Randolph Township Schools
Randolph Middle School

Grade 7 Mathematics Curriculum

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

Department of Science, Technology, Engineering, and Math
Anne V. Richardson, Supervisor

Curriculum Committee
Bryan Mate, Tasha Delp
Revision Committee
Tasha Delp, Emily Milde
Jennifer Piascik, Kelly Hart
Krysta Hyziak, Triona Hoover
Curriculum Developed
July 2014
Curriculum Revised
July 2016
Board APPROVAL Date

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

Table of Contents

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, & 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 Mathematics
Introduction

The Grade 7 Mathematics Course 2, advanced and standard levels, is the second middle school math course. This course introduces key concepts and tools that will be essential for students as they prepare for the third course. Students will become familiar with pre-algebra topics such as equations, geometry, and proportional relationships. It is not assumed that all prior knowledge skills are secure; therefore, all prior knowledge skills will be assessed and reinforced as needed to ensure understanding of those foundational skills. Through this course, students will be prepared for Grade 8 Mathematics Course 3 with the proper vocabulary, methods, and meanings. This course provides a strong foundation for students to continue the study of mathematics throughout high school.

Both the standard and advanced courses 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, using appropriate terminology in a variety of settings.

RANDOLPH TOWNSHIP SCHOOL DISTRICT
Curriculum Pacing Chart
Grade 7 Mathematics

SUGGESTED TIME ALLOTMENT	UNIT NUMBER	CONTENT - UNIT OF STUDY
9 weeks	I	The Number System
9 weeks	II	Expressions, Equations, & Inequalities
4 weeks	III	Rate, Ratios, & Proportional Relationships
5 weeks	IV	Angles, Lines, & 2 Dimensional Geometry
5 weeks	V	Area, Volume, & Surface Area
4 weeks	IV	Statistics & Probability

STANDARDS / GOALS:	ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
Mathematics **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	Real numbers are represented as points on an infinite line and are used to count measure, estimate, or approximate quantities.	• How are numbers used in everyday life?
	Real life word problems can be solved using mathematical operations and applied to rational numbers, including negative numbers	• How can a mathematical model aide in persevering when solving a real-world problem?
	KNOWLEDGE	**SKILLS**
	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.	**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.

operations as strategies to multiply and 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. **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	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 Decimals, Repeating Decimals, Complex Fractions, Additive Inverse, Zero Pair, Bar Notation, Approximate. **KEY TERMS:** Opposites, Number Line, Positive Numbers, Negative Numbers, Fractions, Least Common Denominator, Absolute Value, Decimal, Whole Numbers, Order of Operations, Mixed Number, Improper Fraction, Simplest Form, Percent.	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.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-ESS2		

ASSESSMENT EVIDENCE: Students will show their learning by:

- Pre-assessments
- Math in Focus Chapter Assessments
- Teacher Created Quizzes
- Math in Focus Benchmark Assessments

KEY LEARNING EVENTS AND INSTRUCTION:

- Unit Project – "Career Project"
- Brain @ Work
- Flipping for Integers

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

SUGGESTED TIME ALLOTMENT	CONTENT-UNIT OF STUDY	SUPPLEMENTAL UNIT RESOURCES
9 Weeks	**Unit I – The Number System** • Rational Numbers on the Number line • Rational Numbers as Decimals • Operations with Integers • Operations with Rational Numbers • Operations with Decimals • Word Based Applications	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 Mathematics
UNIT II: Expressions, Equations, & Inequalities

STANDARDS / GOALS:	ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
Mathematics **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.	Algebraic expressions containing rational numbers and multiple variables can be simplified, expanded, or factored to write equivalent expressions.	• Do mathematical symbols model verbal expressions abstractly? Construct a viable argument.
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.	Algebraic equations and inequalities can be used to model mathematical or real-world situations, and to find values of variables.	• How can algebraic equations and inequalities be used to model, analyze, and solve real world problems?
	KNOWLEDGE	**SKILLS**
	Students will know: 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	**Students will be able to:** Simplify algebraic expressions with multiple terms and variables by adding and subtracting like terms. Utilize the distributive property to create equivalent expressions. Identify and apply the greatest common factor to

	terms can be factored.	create equivalent expressions.
Mathematical Practices		
MP1 Make sense of problems and persevere in solving them.	Verbal descriptions can be translated into algebraic expressions with multiple variables and parenthesis.	Convert verbal descriptions into algebraic expressions with one or more variables.
MP2 Reason abstractly and quantitatively.		
MP3 Construct viable arguments and critique the reasoning of others.	Algebraic reasoning can be utilized to solve real world problems.	Demonstrate multiple methods (models, diagrams, tables, and expressions) in order to solve real-world problems.
MP4 Model with mathematics.		
MP5 Use appropriate tools strategically.	Equivalent equations are equations that have the same solution.	Recognize whether a pair of equations is equivalent.
MP6 Attend to precision.		
MP7 Look for and make use of structure.	Algebraic equations with one or more variables can be solved by balancing.	Solve multi-step algebraic equations with variables on one side or both sides.
MP8 Look for and express regularity in repeated reasoning.	Real-world problems can be solved algebraically with equations or inequalities.	Create algebraic equations and inequalities in order to solve a real-world problem.
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	Algebraic inequalities can be solved by balancing. Solution sets of algebraic inequalities can be graphed on a number line.	Solve multi-step algebraic inequalities with variables on one or both sides. Graph solution sets of algebraic inequalities using empty or shaded circles and arrows.
Speaking and Listening SL.7.1 SL.7.1.C SL.7.1.D SL.7.3 SL.7.4	Multiple representations can be used to illustrate a linear relationship. Real-world problems can be solved algebraically with equations or inequalities.	
Technology Literacy 8.1.8.A.5 8.1.8.E.1 **Science** MS-PS1	**VOCABULARY:** Constant, Numerical Term, Algebraic Term, Like Terms, Factors, Equivalent Equations, Solution Set, Equivalent Inequalities, Simplify, Translate, Balancing, Shaded Circle, Open Circle.	

| MS-PS2 MS-LS1 MS-LS2 MS-LS4 MS-ESS1 MS-ESS2 MS-ESS3 MS-ETS1 | **KEY TERMS:** Coefficient, Variable, Expression, Bar Model, Greatest Common Factor, Operation Symbol, Commutative Property, Distributive Property, Factor, Expand, Substitution, Equation, Inequality, Isolate. | |

ASSESSMENT EVIDENCE: Students will show their learning by:
- Pre-assessments
- Math in Focus Chapter Assessments
- Teacher Created Quizzes
- Math in Focus Benchmark Assessments

KEY LEARNING EVENTS AND INSTRUCTION:
- Unit Project – "Bronx Zoo Project"

RANDOLPH TOWNSHIP SCHOOL DISTRICT
Grade 7 Mathematics
Unit II: Expressions, Equations, & Inequalities

SUGGESTED TIME ALLOTMENT	CONTENT-UNIT OF STUDY	SUPPLEMENTAL UNIT RESOURCES
9 weeks	**Unit II – Expressions, Equations, & Inequalities** • 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 Equations and Inequalities	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

RANDOLPH TOWNSHIP SCHOOL DISTRICT
Grade 7 Mathematics
UNIT III: Rates, Ratios, & Proportional Relationships

STANDARDS / GOALS:	ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
Mathematics **6.RP.A.2** Understand the concept of a unit rate and use rate language in the context of a ratio relationship. **6.RP.A.3** Use ratio and rate reasoning to solve real-world mathematical problems. **6.RP.A.3.B** Solve unit rate problems including those involving unit pricing and constant speed. **6.RP.A.3.C** Find a percent of a quantity as a rate per 100; solve problems involving finding the whole, given the party and the percent.	Two quantities that are in a proportional relationship can be used to solve real-world and mathematical problems.	• When is it appropriate to use proportional reasoning to solve real-world problems?
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. **7.RP.A.2** Recognize and represent proportional relationships between quantities.	Ratios and proportional relationships are used to express how quantities are related and how quantities change in relation to each other.	• How does recognizing patterns and structure between quantities help describe the relationship between them?
7.RP.A.2.A Decide whether two quantities are in a proportional relationship. **7.RP.A.2.B** Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal	**KNOWLEDGE**	**SKILLS**
	Students will know: Unit rates can be used to compare two quantities with two different units. Unit rates can be used to solve real-world problems. Sales tax, interest, and commission are real-world applications of percent. Percent of change can be expressed as percent increase or percent decrease.	**Students will be able to:** Examine unit rates to solve problems including unit pricing and constant speed. Calculate unit rates in order to determine speed, distance, or time. Apply percent and problem solving skills to solve real-world problems. Calculate the percent of increase or decrease to solve real-world problems.

descriptions of proportional relationships. **7.RP.A.2.C** Represent proportional relationships by equations. **7.RP.A.2.D** Explain what a point (x,y) on the graph of a proportional relationship means in terms of the situation. **7.RP.A.3** Use proportional relationships to solve multi-step ratio and percent problems. **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	Unit rates can be represented as a constant of proportionally (e.g. $\frac{y}{x} = k$). 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. **VOCABULARY:** Rate, Speed, Average Speed, Sales Tax, Commission, Interest, Interest Rate, Markup, Discount, Direct Proportion, Constant of Proportionality, Inverse Proportion **KEY TERMS:** Ratio, Unit Rate, Proportion, Cross Products, Coordinates, Graph	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.

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 MS-ESS2 MS-ESS3 MS-ETS1		

ASSESSMENT EVIDENCE: Students will show their learning by:

- Pre-assessments
- Math in Focus Chapter Assessments
- Teacher Created Quizzes
- Math in Focus Benchmark Assessments

KEY LEARNING EVENTS AND INSTRUCTION:

- Unit Project – "Grocery Store Math Ratios"
- Brain @ Work

RANDOLPH TOWNSHIP SCHOOL DISTRICT
Grade 7 Mathematics
Unit III: Rates, Ratios, & Proportional Relationships

SUGGESTED TIME ALLOTMENT	CONTENT-UNIT OF STUDY	SUPPLEMENTAL UNIT RESOURCES
4 weeks	**Unit III – Rates, Ratios, & Proportional Relationships** • Rates and Unit Rates • Real-World Problems: Rates and Unit Rates • Real World Problems: Percent • Percent of Change • Understanding Direct Proportion • Representing Direct Proportion Graphically • Solving Direct Proportion Problems • Understanding Inverse Proportion	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 Math in Focus – Singapore Math Textbook Interactive math practice www.ixl.com STEM Worksheets www.superteacherworksheets.com

RANDOLPH TOWNSHIP SCHOOL DISTRICT
Grade 7 Mathematics
UNIT IV: Angles, Lines, & 2 Dimensional Geometry

STANDARDS / GOALS:	ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
Mathematics **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.2** Draw (freehand, with a ruler and protractor, and with technology) geometric shapes with given conditions. **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.	Angles formed on a straight line, and by parallel lines and a transversal, have specific properties that are useful in solving problems.	• How can properties be used to prove relationships between lines and angles?
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.	Triangles and quadrilaterals can be constructed using a compass, a protractor, and a straight edge.	• How can you determine what tools are appropriate for geometric constructions?
	KNOWLEDGE	**SKILLS**
MP4 Model with mathematics. **MP5** Use appropriate tools strategically. **MP6** Attend to precision.	**Students will know:** Angle relationships can be identified as complementary, supplementary, or adjacent angles. Angle relationships can be used to find unknown angle measurements. Properties of angles at point can be used to find unknown angle measurements.	**Students will be able to:** Identify angle relationships as complementary, supplementary, or adjacent angles. Calculate the value of an unknown angle using angle relationships. Calculate the value of unknown angles using angles at a point.

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	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. **VOCABULARY:** Complementary Angles, Supplementary Angles, Adjacent Angles, Vertical Angles, Transversal, Alternate Exterior Angles, Alternate Interior Angles, Corresponding Angles, Bisector, Bisect, Equidistant, Perpendicular Bisector, Midpoint, Included Side, Included Angle, Interior Angle, Exterior Angle, Scale, Scale Factor **KEY TERMS:** Vertex, Congruent Angles, Straight Line, Parallel Lines, Perpendicular Lines, Ratio, Isosceles	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.

| | Triangle, Equilateral Triangle, Quadrilaterals, Compass, Ruler, Protractor, Diagonal | |

ASSESSMENT EVIDENCE: Students will show their learning by:
- Pre-assessments
- Math in Focus Chapter Assessments
- Teacher Created Quizzes
- Math in Focus Benchmark Assessments

KEY LEARNING EVENTS AND INSTRUCTION:
- Brain @ Work

RANDOLPH TOWNSHIP SCHOOL DISTRICT
Grade 7 Mathematics
Unit IV: Angles, Lines, & 2 Dimensional Geometry

SUGGESTED TIME ALLOTMENT	CONTENT-UNIT OF STUDY	SUPPLEMENTAL UNIT RESOURCES
5 weeks	**Unit IV – Angles, Lines, & 2 Dimensional Geometry** • Complimentary, Supplementary, and Adjacent Angles • Angles That Share a Vertex • Constructing Angle Bisectors • Constructing Perpendicular Bisectors • Constructing Triangles • Constructing Quadrilaterals • Understanding Scale Drawings	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

STANDARDS / GOALS:	ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
Mathematics **6.G.A.1** Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes.	The area of a polygon can be found by dividing it into smaller shapes, and then adding the area of those shapes	• What methods could be used most efficiently to simplify finding the area of a composite figure?
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.	A circle is a geometric figure that has many useful applications in the real world.	• How is everyday life impacted by circles?
6.EE.A.1 Write and evaluate numerical expressions involving whole number exponents.	**KNOWLEDGE**	**SKILLS**
6.EE.A.2.C Evaluate expressions at specific values of their variables. **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.	**Students will know:** 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. The area of a circle can be found using the formula $A = \pi r^2$	**Students will be able to:** 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 values of pi. Calculate the area of circles, semicircles, and quarter circles using different values of pi.

7.G.B.4 Know the formulas for the area and circumference of a circle and use them to solve problems.	Properties of circles and composite figures can be used to solve real-world problems.	Apply properties of circles and composite figures to solve real-world problems.
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.	Properties of prisms can be used to find volume and surface area. A cross section is the intersections of a solid and a plane.	Apply properties of prisms to solve real-world problems. Identify the basic geometric shape created by a cross section of a solid.
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.	**VOCABULARY:** Composite Solids, Center, Diameter, Arc, Quadrant, Radius, Radii, Circumference, Semicircle, Pi, Surface Area, Volume, Cylinder, Cone, Square Pyramid, Triangular Pyramid, Triangular Prism, Nets, Lateral Surface, Slant Height, Sphere, Hemisphere, Plane, Cross Section	
Mathematical Practices		
MP1 Make sense of problems and persevere in solving them.	**KEY TERMS:** Area, Height, Base	
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
8.2.8.B.1 | | |

ASSESSMENT EVIDENCE: Students will show their learning by:
- Pre-assessments
- Math in Focus Chapter Assessments
- Teacher Created Quizzes
- Math in Focus Benchmark Assessments

KEY LEARNING EVENTS AND INSTRUCTION:
- Unit Project – "Bedroom Remodel Project"
- Brain @ Work

SUGGESTED TIME ALLOTMENT	CONTENT-UNIT OF STUDY	SUPPLEMENTAL UNIT RESOURCES
5 weeks	**Unit V - Area, Surface Area, & Volume** • Area of Composite Figures • Radius, Diameter, and Circumference of Circles (Course 1) • Area of a Circle • Real-World Problems: Circles (Course 1) • Real-World Problems: Surface Area and Volume • Recognizing Cylinders, Cones, Spheres, and Pyramids	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

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.5.C** Summarize numerical data sets in relation to their context by giving quantitative measures of variability (interquartile range). **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 variability for numerical data	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: Stem-and-leaf plots can be used to collect and organize large amounts of data for analyzing. Box plots can be used to indicate quartiles and interquartile ranges. Samples can be used to study or analyze the members of a larger population.	**Students will be able to:** Create a stem-and-leaf plot to represent data. Draw conclusions and solve problems involving stem-and-leaf plots Create box plot to represent data. Understand and apply random sampling methods and simulate a random sampling process.

from random samples to draw informal comparative inferences about two populations.	Statistics from a sample can be used to make inferences about a population.	Draw conclusions about a population based on the statistics of a sample.
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.	Comparative inferences can be made about two populations using two sets of sample statistics.	Compare inferences about two populations using the same measure of variation.
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.	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. | Describe and apply the concepts of outcomes, events, and sample space.

Calculate the probability of an event. |
7.SP.C.7 Develop a probability model and use it to find probabilities of events.	Venn diagrams can be used to illustrate events and their relationships.	Construct and interpret Venn diagrams.
7.SP.C.8 Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.	Probability can be used to solve real-world problems.	Solve real-world problems involving probability using multiple methods.
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.	Relative frequencies as probabilities can be interpreted to make predictions.	Predict probability of an event from relative frequencies.
7.SP.C.8.B Represent sample spaces for compound events using methods such as organized lists, tables, and tree diagrams.	In a long-run chance process, relative frequency resembles theoretical probability more closely.	Compare long-run relative frequencies to related theoretical probabilities.
7.SP.C.8.C Design and use a simulation to generate frequencies for compound events.	Probability of outcomes of events can be written as a uniform or a nonuniform probability model.	Illustrate outcomes of events of uniform or nonuniform probability models through multiple representations.
Mathematical Practices

MP1 Make sense of problems and persevere in solving them. | Probability models can be used to predict outcomes in real life. | Predict outcomes of real life events using probability models. |
| **MP2** Reason abstractly and quantitatively.

MP3 Construct viable arguments and | A compound event consists of two or more simple events occurring together or one after another. | Understand and represent compound events using multiple representations. |

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
MS-ETS1

Possibility 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: Stems, Leaves, Outlier, Stem-and-Leaf Plot, Population, Sample, Sample Size, Random Sample, Unbiased Sample, Biased Sample, Simple Random Sampling, Stratified Sampling, Systematic Sampling, Inference, Sample Space, Event, Probability, Fair, 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, Dependent Events, Measure of Variation, Quartiles, Interquartile Range, Box Plot, Mean Absolute Deviation

KEY TERMS: Outcome, Venn Diagram, Mean, Median, Mode, Range, Frequency Table, Dot Plot

Construct and utilize possibility 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.

ASSESSMENT EVIDENCE: Students will show their learning by:
- Pre-assessments
- Math in Focus Chapter Assessments
- Teacher Created Quizzes
- Math in Focus Benchmark Assessments

KEY LEARNING EVENTS AND INSTRUCTION:
- Unit Project – "Calorie Content Project"
- Brain @ Work

RANDOLPH TOWNSHIP SCHOOL DISTRICT
Grade 7 Mathematics
Unit VI: Statistics & Probability

SUGGESTED TIME ALLOTMENT	CONTENT-UNIT OF STUDY	SUPPLEMENTAL UNIT RESOURCES
4 weeks	**Unit VI – Statistics & Probability** • 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

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