8.EE.B.6** Use similar triangles to explain why the slope *m* is the same between any two distinct points on a vertical line in the coordinate plane. **8.EE.C.7** Solve linear equations in one variable. **8.EE.C.7.A** Give examples of linear equations in one variable with one solution, no solution, or infinitely many solutions. **8.EE.C.7.B** Solve linear equations including equations whose solutions require expanding expressions using the distributive property and collecting like terms. **<u>Mathematical Practices</u>** **MP1** Make sense of problems and persevere in solving them.	Mathematical operations can be performed on expressions involving zero and negative exponents. Unit rates can be represented as a constant of proportionality (e.g. $\frac{y}{x} = k$ or $y = kx$). Direct proportions can be interpreted using a graph. Direct proportions can be used to solve real-world problems. Inverse proportions can be represented as a constant of proportionality (e.g. $xy = k$). Inverse proportions can be interpreted using a graph. Inverse proportions can be used to solve real-world problems. Algebraic expressions with fractional and decimal coefficients can be simplified. Algebraic expressions with fractional, decimal, and negative factors can be expanded. Algebraic expressions with two variables and negative terms can be factored.	Simplify expressions involving zero and negative exponents. Identify unit rates as direct proportions. Utilize a graph in order to interpret direct proportions. Create direct proportional relationships to solve real-world problems. Identify inverse proportions using the constant of proportionality. Utilize a graph in order to interpret inverse proportions. Create inverse proportional relationships to solve real- world problems. Simplify algebraic expressions with multiple terms and variables by combining like terms. Utilize the distributive property to create equivalent expressions. Identify and apply the greatest common factor to create equivalent expressions.

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. **CCSS.ELA-Science & Technical** WHST.6-8.1.B WHST.6-8.1.C RST.6-8.3 RST.6-8.4 RST.6-8.7 RST.6-8.9 RST.6-8.10 **Speaking and Listening** SL.7.1 SL.7.1.C SL.7.1.D SL.7.3 SL.7.4 **Technology Literacy** 8.1.8.A.5 8.1.8.E.1 **Science** MS-PS1 MS-PS2 MS-LS1 MS-LS2 MS-LS4 MS-ESS1	Verbal descriptions can be translated into algebraic expressions with multiple variables and parenthesis and simplified. Algebraic reasoning can be utilized to solve real world problems. Real-world problems can be solved algebraically with equations or inequalities. Algebraic inequalities can be solved using the concept of balancing. Solution sets of algebraic inequalities can be graphed on a number line. Real-world problems can be solved algebraically with equations or inequalities. Algebraic inequalities can be solved by balancing. A variable in a two-variable equation can be solved in terms of the other variable. Linear equations can be used to solve mathematical and real-world problems. A linear equation with one variable can have one solution, no solution, or infinitely many solutions.	Convert verbal descriptions into algebraic expressions with one or more variables. Demonstrate multiple methods (models, diagrams, tables, and expressions) in order to solve real-world problems. Solve multi-step algebraic equations or inequalities with variables on one side or both sides. Write and solve algebraic equations and inequalities to represent real-world problems. Graph solution sets of algebraic inequalities using empty or shaded circles and arrows. Create algebraic equations and inequalities in order to solve a real-world problem. Solve multi-step algebraic inequalities with variables on one or both sides. Solve for a variable in a two-variable equation. Identify linear equations with no solution and infinitely many solutions.

MS-ESS2 MS-ESS3 MS-ETS1	The relationship between two variables can be represented using a linear equation.	
	A table of values can be used to represent a linear relationship.	Express a linear relationship using equations and tables.
	Algebraic equations with one or more variables can be solved using the concept of balancing.	
	The slope of a line can be determined by finding the ratio of the rise to the run.	Utilize multiple methods to calculate the slope of a line.
	Linear equations can be written in slope-intercept form ($y = mx + b$).	Describe and compare graphs of linear equations based on their equations.
	Parallel lines have the same slope and different y-intercepts.	Write an equation of a line that is parallel to a given line.
	Linear equations can be graphed using the slope and the y-intercept.	Sketch a graph of a line using the slope and the *y*-intercept or the slope and a given point.
	Slope and y-intercept can be interpreted in the context of real-world problems.	Explain the meaning of the slope and *y*-intercept in real-world problems.
	VOCABULARY: Equivalent Inequalities, Inconsistent Equation, Consistent Equation, Identity, Slope, Rise, Run, *y*-Intercept, *x*-Intercept, Slope-Intercept Form, Linear relationship, Direct Proportion, Proportion, Constant of Proportionality, Cross Products, Inverse Proportion, Consistent Equation, Identity, Inconsistent Equation, Slope, Rise, Run, Slope-Intercept Form, Linear Relationship.	

	KEY TERMS: Coefficient, Expression, Like Terms, Factors, Greatest Common Factors, Distributive Property, Commutative Property, Equivalent Equations, Solution Set	

ASSESSMENT EVIDENCE: Students will show their learning by:

- Chapter Assessments
- Teacher created mid-chapter assessments
- Benchmark Assessments

KEY LEARNING EVENTS AND INSTRUCTION:

- Brain @ Work
- Unit Project – "Pythagorean Theorem" project

RANDOLPH TOWNSHIP SCHOOL DISTRICT
Grade 7 Accelerated Mathematics
Unit II: Algebraic Expressions and Equations

SUGGESTED TIME ALLOTMENT	CONTENT-UNIT OF STUDY	SUPPLEMENTAL UNIT RESOURCES
14 weeks	**Unit II – Algebraic Expressions and Equations** • Exponential Notation • The Product and Quotient of Powers • The Power of a Power • The Power of a Product and the Power of a Quotient • Zero and Negative Exponents • Understanding Direct Proportion • Representing Direct Proportion Graphically • Solving Direct Proportion Problems • Understanding Inverse Proportion • Adding and Subtracting Algebraic Terms • Simplifying and Expanding Algebraic Expressions • Factoring Algebraic Expressions • Writing Algebraic Expressions • Real-World Problems: Algebraic Reasoning • Understanding and Solving Algebraic Equations • Solving Algebraic Inequalities • Real-World Problems: Algebraic	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/ Math in Focus – Singapore Math Textbook 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 Inequality game involving word problems http://www.math-play.com/Inequality-Game.html Tic –Tac- Toe inequalities and equations http://www.education.com/activity/article/tic-tac-equations/ Students must solve equations and find pairs of equations that "match" http://www.bbc.co.uk/education/mathsfile/shockwave/games/equationmatch.html Solving Equations: How Sweet It Is! – hand-on approach to solving equations http://www.lpb.org/education/classroom/itv/algebra/sweet.pdf

	Equations and Inequalities • Solving Linear Equations with One Variable • Identifying the Number of Solutions to a Linear Equation • Understanding Linear Equations with Two Variables • Solving for a Variable in a Two-Variable Linear Equation • Finding and Interpreting Slopes of Lines • Understanding Slope-Intercept Form • Writing Linear Equations • Sketching Graphs of Linear Equations • Real-World Problems: Linear Equations	

RANDOLPH TOWNSHIP SCHOOL DISTRICT

Grade 7 Accelerated Mathematics

UNIT III: Angles, Lines, and Two-Dimensional Geometry

<table>
<tr><td rowspan="6">STANDARDS / GOALS:

<u>Mathematics</u>

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.

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.

7.G.B.4 Know the formulas for the area and circumference of a circle and use them to solve problems.

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.

8.G.A.2 Given two congruent (or similar) two-dimensional figures, describe a sequence that exhibits the congruence (or similarity) between them.

8.G.A.3 Describe the effects of dilations, translations, rotations, and reflections on</td><td>ENDURING UNDERSTANDINGS</td><td>ESSENTIAL QUESTIONS</td></tr>
<tr><td>Angles formed on a straight line, and by parallel lines and a transversal, have specific properties that are useful in solving problems.</td><td>• How can properties be used to prove relationships between lines and angles?</td></tr>
<tr><td>A circle is a geometric figure that has many useful applications in the real world.</td><td>• How is everyday life impacted by circles?</td></tr>
<tr><td>KNOWLEDGE</td><td>SKILLS</td></tr>
<tr><td>Students will know:

The Pythagorean Theorem is used to find a missing side length of a right triangle, given two sides.

The converse of the Pythagorean Theorem determines whether a triangle is a right triangle.

Angle relationships can be identified as complementary, supplementary, or adjacent angles.</td><td>Students will be able to:

Use the Pythagorean Theorem to find unknown side lengths in real-world problems.

Use the converse of the Pythagorean Theorem to determine if a triangle is a right triangle.

Identify angle relationships as complementary, supplementary, or adjacent angles.</td></tr>
</table>

two-dimensional figures using coordinates. **8.G.B.6** Explain a proof of the Pythagorean Theorem and its converse. **8.G.B.7** Apply the Pythagorean Theorem to determine unknown side lengths. **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. **CCSS.ELA-Science & Technical** WHST.6-8.1.B WHST.6-8.1.C RST.6-8.3 RST.6-8.4 RST.6-8.7 RST.6-8.9 RST.6-8.10 **Speaking and Listening** SL.7.1 SL.7.1.C SL.7.1.D SL.7.3	Angle relationships can be used to find unknown angle measurements. Properties of angles at point can be used to find unknown angle measurements. Properties of vertical angles can be used to find unknown angle measurements. Angle bisectors divide angles into two equal parts. Perpendicular bisectors of a line segment always pass through the midpoint of the segment at a right angle. Triangles can be constructed when three of its measures are given. A given set of measurements can be used to determine whether a unique triangle, more than one triangle, or no triangle can be drawn. Quadrilaterals can be constructed using a compass, ruler, and a protractor. Scale factor is the ratio of the length in a drawing to the corresponding length in the actual figure. Scale drawings can be used to solve problems involving scale drawings of geometric figures. Characteristics of basic geometric shapes can be used to find the area of composite figures. Circumference is the measurement of the distance around the circle.	Calculate the value of an unknown angle using angle relationships. Calculate the value of unknown angles using angles at a point. Calculate the value of unknown angles using vertical angles. Identify and construct an angle bisector using appropriate tools. Define and construct perpendicular bisectors. Construct triangles with three given measurements. Conclude whether a unique triangle, more than one triangle, or no triangle can be drawn from a given set of measurements. Recognize and use the appropriate tools to construct quadrilaterals. Calculate the scale factor using corresponding lengths in drawings and actual figures. Utilize the scale factor to relate the length in a drawing to the length of the actual figure. Subdivide composite figures into basic geometric shapes in order to find the total area. Calculate the circumference of circles, semicircles, and quarter circles using different

SL.7.4 **<u>Technology Literacy</u>** 8.1.8.A.5 8.2.8.B.1	The area of a circle can be found using the formula $A = \pi r^2$ Properties of circles and composite figures can be used to solve real-world problems. Geometric transformations move figures on a plane. Each transformation changes some properties of a figure, but leaves others unchanged. **VOCABULARY:** Complementary Angles, Supplementary Angles, Adjacent Angles, Vertical Angles, Congruent Angles, Vertex, Alternate interior, Alternate exterior, Corresponding, Transversal, Interior Angles, Exterior Angles**,** Bisector, Bisect, Equidistant, Straight Edge, Perpendicular Bisector, Midpoint, Included Side, Included Angle, Scale, Scale Factor, Dilation, Center of Dilation, Transformation, Translation, Reflection, Rotation, Pythagorean Theorem, Hypotenuse, Leg **KEY TERMS**: Circle, Circumference, Area, Radius, Radii, Diameter, Pi, Chord	values of pi. Calculate the area of circles, semicircles, and quarter circles using different values of pi. Apply properties of circles and composite figures to solve real-world problems. Describe the effects of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates. Compare translations, reflections, rotations and dilations.

ASSESSMENT EVIDENCE: Students will show their learning by:

- Chapter Assessments

- Teacher created mid-chapter assessments
- Benchmark Assessments

KEY LEARNING EVENTS AND INSTRUCTION:

- Brain @ Work
- Unit Project – "Home Renovation" Project

RANDOLPH TOWNSHIP SCHOOL DISTRICT
Grade 7 Accelerated Mathematics
Unit III: Angles, Lines, and Two-Dimensional Geometry

SUGGESTED TIME ALLOTMENT	CONTENT-UNIT OF STUDY	SUPPLEMENTAL UNIT RESOURCES
5 weeks	**Unit III – Angles, Lines, and Two-Dimensional Geometry** • Complimentary, Supplementary, and Adjacent Angles • Alternate Interior, Alternate Exterior, and Corresponding Angles • Angles That Share a Vertex • Constructing Angle Bisectors • Constructing Perpendicular Bisectors • Constructing Triangles • Constructing Quadrilaterals • Understanding Scale Drawings • Understanding the Pythagorean Theorem • Transformations on the Coordinate Plane • Comparing Transformations • Area of Composite Figures • Radius, Diameter, and Circumference of Circles • Area of a Circle • Real-World Problems: Circles	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 Math in Focus Chapter Projects

RANDOLPH TOWNSHIP SCHOOL DISTRICT

Grade 7 Accelerated Mathematics

UNIT IV: Three-Dimensional Geometry

<table>
<tr><td rowspan="6">STANDARDS / GOALS:

<u>Mathematics</u>

6.G.A.2 Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism.

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.

8.G.A.5 Establish facts…about the angle-angle criterion for similarity in triangles.

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.

<u>Mathematical Practices</u>

MP1 Make sense of problems and persevere in solving them.

MP2 Reason abstractly and quantitatively.</td><td>ENDURING UNDERSTANDINGS</td><td>ESSENTIAL QUESTIONS</td></tr>
<tr><td>Geometry and spatial sense offer ways to interpret and reflect on our physical environment.</td><td>• How do geometric models describe spatial relationships?</td></tr>
<tr><td>Analyzing geometric relationships develops reasoning and justification.</td><td>• How are geometric shapes and objects classified?</td></tr>
<tr><td>KNOWLEDGE</td><td>SKILLS</td></tr>
<tr><td>Students will know:

Properties of prisms can be used to find volume and surface area.

A cross section is the intersections of a solid and a plane.

Both congruent figures and similar figures can be related by geometric transformations.</td><td>Students will be able to:

Apply properties of prisms to solve real-world problems.

Identify the basic geometric shape created by a cross section of a solid.

Relate congruent or similar figures using geometric transformations.</td></tr>
</table>

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. **CCSS.ELA-Science & Technical** WHST.6-8.1.B WHST.6-8.1.C RST.6-8.3 RST.6-8.4 RST.6-8.7 RST.6-8.9 RST.6-8.10 **Speaking and Listening** SL.7.1 SL.7.1.C SL.7.1.D SL.7.3 SL.7.4 **Technology Literacy** 8.1.8.A.5 8.2.8.B.1	Concept of congruence and tests used to determine congruence in triangles. **VOCABULARY:** Cylinder, Cone, Lateral Surface, Slant Height, Sphere, Hemisphere, Cross Section, Statement of Congruence, Similarity, Corresponding Angles, Corresponding Sides **KEY TERMS**: Composite Figure, Sphere, Plane, Congruence	Perform and identify a sequence of transformations.

ASSESSMENT EVIDENCE: Students will show their learning by:

- Chapter Assessments
- Teacher created mid-chapter assessments
- Benchmark Assessments

KEY LEARNING EVENTS AND INSTRUCTION:

- Brain @ Work

RANDOLPH TOWNSHIP SCHOOL DISTRICT
Grade 7 Accelerated Mathematics
Unit IV: Three-Dimensional Geometry

SUGGESTED TIME ALLOTMENT	CONTENT-UNIT OF STUDY	SUPPLEMENTAL UNIT RESOURCES
4 weeks	**Unit IV – Three-Dimensional Geometry** • Real-World Problems: Surface Area and Volume • Recognizing Cylinders, Cones, Spheres, and Pyramids • Understanding and Applying Congruent Figures • Understanding and Applying Similar Figures	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 Slicing Three-Dimensional Figures – interactive website http://www.learner.org/courses/learningmath/geometry/session9/part_c/index.html

RANDOLPH TOWNSHIP SCHOOL DISTRICT

Grade 7 Accelerated Mathematics

UNIT V: Statistics and Probability

STANDARDS / GOALS:	**ENDURING UNDERSTANDINGS**	**ESSENTIAL QUESTIONS**
Mathematics **6.SP.A.3** Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number. **6.SP.B.4** Display numerical data in box plots. **6.SP.B.5** Summarize and describe the shape of data distributions. **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. **7.SP.A.2** Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. **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. **7.SP.B.4** Use measures of center and	Measures of central tendency and measures of variation are used to draw conclusions about populations.	• How can statistics be used to reason quantitatively and make decisions about populations?
	Events happen around you every day, some more likely than others. You can use probability to describe how likely an event is to occur.	• How does the study of probability integrate the study of statistics?
	KNOWLEDGE	**SKILLS**
	Students will know: Box plots are used to show the distribution of data. Stem-and-leaf plots can be used to collect and organize large amounts of data for analyzing.	**Students will be able to:** Draw and interpret box plots. Solve problems involving box plots and mean absolute deviation. Create a stem-and-leaf plot to represent data. Draw conclusions and solve problems involving stem-and-leaf plots.

measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. **7.SP.C.5** Understand that the probability of a chance event is a number between zero and one that expresses the likely hood of an event occurring. **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. **7.SP.C.7** Develop a probability model and use it to find probabilities of events. **7.SP.8** Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation. **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. **7.SP.C.8.B** Represent sample spaces for compound events using methods such as organized lists, tables, and tree diagrams. **7.SP.C.8.C** Design and use a simulation to generate frequencies for compound events. **<u>Mathematical Practices</u>** **MP1** Make sense of problems and persevere in solving them. **MP2** Reason abstractly and quantitatively.	The probability of simple events can be used to compute the probability of compound events, either dependent or independent. Samples can be used to study or analyze the members of a larger population. The concepts of outcomes, events, and sample space can be applied to everyday life. Probability can be used to determine the likelihood of an event. Statistics from a sample can be used to make inferences about a population. Comparative inferences can be made about two populations using two sets of sample statistics. Venn diagrams can be used to illustrate events and their relationships. Probability can be used to solve real-world problems. Relative frequencies as probabilities can be interpreted to make predictions. In a long-run chance process, relative frequency resembles theoretical probability more closely. Probability of outcomes of events can be written as a uniform or a non-uniform probability model.	Describe and apply the concepts of outcomes, events, and sample space. Calculate the probability of an event. Draw conclusions about a population based on the statistics of a sample. Compare inferences about two populations using the same measure of variation. Construct and interpret Venn diagrams. Solve real-world problems involving probability using multiple methods. Predict probability of an event from relative frequencies. Compare long-run relative frequencies to related theoretical probabilities. Illustrate outcomes of events of uniform or non-uniform probability models through multiple representations.

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. **CCSS.ELA-Science & Technical** WHST.6-8.1.B WHST.6-8.1.C RST.6-8.3 RST.6-8.4 RST.6-8.7 RST.6-8.9 RST.6-8.10 **Speaking and Listening** SL.7.1 SL.7.1.C SL.7.1.D SL.7.3 SL.7.4 **Technology Literacy** 8.1.8.A.5 8.1.8.D.3 8.2.8.D.1 **Science** MS-PS1 MS-PS3 MS-LS1 MS-LS2 MS-LS3 MS-LS4	Probability models can be used to predict outcomes in real life. A compound event consists of two or more simple events occurring together or one after another. Diagrams can be used to find the probability of compound events. The multiplication and addition rules of probability can be used to solve problems involving independent events. For dependent events, the occurrence of one event will affect the probabilities of one event. **VOCABULARY:** Stem-and-Leaf Plot, Inference, Outcome, Sample Space, Event, Probability, Fair, Biased, Venn Diagram, Mutually Exclusive, Complementary Events, Compliment, Relative Frequency, Observed Frequency, Experimental Probability, Theoretical Probability, Probability Model, Probability Distribution, Uniform Probability Model, Non-uniform Probability Model, Compound Event, Simple Event, Possibility Diagram, Tree Diagram, Independent	Predict outcomes of real life events using probability models. Understand and represent compound events using multiple representations. Construct and utilize diagrams to find the probability of compound events. Differentiate between the multiplication and addition rules of probability to calculate the probability of independent events. Implement the rules of probability to solve problems with dependent events. Understand and represent compound events. Apply the rules of probability to solve problems with dependent events. Apply the multiplication rule of probability to solve problems with independent events.

MS-ETS1	Events, Multiplication Rule of Probability, Addition rule of Probability, Dependent Events, Compound Events, Independent Events, Dependent Events, Measure of Variation, First Quartile, Second Quartile, Upper Quartile, Range, Lower Quartile, Third Quartile, Interquartile Range, Box Plot, Box-and-Whisker Plot, 5-Point Summary, Mean Absolute Deviation **KEY TERMS**: Mean, Median, Mode, Range, Distribution, Minimum, Maximum	

ASSESSMENT EVIDENCE: Students will show their learning by:

- Chapter Assessments
- Teacher created mid-chapter assessments
- Benchmark Assessments

KEY LEARNING EVENTS AND INSTRUCTION:

- Brain @ Work
- Unit Project – In-class "Calorie Content Box Plot" Project

RANDOLPH TOWNSHIP SCHOOL DISTRICT
Grade 7 Accelerated Mathematics
Unit V: Statistics and Probability

SUGGESTED TIME ALLOTMENT	CONTENT-UNIT OF STUDY	SUPPLEMENTAL UNIT RESOURCES
5 weeks	**Unit V– Statistics and Probability** • Interpreting Quartiles and Interquartile Range • Understanding Box Plots and Mean Absolute Deviation • Stem-and-Leaf Plots • Understanding Random Sampling Methods • Making Inferences About Populations • Defining Outcomes, Events, and Sample Space • Finding Probability of Events • Approximating Probability and Relative Frequency • Developing Probability Models • Compound Events • Probability of Compound Events • Independent Events • Dependent Events	Worksheets http://www.kutasoftware.com/ www.mathblaster.com Illuminations Activities http://illuminations.nctm.org Math in Focus – Singapore Math Textbook 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

Appendix A – Resources:

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