Kenilworth Public Schools

Curriculum Guide

Content Area: Grade 8 Math
Grade: 8
BOE Approved: 8/11/2014

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Submitted by: Michelle Alvarez & Nancy Bechtler
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Mathematics - Grade 8- Scope and Sequence

Unit 1- Real Numbers, Exponents, Scientific Notation, and Pythagorean Theorem (Go Math Modules 1, 2, & 12)	Unit 2- Solving Equations and Systems of Equations (Go Math Modules 7 & 8)	Unit 3- Proportional and Non-proportional Relationships and Functions (Go Math Modules 3, 4, & 6)	Unit 4- Transformational Geometry (Go Math Modules 9 & 10)	Unit 5- Measurement Geometry (Go Math Modules 11 & 13)	Unit 6- Statistics (Go Math Modules 14 & 15)
Weeks 1-8	Weeks 9-17	Weeks 18-22	Weeks 23-29	Weeks 30-34	Weeks 35-38
Unit Description: Students will rewrite rational numbers and decimals, take square roots and cube roots, and approximate irrational numbers. They will also use and apply the properties of exponents and scientific notation. In addition, they will know and apply the Pythagorean theorem in real-world situations.	*Unit Description:* Students will solve one step, two step, and multi-step equations. They will solve systems of equations using graphing, substitution, and elimination.	*Unit Description:* Students will make connections between proportional relationships, graphs of lines, and linear equations. They will be able to determine slope, the y intercept, and how to write the equation of a non-proportional line. Students will define, evaluate, and compare functions.	*Unit Description:* Students will be able to describe the differences between the transformations and the effect translations, rotations, reflections, and dilations have on 2 dimensional figures.	*Unit Description:* Students will know and apply the formulas for volume of cylinders, cones, and spheres. They will use angle relationships in parallel lines and triangles to solve real-world problems.	*Unit Description:* Students will construct, interpret, and organize two-way frequency tables, data, and scatter plots. They will be able to make a prediction from a scatter plot.
Unit Targets: • numbers that are not rational are called irrational • every number has a	*Unit Targets:* • a linear equation in one variable can result in one solution, infinitely many	*Unit Targets:* • a function is a rule that assigns to each input exactly one output	*Unit Targets:* • the sum of the interior angles of a triangle is 180 degrees • the measure of an	*Unit Targets:* • the sum of the interior angles of a triangle is 180 degrees	*Unit Targets:* • construct scatter plots • interpret scatter plots to investigate

decimal expansion • show that rational numbers have decimal expansions that either terminate in zeros or repeats eventually • convert a repeating decimal to a rational number • estimate the value of irrational numbers using rational approximations • use rational approximations of irrational numbers to compare their size • use rational approximations of irrational numbers to locate them on a number line • know the properties of integer exponents • determine whether two numerical expressions involving integer exponents are equivalent • generate equivalent expressions using the properties of exponents • estimate a very large	solutions, or no solution • show which of these outcomes is the case by transforming the original equation into the form $x = a$, $a = a$, or $a = b$ • solve linear equations in one variable with rational number coefficients, including equations that require expanding expressions using the distributive property and combining like terms • solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs • points of intersection satisfy both equations simultaneously • solve systems of two linear equations in two variables algebraically • estimate solutions of two linear equations in two variables by	• the graph of a function is the set of ordered pairs consisting of an input and the corresponding output • describe qualitatively the functional relationships between two quantities by analyzing a graph • sketch a graph that exhibits the qualitative features of a function given a verbal description • the equation $y = mx + b$ defines a linear function • interpret a set of points forming a straight line as the graph of a linear function • graph linear equations • give examples of nonlinear functions • graph proportional relationships represented in different ways (i.e. ordered pairs, table, equation, phrases, etc.)	exterior angle of a triangle is equal to the sum of the two remote interior angles • when parallel lines are cut by a transversal, corresponding, alternate interior, and alternate exterior angles are congruent • if two sets of corresponding angles in two triangles are congruent, then the triangles are similar • use facts about angles to construct an informal argument • apply the formulas for volume of a cone, cylinder, or sphere in a real-world context • calculate the volume of a cone, cylinder, or sphere • find a missing dimension of a cone, cylinder or sphere given its volume	• the measure of an exterior angle of a triangle is equal to the sum of the two remote interior angles • when parallel lines are cut by a transversal, corresponding, alternate interior, and alternate exterior angles are congruent • if two sets of corresponding angles in two triangles are congruent, then the triangles are similar • use facts about angles to construct an informal argument • apply the formulas for volume of a cone, cylinder, or sphere in a real-world context • calculate the volume of a cone, cylinder, or sphere	patterns of association between two quantities • describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association • interpret the slope and intercept in the context of bivariate measurement data using the equation of a linear model • two-way tables can be used to show patterns of association in categorical data • construct a two-way table summarizing data on two categorical variables collected from the same subjects • interpret a two-way

or very small number as a single digit times an integer power of ten • express how many times larger one quantity is compared to another when written as a single digit times an integer power of ten • add, subtract, multiply, and divide numbers expressed in scientific notation • add, subtract, multiply, and divide numbers where one is expressed in decimal notation and the other is expressed in scientific notation • choose appropriate units to represent measurements of very large or very small quantities • interpret scientific notation generated by technology as a number multiplied by a power of ten • the Pythagorean Theorem states that	graphing the equations • determine the number of solutions a system of two linear equations will have based upon inspection • solve a system of two linear equations modeling real-world and mathematical problems	• recognize that for proportional relationships, the unit rate is the slope of the graph • compare the unit rates of two proportional relationships represented in different ways • explain why the slope is the same between any two distinct points on a non-vertical line by drawing similar right triangles and comparing the ratios of their sides • derive the equation $y = mx$ for a line through the origin • derive the equation $y = mx + b$ for a line intercepting the y-axis at b • construct a function to model a linear relationship between two quantities • determine the rate of change and initial value of a function from a description of		• find a missing dimension of a cone, cylinder or sphere given its volume	table by identifying joint frequencies and calculating marginal frequencies • use relative frequencies calculated for rows or columns to describe possible association between the two variables

the square of the hypotenuse of a right triangle is equal to the sum of the squares of the other two sides • explain a proof of the Pythagorean Theorem • explain a proof of the converse of the Pythagorean Theorem • apply the Pythagorean Theorem to find the distance between two points in a coordinate system • apply the Pythagorean Theorem to determine unknown side lengths in right triangles in two-dimensional figures • apply the Pythagorean Theorem to determine unknown side lengths in right triangles in three-dimensional figures • apply the Pythagorean Theorem to determine unknown		a relationship or from two (x, y) values, including reading these from a table or from a graph • interpret the rate of change and initial value of a function in terms of the situation it models • compare properties such as rate of change, intercepts, domain and range of two functions each represented in a different way • construct scatter plots • interpret scatter plots to investigate patterns of association between two quantities • describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association • straight lines are used to model relationships between two quantitative variables			

side lengths in right triangles in real-world problems		• informally fit a straight line for scatter plots that suggest a linear association • informally assess the fit of the line for a scatter plot by judging the closeness of the data points to the line • interpret the slope and intercept in the context of bivariate measurement data using the equation of a linear model			

Mathematics – Grade 8 Unit 1: Real Numbers

Unit Title: Real Numbers, Exponents, Scientific Notation, and Pythagorean Theorem	
Unit Summary: Use real numbers, scientific notation, and the Pythagorean Theorem to solve real-world problems (Go Math Modules 1, 2, and 12)	
Primary Interdisciplinary Connections: Social Studies (Geography) and Science SCI.MS-ESS1-3	
Career Readiness, Life Literacies, and Key Skills: 9.2.8.CAP5, 9.2.8.CAP3, 9.2.8.CAP4	
Learning Targets	
NJSLS Standards: 8.NS.A.1, 8. NS.A.2, 8.EE.A.1, 8.EE.A.3, 8.EE.A.4, 8.G.B.6, 8.G.B.7, 8.G.B.8	
Computer Science and Design Thinking Standards: 9.4.8.DC6	
Climate Change Standards: 9.4.8.CI1	
Content Statements:	
1	Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.
2	Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions
3	Know and apply the properties of integer exponents to generate equivalent numerical expressions.
4	Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other.
5	Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.
6	Explain a proof of the Pythagorean Theorem and its converse.
7	Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.
8	Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.
Big Idea: Numbers can be expressed in a variety of ways, but still maintain the same value. We can recognize shapes and understand their properties can lead to indirect solutions to measurement problems.	

Unit Essential Questions:	**Unit Enduring Understandings:**
• How do you rewrite rational numbers and decimals, take square roots and cube roots, and approximate irrational numbers? • How can you describe relationships between sets of real numbers? • How do you order a set of real numbers? • How do you develop and use the properties of integer exponents? • How can you use scientific notation to express very large and small quantities? • How can you use the Pythagorean Theorem and use it to solve problems? • How can you test the converse of the Pythagorean Theorem and use it to solve problems? • How can you use the Pythagorean Theorem to find the distance between two points on a coordinate plane?	Students will understand that… • Laws of exponents can be used to find powers of monomials • Scientific notation can be used to write large and small numbers. • Mathematical expressions can be compared using real number properties. • Understand and apply the Pythagorean Theorem • Work with radicals and integer exponents.

Unit Learning Targets

Students will…

- numbers that are not rational are called irrational
- every number has a decimal expansion
- show that rational numbers have decimal expansions that either terminate in zeros or repeats eventually
- convert a repeating decimal to a rational number
- estimate the value of irrational numbers using rational approximations
- use rational approximations of irrational numbers to compare their size
- use rational approximations of irrational numbers to locate them on a number line
- know the properties of integer exponents
- determine whether two numerical expressions involving integer exponents are equivalent
- generate equivalent expressions using the properties of exponents
- estimate a very large or very small number as a single digit times an integer power of ten
- express how many times larger one quantity is compared to another when written as a single digit times an integer power of ten
- add, subtract, multiply, and divide numbers expressed in scientific notation
- add, subtract, multiply, and divide numbers where one is expressed in decimal notation and the other is expressed in scientific notation
- choose appropriate units to represent measurements of very large or very small quantities
- interpret scientific notation generated by technology as a number multiplied by a power of ten

- the Pythagorean Theorem states that the square of the hypotenuse of a right triangle is equal to the sum of the squares of the other two sides
- explain a proof of the Pythagorean Theorem
- explain a proof of the converse of the Pythagorean Theorem
- apply the Pythagorean Theorem to find the distance between two points in a coordinate system
- apply the Pythagorean Theorem to determine unknown side lengths in right triangles in two-dimensional figures
- apply the Pythagorean Theorem to determine unknown side lengths in right triangles in three-dimensional figures
- apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world problems

Evidence of Learning

Summative Assessment: Benchmark #1/Module Assessments

Formative Assessments:

- Module quizzes
- Module tests
- Exit Slips/individual wipe boards
- Open Ended questions
- Teacher observation
- Do Now/homework review
- Cooperative learning groups
- Projects with rubrics, self-evaluation

Lesson Plans

Activities/Interdisciplinary Connections	*Timeframe*
• Play the game Root-O! as seen in the Go Math Resources (Lesson 1.3) • Watch Real-World Video and discuss how biologists classify animals • Connect Real-World Video with how to classify numbers mentioned in the video • Analyze populations using scientific notation • Use Pythagorean theorem relationships to measure objects that are out of reach • Discuss the origin of pi by researching Liu Hui of China and other mathematicians • Create a concept map or graph organizer to assist in	Weeks 1-8

means of test taking • Use symbolic representations, such as pictures, to assist in making language connections • Teacher models the desired learning strategy or task, and then teacher will gradually shift responsibility to the students • Apply a variety of strategies to comprehend vocabulary and mathematical concepts • Assist those who require additional help and need extended time	
Teacher Resources	*Teacher Note*
• GoMath! Textbook • GoMath! Resource materials • Technology Tools (add/delete as appropriate): -Google Classroom -Pear Deck -BrainPOP -FlipGrid -Kahoot -Kami -Quizizz (See this list for more ideas from the NJDOE) (See this list for Kenilworth Tools and Platforms)	

Differentiating Instruction:
Students with Disabilities, English Language Learners, and Gifted & Talented Students

Examples of Strategies and Practices that Support Students with Disabilities:
• Use of visual and multisensory formats
• Use of assisted technology
• Use of prompts
• Modification of content and student products
• Testing accommodations
• Authentic assessments

Examples of Strategies and Practices that Support Gifted & Talented Students:
• Adjusting the pace of lessons
• Curriculum compacting
• Inquiry-based instruction
• Independent study

• Higher-order thinking skills
• Interest-based content
• Student-driven instruction
• Real-world problems and scenarios

Examples of Strategies and Practices that Support English Language Learners:
• Pre-teaching of vocabulary and concepts
• Visual learning, including graphic organizers
• Use of cognates to increase comprehension
• Teacher modeling
• Pairing students with beginning English language skills with students who have more advanced English language skills
• Scaffolding
•Word walls
•Sentence frames
•Think-pair-share
•Cooperative learning groups

Mathematics - Grade 8 Unit 2: Solving Equations and Systems of Equations

Unit Title: Solving Equations and Systems of Equations

Unit Summary: Students will solve equations with variables on both sides and with rational number coefficients and constants and solve linear systems by using graphing, substitution, and elimination. (Go Math Modules 7 and 8)

Primary Interdisciplinary Connections: Science

Career Readiness, Life Literacies, and Key Skills: 9.2.8.CAP5, 9.2.8.CAP3, 9.2.8.CAP4

Learning Targets

NJSLS Standards: 8.EE.C.7, 8.EE.C.7b, 8.EE.C.8a, 8.EE.C.8, 8.EE.C.8c

Computer Science and Design Thinking Standards: 9.4.8.DC6

Climate Change Standards: 9.4.8.CI1

Content Statements:

1	Solve linear equations in one variable.
2	Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.
3	Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.
4	Analyze and solve pairs of simultaneous linear equations.
5	Solve real-world and mathematical problems leading to two linear equations in two variables.

Big Idea: To apply mathematics to problems that arise in everyday life, society, and the workplace. Students use information about two related real-world situations to write and solve an equation with the same variable on both sides of the equation.

Unit Essential Questions:

- How can you represent and solve equations with the variable on both sides?
- How can you solve equations with rational numbers and coefficients?
- How do you use the Distributive Property to solve equations?
- How can you give examples of equations with a given number of solutions?
- How can you solve a system of equations by graphing, substitution, and elimination?

Unit Enduring Understandings:

Students will understand that:

- Model and solve an equation with variables on both sides
- Write a real world situation that can be modeled by a given equation
- Pairs of simultaneous linear equations can be analyzed and solved
- Patterns and relationships can be represented graphically, numerically, and symbolically

• How do you solve a system with no solutions or infinitely many solutions?	

Unit Learning Targets
Students will…

- a linear equation in one variable can result in one solution, infinitely many solutions, or no solution
- show which of these outcomes is the case by transforming the original equation into the form $x = a$, $a = a$, or $a = b$
- solve linear equations in one variable with rational number coefficients, including equations that require expanding expressions using the distributive property and combining like terms
- solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs
- points of intersection satisfy both equations simultaneously
- solve systems of two linear equations in two variables algebraically
- estimate solutions of two linear equations in two variables by graphing the equations
- determine the number of solutions a system of two linear equations will have based upon inspection
- solve a system of two linear equations modeling real-world and mathematical problems

Evidence of Learning

Summative Assessment: Unit Assessment

Formative Assessments:

- Module quizzes
- Module tests
- Exit Slips/individual wipe boards
- Open Ended questions
- Teacher observation
- Do Now/homework review
- Cooperative learning groups
- Projects with rubrics, self-evaluation

Lesson Plans

Activities/Interdisciplinary Connections	*Timeframe*
• Solve real-world situations that can be modeled using multi step equations and systems of equations (purchasing tile, rental situations, monetary comparisons) • Science – Research careers in math such as hydraulic engineering (www.ams.org for research) • Language arts – focus on what information is important,	Weeks 9 - 17

identify the actual equation(s) being asked, and illustrate the equation. • Language arts – create a concept web using the vocabulary from the unit	
Teacher Resources	*Teacher Note*
• GoMath! Textbook • GoMath! Resource materials • Technology Tools (add/delete as appropriate): -Google Classroom -Seesaw -Pear Deck -BrainPOP -Book Creator -FlipGrid -Kahoot -Kami -Quizizz (See this list for more ideas from the NJDOE) (See this list for Kenilworth Tools and Platforms)	

Differentiating Instruction: Students with Disabilities, English Language Learners, and Gifted & Talented Students

Examples of Strategies and Practices that Support Students with Disabilities:
• Use of visual and multisensory formats
• Use of assisted technology
• Use of prompts
• Modification of content and student products
• Testing accommodations
• Authentic assessments

Examples of Strategies and Practices that Support Gifted & Talented Students:
• Adjusting the pace of lessons
• Curriculum compacting
• Inquiry-based instruction
• Independent study
• Higher-order thinking skills
• Interest-based content
• Student-driven instruction
• Real-world problems and scenarios

Examples of Strategies and Practices that Support English Language Learners:
• Pre-teaching of vocabulary and concepts
• Visual learning, including graphic organizers
• Use of cognates to increase comprehension
• Teacher modeling
• Pairing students with beginning English language skills with students who have more advanced English language skills
• Scaffolding
•Word walls
•Sentence frames
•Think-pair-share
•Cooperative learning groups

Mathematics - Grade 8 Unit 3: Proportional and Non-proportional Relationships & Functions

Unit Title: Proportional and Non-proportional Relationships and Functions	
Unit Summary: Students will demonstrate and effectively communicate their mathematical understanding of ratios and proportional relationships with a focus on expressions and equations. Students will also learn the concept of a function and why functions are necessary for describing algebraic concepts in everyday life. (Go Math Modules, 3, 4, & 6)	
Primary Interdisciplinary Connections: Language Arts	
Career Readiness, Life Literacies, and Key Skills: 9.2.8.CAP5, 9.2.8.CAP3, 9.2.8.CAP4	
Learning Targets	
NJSLS Standards: 8.EE.B.5, 8.EE.B.6, 8.F.A.1, 8.F.A.2, 8.F.A.3, 8.F.B.4, 8.F.B.5, 8.SP.A.1, 8.SP.A.2, 8.SP.A.3	
Computer Science and Design Thinking Standards: 9.4.8.DC6	
Climate Change Standards: 9.4.8.CI1	
Content Statements:	
1	Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.
2	Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.
3	Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.
4	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.
5	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.
6	Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.
7	Compare properties (e.g. rate of change, intercepts, domain and range) of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).
8	Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.
9	Know that straight lines are widely used to model relationships between two quantitative

	variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit (e.g. line of best fit) by judging the closeness of the data points to the line.
10	Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept.

Big Idea: Students will use linear equations and functions to solve real-world problems.

Unit Essential Questions:

- How can you use tables, graphs, and equations to represent proportional and non-proportional situations?
- How do you write an equation to model a linear relationship given a graph or a description?
- How does an equation with two variables represent a line in the coordinate plane?
- How can you identify and represent functions?

Unit Enduring Understandings:

Students will understand that:

- There are connections between proportional relationships, lines and linear equations
- Pairs of simultaneous linear equations can be analyzed and solved
- Reasoning can be generalized for solving proportion problems
- Define, evaluate, and compare functions
- Use functions to model relationships between quantities

Unit Learning Targets

Students will…

- a function is a rule that assigns to each input exactly one output
- the graph of a function is the set of ordered pairs consisting of an input and the corresponding output
- describe qualitatively the functional relationships between two quantities by analyzing a graph
- sketch a graph that exhibits the qualitative features of a function given a verbal description
- the equation $y = mx + b$ defines a linear function
- interpret a set of points forming a straight line as the graph of a linear function
- graph linear equations
- give examples of nonlinear functions
- graph proportional relationships represented in different ways (i.e. ordered pairs, table, equation, phrases, etc.)
- recognize that for proportional relationships, the unit rate is the slope of the graph
- compare the unit rates of two proportional relationships represented in different ways
- explain why the slope is the same between any two distinct points on a non-vertical line by drawing similar right triangles and comparing the ratios of their sides
- derive the equation $y = mx$ for a line through the origin
- derive the equation $y = mx + b$ for a line intercepting the y-axis at b
- construct a function to model a linear relationship between two quantities
- determine the rate of change and initial value of a function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph

- interpret the rate of change and initial value of a function in terms of the situation it models
- compare properties such as rate of change, intercepts, domain and range of two functions each represented in a different way
- construct scatter plots
- interpret scatter plots to investigate patterns of association between two quantities
- describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association
- straight lines are used to model relationships between two quantitative variables
- informally fit a straight line for scatter plots that suggest a linear association
- informally assess the fit of the line for a scatter plot by judging the closeness of the data points to the line
- interpret the slope and intercept in the context of bivariate measurement data using the equation of a linear model

Evidence of Learning

Summative Assessment: Module Assessments

Formative Assessments:

- Module quizzes
- Module tests
- Exit Slips/individual wipe boards
- Open Ended questions
- Teacher observation
- Do Now/homework review
- Cooperative learning groups
- Projects with rubrics, self-evaluation

Lesson Plans

Activities/Interdisciplinary Connections	*Timeframe*
• Language Arts: Use a word find puzzle to preview important vocabulary concepts from the module • Watch Real-World Video about the measurements needs to find the speed/rate of each boat • Create a Key-Term Fold to highlight important definitions and vocabulary from the module (i.e, use to visualize the similarities and differences between tables, equations, and graphs • Help students understand the meanings of rise and run, have them compare the slope of stairwells in various	Weeks 18-22

locations • Make a picture on a coordinate plane to show accurate ordered pairs	
Teacher Resources	*Teacher Note*
• GoMath! Textbook • GoMath! Resource materials • Technology Tools: -Google Classroom -Pear Deck -BrainPOP -FlipGrid -Kahoot -Kami -Quizizz (See this list for more ideas from the NJDOE) (See this list for Kenilworth Tools and Platforms)	

Differentiating Instruction:
Students with Disabilities, English Language Learners, and Gifted & Talented Students

Examples of Strategies and Practices that Support Students with Disabilities:
• Use of visual and multisensory formats
• Use of assisted technology
• Use of prompts
• Modification of content and student products
• Testing accommodations
• Authentic assessments

Examples of Strategies and Practices that Support Gifted & Talented Students:
• Adjusting the pace of lessons
• Curriculum compacting
• Inquiry-based instruction
• Independent study
• Higher-order thinking skills
• Interest-based content
• Student-driven instruction
• Real-world problems and scenarios

Examples of Strategies and Practices that Support English Language Learners:
• Pre-teaching of vocabulary and concepts
• Visual learning, including graphic organizers

• Use of cognates to increase comprehension
• Teacher modeling
• Pairing students with beginning English language skills with students who have more advanced English language skills
• Scaffolding
•Word walls
•Sentence frames
•Think-pair-share
•Cooperative learning groups

Mathematics – Grade 8 Unit 4: Transformational Geometry

Unit Title: Transformational Geometry

Unit Summary: Students will learn about transformations on the coordinate plane and apply their properties to determine congruence by a sequence of rotations, reflections, and translations. They will learn to manipulate two and three dimensional shapes and angles. They will discover similar figures with dilations. (Go Math Modules 9 and 10)

Primary Interdisciplinary Connections: Science, Language Arts

Career Readiness, Life Literacies, and Key Skills: 9.2.8.CAP5, 9.2.8.CAP3, 9.2.8.CAP4

Learning Targets

NJSLS Standards: 8.G.A.1, 8.G.A.2, 8.G.A.3, 8.G.A.4

Computer Science and Design Thinking Standards: 9.4.8.DC6

Climate Change Standards: 9.4.8.CI1

Content Statements:

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

Big Idea: Students will learn how to describe the properties of transformations and their effect on the congruence and orientation of figures.

Unit Essential Questions:

- How would you describe the effect of transformations on geometric figures?
- What properties of transformations produce congruent and similar figures?

Unit Enduring Understandings:

Students will understand that:

- Congruence and similarity using physical models or geometry software
- Apply properties of congruence to lines, angles, and shapes

Unit Learning Targets
Students will…

- verify that when a reflection, rotation, and/or translation is performed, lines are transformed to lines, and line segments to line segments of the same length
- verify that when a reflection, rotation, and/or translation is performed, angles are transformed to angles of the same measure
- verify that when a reflection, rotation, and/or translation is performed, parallel lines are transformed to parallel lines
- two figures are congruent if one can be obtained from the other by a sequence of rotations, reflections, and/or translations
- describe a sequence of transformations that maps one congruent figure onto another
- dilate, translate, rotate, and reflect two-dimensional figures on a coordinate plane
- describe the effects of dilations, translations, rotations, and reflections using coordinates
- two figures are similar if one can be obtained from the other by a sequence of dilations and rotations, reflections, and/or translations
- describe a sequence of transformations that maps one similar figure onto another

Evidence of Learning

Summative Assessment: Modular Assessments

Formative Assessments:

- Module quizzes
- Module tests
- Exit Slips/individual wipe boards
- Open Ended questions
- Teacher observation
- Do Now/homework review
- Cooperative learning groups
- Projects with rubrics, self-evaluation

Lesson Plans

Activities/Interdisciplinary Connections	*Timeframe*
• Create a design and transform it on the coordinate plane using translations, rotations, reflections, and dilations • Research a contractor and how they utilize measurements and scale models to determine financial management. • Use a word search to preview important vocabulary	Weeks 23 - 29

from the module • Have students work in groups to create a pattern of dance steps formed by translating shapes, which represent dancers' feet, on a grid. • Create a strip pattern, such as a snowflake or sun, to demonstrate a translation • Use whiteboards to demonstrate understanding of transformations	
Teacher Resources	*Teacher Note*
• GoMath! Textbook • GoMath! Resource materials • Technology Tools: -Google Classroom -Pear Deck -BrainPOP -FlipGrid -Kahoot -Kami -Quizizz (See this list for more ideas from the NJDOE) (See this list for Kenilworth Tools and Platforms)	

Differentiating Instruction:
Students with Disabilities, English Language Learners, and Gifted & Talented Students

Examples of Strategies and Practices that Support Students with Disabilities:
• Use of visual and multisensory formats
• Use of assisted technology
• Use of prompts
• Modification of content and student products
• Testing accommodations
• Authentic assessments

Examples of Strategies and Practices that Support Gifted & Talented Students:
• Adjusting the pace of lessons
• Curriculum compacting
• Inquiry-based instruction
• Independent study
• Higher-order thinking skills
• Interest-based content

• Student-driven instruction
• Real-world problems and scenarios

Examples of Strategies and Practices that Support English Language Learners:
• Pre-teaching of vocabulary and concepts
• Visual learning, including graphic organizers
• Use of cognates to increase comprehension
• Teacher modeling
• Pairing students with beginning English language skills with students who have more advanced English language skills
• Scaffolding
•Word walls
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•Think-pair-share
•Cooperative learning groups

Mathematics – Grade 8 Unit 5: Measurement Geometry

Unit Title: Measurement Geometry

Unit Summary: Students will draw conclusions about the angles formed by parallel lines cut by a transversal, the angles formed in a triangle, and the volume of cylinders, cones, and spheres. (Go Math Modules 11 & 13)

Primary Interdisciplinary Connections: Science and Language Arts

Career Readiness, Life Literacies, and Key Skills: 9.2.8.CAP5, 9.2.8.CAP3, 9.2.8.CAP4

Learning Targets

NJSLS Standards: 8.G.A.5, 8.G.C.9

Computer Science and Design Thinking Standards: 9.4.8.DC6

Climate Change Standards: 9.4.8.CI1

Content Statements:

1	Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.
2	Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.

Big Idea: Students learn to recognize the relationships among the angles formed when two parallel lines intersect a transversal and explore ways to find the volume of cylinders, cones, and spheres.

Unit Essential Questions:

- How can you use what you know about transformations to identify relationships between angles formed by a pair of parallel lines and a line that intersects them?
- How can we show that two lines are parallel?
- How do different angle pairs in triangles help you to identify missing angle measures and angle relationships in triangles?
- How can you determine the volume of cylinders, cones, and spheres?

Unit Enduring Understandings:

Students will understand that…

- Apply properties of congruence to lines and angles
- Solve real world and mathematical problems involving cylinders, cones, and spheres.

Unit Learning Targets

Students will…

- the sum of the interior angles of a triangle is 180 degrees
- the measure of an exterior angle of a triangle is equal to the sum of the two remote interior

angles
- when parallel lines are cut by a transversal, corresponding, alternate interior, and alternate exterior angles are congruent
- if two sets of corresponding angles in two triangles are congruent, then the triangles are similar
- use facts about angles to construct an informal argument
- apply the formulas for volume of a cone, cylinder, or sphere in a real-world context
- calculate the volume of a cone, cylinder, or sphere
- find a missing dimension of a cone, cylinder or sphere given its volume

Evidence of Learning

Summative Assessment: Module Assessments

Formative Assessments:

- Module quizzes
- Module tests
- Exit Slips/individual wipe boards
- Open Ended questions
- Teacher observation
- Do Now/homework review
- Cooperative learning groups
- Projects with rubrics, self-evaluation

Lesson Plans

Activities/Interdisciplinary Connections	*Timeframe*
• Use Maps to investigate angle relationships • Use real world objects to compare price points and volume of shapes • Create 3-D representations of various shapes • To determine prior knowledge, use a word splash of previous vocabulary learned	Weeks 30-34
Teacher Resources	*Teacher Note*
• GoMath! Textbook • GoMath! Resource materials • Technology Tools: -Google Classroom -Pear Deck	

-BrainPOP -FlipGrid -Kahoot -Kami -Quizizz (See this list for more ideas from the NJDOE) (See this list for Kenilworth Tools and Platforms)	

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Mathematics - Grade 8 Unit 6: Statistics

Unit Title: Statistics

Unit Summary: Students learn to represent data in a scatter plot, describe associations in data in scatter plots, make predictions from a scatter plot or trend line. They will create and analyze a two-way table to discover any association between the variables. (Go Math Modules 14 & 15)

Primary Interdisciplinary Connections: Science

Career Readiness, Life Literacies, and Key Skills: 9.2.8.CAP5, 9.2.8.CAP3, 9.2.8.CAP4

Learning Targets

NJSLS Standards: 8.SP.A.1, 8.SP.A.3, 8.SP.A.4

Computer Science and Design Thinking Standards: 9.4.8.DC6

Climate Change Standards: 9.4.8.CI1

Content Statements:

1	Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.
2	Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept.
3	Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables.

Big Idea: Students will construct scatter plots and two-way frequency tables to display and interpret data.

Unit Essential Questions:

- What inferences can be collected and drawn from sets of data when having positive, negative, or no association?
- How can you construct and interpret scatter plots?
- How can you use a trend line to make a prediction from a scatter plot?

Unit Enduring Understandings:

Students will understand that…

- Two sets of numerical data can be graphed as ordered pairs. If the two sets of data are related, a line on the graph can be used to estimate or predict values.
- Although scatter plots and trend lines reveal a pattern, the relationship of the variables may indicate a correlation.
- You can use two-way frequency tables to organize and analyze real-world data that are

	paired and categorical.

Unit Learning Targets
Students will…

- construct scatter plots
- interpret scatter plots to investigate patterns of association between two quantities
- describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association
- interpret the slope and intercept in the context of bivariate measurement data using the equation of a linear model
- two-way tables can be used to show patterns of association in categorical data
- construct a two-way table summarizing data on two categorical variables collected from the same subjects
- interpret a two-way table by identifying joint frequencies and calculating marginal frequencies
- use relative frequencies calculated for rows or columns to describe possible association between the two variables

Evidence of Learning

Summative Assessment: Module Assessments

Formative Assessments:

- Module quizzes
- Module tests
- Exit Slips/individual wipe boards
- Open Ended questions
- Teacher observation
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- Cooperative learning groups
- Projects with rubrics, self-evaluation

Lesson Plans

Activities/Interdisciplinary Connections	*Timeframe*
• Use the birthdays of each student to create a human scatter plot • Science – analyze data from tests to determine similarities and differences. They can investigate patterns of association in bivariate data. • Analyze clusters, trend lines, and outliers after a test	Weeks 35-38

• Climate Change Activity – Discuss the relationship between a polluted town and the population's health versus a clean town and their health • Research and record relevant data to investigate climate change questions. • Have students choose a topic to survey their peers and create a relevant way to express their data • Use their data to extract clusters, trend lines, and outliers	
Teacher Resources	*Teacher Note*
• GoMath! Textbook • GoMath! Resource materials • Technology Tools: -Google Classroom -Pear Deck -BrainPOP -FlipGrid -Kahoot -Kami -Quizizz (See this list for more ideas from the NJDOE) (See this list for Kenilworth Tools and Platforms)	

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