Hainesport Township School District
211 Broad Street Hainesport, NJ 08036

Course Title: Math Grade 8
Board of Education Adoption Date: January, 2017
Board of Education Re-adoption Date: 8/28/2018, 1/2/2024

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Course Description and Concepts

Goals and objectives at this level are to prepare students for the rigorous demands of the high school math program. Students will be expected to master the following: problem solving, integers, solving multi-step equations, and understanding the coordinate system and its applications. Students will be exposed to pre-algebra and pre-geometry concepts. Teaching strategies emphasize higher order thinking through analysis and synthesis.

By the end of Grade 8 math, students should be proficient in the following three critical areas: formulating and reasoning about expressions and equations, including modeling an association in bivariate data with a linear equation, and solving linear equations and systems of linear equations; grasping the concept of a function and using functions to describe quantitative relationships; and analyzing two- and three-dimensional space and figures using distance, angle, similarity, and congruence, and understanding and applying the Pythagorean Theorem.

New Jersey Student Learning Standards Math

New Jersey Student Learning Standards for Mathematics

NJ Technology Standards

8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and create and communicate knowledge.

8.2 Technology Education, Engineering, Design and Computational Thinking - Programming: All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.

Career Ready Practices

Career Ready Practices describe the career-ready skills that all educators in all content areas should seek to develop in their students. They are practices that have been linked to increase college, career, and life success. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

CRP1. Act as a responsible and contributing citizen and employee.
CRP2. Apply appropriate academic and technical skills.
CRP3. Attend to personal health and financial well-being.
CRP4. Communicate clearly and effectively and with reason.
CRP5. Consider the environmental, social and economic impacts of decisions.
CRP6. Demonstrate creativity and innovation.
CRP7. Employ valid and reliable research strategies.
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
CRP9. Model integrity, ethical leadership and effective management.
CRP10. Plan education and career paths aligned to personal goals.
CRP11. Use technology to enhance productivity.
CRP12. Work productively in teams while using cultural global competence.

http://www.state.nj.us/education/cccs/2014/career/CareerReadyPractices.pdf

Pacing Guide

Unit Topic	Unit #	APX Unit Length
Numbers and Operations	I	3 weeks (14 days)
Expressions and Equations	II	8 weeks (33 days)
Geometry	III	10 weeks (47.5 days)

Graphing, Systems, Modeling, and Functions	IV	12 weeks (37 days)
Data Displays and Analysis	V	2 weeks (10 days)

Math 8 Curriculum **Unit 1 (1 Part)**	
Title: Numbers and Operations	
Subject: Math 8	**Length of Time:** 3 weeks (14 days)
Unit 1 Summary: Unit 1 starts off reviewing skills students learned in 7th grade. This unit will then allow them to evaluate squares and radicals. Students will explore how to simplify and approximate square roots to help solve expressions. The unit will also introduce different properties of exponents and solving equations using them. These skills will be needed when solving problems involving Pythagorean Theorem or exponential notations.	
Learning Targets	
PARCC ■ Major Clusters; ■ Supporting Clusters; ○ Additional Clusters	
Domain: The Number System	

Cluster: Know that there are numbers that are not rational, and approximate them by rational numbers.	
Standard #s:	**Standards:**
8.NS.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.
8.NS.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 (e.g., $\pi 2$).
Domain: Expressions and Equations	
Cluster: Expressions and Equations work with radicals and integer exponents. Analyze and solve linear equations and pairs of simultaneous linear equations.	
Standard #:	**Standard:**
8.EE.1	Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$.
Technology 8.1.5.D.1	Understand and model appropriate online behaviors related to cyber safety, cyber bullying, cyber security, and cyber ethics including appropriate use of social media.
Technology 8.1.5.D.4	Assess the credibility and accuracy of digital content.
Technology 8.1.8.A.1	Demonstrate knowledge of a real world problem using digital tools.

Unit 1 Essential Questions:	**Unit 1 Enduring Understandings:**
● What is the difference between rational and irrational numbers?	● Squares and Radicals can help solve real world problems. ● Squares and Radicals affect the numbers that are being used within an operation.

Unit 1 Objectives:

- Students will be able to find the squares and square roots of both rational and irrational numbers.
- Students will know the perfect squares. They will also be able to simplify perfect square radical expressions as well as non-perfect square radicands.
- Students will use the perfect squares to approximate square roots.
- Students will understand the properties of exponents and will use them to solve equations with perfect square and cube roots.

Evidence of Learning

Formative Assessments:

- Questioning strategies used throughout the unit.
- Quizzes

Summative Assessment:

- Cumulative Assessment

Pacing Guide	
Topics	**Time Frames**
Presentation Part 1	
Topic #1: Addition, Natural Numbers & Whole Numbers (Not in HM textbook)	0.5 day
Topic #2: Addition, Subtraction and Integers (Not in HM textbook)	0.5 day
Topic #3: Multiplication and Division of Integers (Not in HM textbook)	0.5 day
Topic #4: Operations with Rational Numbers (1.1 - 1.4 in HM textbook)	0.5 day
Topic #5: Converting Repeating Decimals to Fractions (Not in HM textbook) **Quiz #1**	1 days
Topic #6: Exponents, Squares, Square Roots and Perfect Squares Activity: A Penny for Your Thoughts (3.1 in HM textbook) **Quiz #2**	1 days
Presentation Part 2	
Topic #7: Squares of Numbers Greater than 20 (Not in HM textbook)	1 day
Topic #8: Simplifying Perfect Square Radical Expressions (3.5 in HM textbook) **Quiz #3**	1.5 days
Topic #9: Approximating Square Roots Activity: Root Race (3.6 in HM textbook)	1.5 days
Topic #10: Rational & Irrational Numbers (3.7 in HM textbook) **Quiz #4**	1.5 days
Topic #11: Real Numbers (3.7 in HM textbook)	0.5 day
Topic #12: Properties of Exponents Activity: Laws of Exponents (3.2 in HM textbook) **Quiz #5**	2 days
Review and Cumulative Assessment	2 days

Curriculum Development Resources:

- http://njctl.org/courses/math/8th-grade-math/
- http://www.raftbayarea.org/ideas/Occasions%20for%20an%20Equation.pdf
- http://www.buzzmath.com/Docs#CC08E11808

Standards for Math Practice	
Standard#:	**Standard:**
MP1	Making 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.

Modifications

Standards-based grading, reassessments, differentiate assignments, scaffold instruction, study guides, peer/teacher tutoring assistance, tiered assignments, modify pace, lesson tutorial videos, performance assessments, modified rubrics, assessment modified for IDEA, add enrichment activities, add extension activities to projects, challenge activities, etc.

Interdisciplinary Connections

Science, Language Arts, Social Studies, Art, and Technology

Integration of 21st Century Themes and Skills

21st Century Skills

- Financial, Economic, Business, and Entrepreneurial Literacy

21st Century Themes

- Critical Thinking and Problem Solving
- Communication and Collaboration
- Life and Career Skills
- Information Literacy
- ICT Literacy

Math 8 Curriculum Unit 2	
Title: Expressions and Equations	
Subject: Math 8	**Length of Time:** 8 weeks (33 days)
Unit 2 Summary: Unit 2 Part 1 explores linear equations. Students learn to solve equations starting with a review of inverse operations and two-step equations and progressing to more complex equations. Unit 2 Part 1 concludes with using the skills to solve word problems. Unit 2 Part 2 will allow students to evaluate squares and radicals in equations. They will explore how to simplify and approximate square roots to help solve expressions. Unit 2 Part 3 will introduce the concept of scientific notation to students. It will demonstrate the purpose of scientific notation and how to write numbers using this form. They will be able to convert numbers between scientific notation and standard form, as well as perform different operations within equations.	
Learning Targets	
PARCC ■ Major Clusters; ▣ Supporting Clusters; ○ Additional Clusters	
Standard #s:	**Standards:**

8.EE.2	Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational.
8.EE.3	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. *For example, estimate the population of the United States as 3 times 10^8 and the population of the world as 7 times 10^9, and determine that the world population is more than 20 times larger*.
8.EE.4	Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.
8.EE.7	Solve linear equations in one variable.
8.EE.7a	Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers).
8.EE.7b	Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.
Technology 8.1.5.D.1	Understand and model appropriate online behaviors related to cyber safety, cyber bullying, cyber security, and cyber ethics including appropriate use of social media.
Technology 8.1.5.D.4	Assess the credibility and accuracy of digital content.
Technology 8.2.5.E.1	Effectively use a variety of search tools and filters in professional public databases to find information to solve a real world problem.
Technology 8.2.8.E.3	Develop an algorithm to solve an assigned problem using a specified set of commands and use peer review to critique the solution.
Standards for Mathematical Practice	
Standard#:	**Standard:**
MP1	Making 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.

Modifications

Standards-based grading, reassessments, differentiate assignments, scaffold instruction, study guides, peer/teacher tutoring assistance, tiered assignments, modify pace, lesson tutorial videos, performance assessments, modified rubrics, assessment modified for IDEA, add enrichment activities, add extension activities to projects, challenge activities, etc.

Interdisciplinary Connections

Science, Language Arts, Social Studies, Art, and Technology

Integration of 21st Century Themes and Skills

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21st Century Themes

- Critical Thinking and Problem Solving
- Communication and Collaboration
- Life and Career Skills
- Information Literacy
- ICT Literacy

Title: Scientific Notation	
Subject: Math 8	**Length of Time:** 2 weeks (6 days)

Unit 2 Part 3 Summary: Unit 2 Part 3 will introduce the concept of scientific notation to students. It will demonstrate the purpose of scientific notation and how to write numbers using this form. They will be able to convert numbers between scientific notation and standard form, as well as perform different operations within equations.

Learning Targets

PARCC ■ Major Clusters; ▣ Supporting Clusters; ○ Additional Clusters	
Domain: Expressions & Equations	
Cluster: Expressions and equations work with radicals and integer exponents.	
Standard #s:	**Standards:**
8.EE.3	Use numbers expressed in the form of a single digit times a whole-number power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other.
8.EE.4	Perform operations with numbers expresses 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.

Unit 2 Part 3 Essential Question:	**Unit 2 Part 3 Enduring Understanding:**
· How will scientific notation help when writing numbers and equations? · How is scientific notation used in real world application problems? · How numbers are compared and manipulated using scientific notation?	· Scientific notation will help demonstrate very large and very small numbers when solving real world application problems. · Numbers can be represented in scientific notation and still be manipulated using operations such as addition, subtraction, multiplication, and division.

Unit 2 Part 3 Objectives:

· Students will express numbers using scientific notation.
· Students will recognize the difference between scientific notation and standard form.
· Students will distinguish the difference between different numbers written in scientific notation.
· Students will solve equations with addition, subtraction, multiplication, and division using numbers in scientific notation.

Evidence of Learning

Formative Assessments:

· Questioning strategies used throughout the unit.
· 5 Quizzes

Summative Assessment:

· Cumulative Assessment

Lesson Plan

Topics	Timeframe
Topic #1: Purpose of Scientific Notation Lab: RAFT – One in a Million	1 day

Quiz #1	
Topic #2: How to Write Numbers in Scientific Notation (3.3 in HM textbook)	0.5 day
Topic #3: How to convert between Scientific Notation and Standard Form (3.3 in HM textbook) **Quiz #2**	0.5 days
Topic #4: Magnitude (3.4 in HM textbook) **Quiz #3**	1 day
Topic #5: Comparing Numbers in Scientific Notation (3.3 in HM textbook) **Quiz #4**	1 day
Topic #6: Multiply and Divide with Scientific Notation (3.4 in HM textbook)	0.5 day
Topic #7: Addition and Subtraction with Scientific Notation (3.4 in HM textbook) **Quiz #5**	0.5 day
Review and Cumulative Assessment	1 day

Curriculum Development Resources:

- **https://njctl.org/courses/math/8th-grade-math/**
- **http://www.raftbayarea.org/ideas/One%20in%20a%20Million.pdf**

Math 8 Curriculum **Unit 3 (3 Parts)**	
Title: Geometry	
Subject: Math 8	**Length of Time:** 10 weeks (47.5 days)
Unit 3 Summary: In Unit 1 Part 1, students will be able to use models to show their understanding of congruent and similar one and two-dimensional figures. In this unit, students will be able to use models to show their understanding of congruent and similar one and two-dimensional figures. Unit 3 Part 2 will allow students to learn about 3-dimensional solids and how to calculate their volume. They will also use these formulas to solve real world problems. Unit 3 Part 3 will provide a deeper understanding of the Pythagorean Theorem and its converse for students. They will apply the theorem to problems involving right triangles that model real world problems. They will also find distances and midpoints between two points.	
Learning Targets	
PARCC ■ Major Clusters; ◘ Supporting Clusters; ○ Additional Clusters	
Standard #s:	**Standards:**

8.G.1	Verify experimentally the properties of rotations, reflections, and translations:
8.G.1a	Lines are taken to lines, and line segments to line segments of the same length.
8.G.1b	Angles are taken to angles of the same measure.
8.G.1c	Parallel lines are taken to parallel lines.
8.G.2	Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.
8.G.3	Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
8.G.4	Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.
8.G.5	Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.
8.G.6	Explain a proof of the Pythagorean Theorem and its converse
8.G.7	Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.
8.G.8	Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.
8.G.9	Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.
Technology 8.1.5.D.1	Understand and model appropriate online behaviors related to cyber safety, cyber bullying, cyber security, and cyber ethics including appropriate use of social media.
Technology 8.1.5.D.4	Assess the credibility and accuracy of digital content.
Technology 8.2.5.E.1	Effectively use a variety of search tools and filters in professional public databases to find information to solve a real world problem.
Technology 8.2.8.E.3	Develop an algorithm to solve an assigned problem using a specified set of commands and use peer review to critique the solution.
Standards for Mathematical Practice	
Standard#:	**Standard:**
MP1	Making 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.

Modifications

Standards-based grading, reassessments, differentiate assignments, scaffold instruction, study guides, peer/teacher tutoring assistance, tiered assignments, modify pace, lesson tutorial videos, performance assessments, modified rubrics, assessment modified for IDEA, add enrichment activities, add extension activities to projects, challenge activities, etc.

Interdisciplinary Connections

Science, Language Arts, Social Studies, Art, and Technology

Integration of 21st Century Themes and Skills

21st Century Skills

- Financial, Economic, Business, and Entrepreneurial Literacy

21st Century Themes

- Critical Thinking and Problem Solving
- Communication and Collaboration
- Life and Career Skills
- Information Literacy
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Title: Pythagorean Theorem, Distance and Midpoints	
Subject: Math 8	**Length of Time:** 3 weeks (15 days)

Unit 3 Part 3 Summary: Unit 3 Part 3 will provide a deeper understanding of the Pythagorean Theorem and its converse for students. They will apply the theorem to problems involving right triangles that model real world problems. They will also find distances and midpoints between two points.

Learning Targets

PARCC ■ Major Clusters; ▣ Supporting Clusters; ○ Additional Clusters

Domain: Geometry

Cluster: Understand and apply the Pythagorean Theorem

Standard #s:	**Standards:**
8.G.6	Explain a proof of the Pythagorean Theorem and its converse.
8.G.7	Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.
8.G.8	Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.

Unit 3 Part 3 Essential Question:

- How does the Pythagorean Theorem help solve real world problems?
- How do we compute the distance and midpoint within problems?

Unit 3 Part 3 Enduring Understanding:

- The Pythagorean Theorem can be used to solve real world problems.
- The Pythagorean Theorem aids in solving problems involving right triangles.

Unit 3 Part 3 Objectives:

- Students will be able to explain the proof of the Pythagorean Theorem.
- Students will find unknown side lengths using the Pythagorean Theorem.
- Students will use the Pythagorean Theorem to solve problems involving distance and midpoints.
- Students will solve real world application problems using the Pythagorean Theorem.

Evidence of Learning

Formative Assessments:

· Questioning strategies used throughout the unit. · 2 Quizzes
Summative Assessment: · Cumulative Assessment

Lesson Plan	
Topics	**Timeframe**
Topic #1: Proofs (Not in HM textbook. Presentation in NJCTL is great!) Lab #1: Introduction to Proofs	2 days
Topic #1: Pythagorean Theorem (3.8 and Technology Lab p. 136 in HM textbook) **Quiz #1**	3 days
Topic #2: Distance Formula (3.9 in HM textbook)	4 days
Topic #3: Midpoints **Quiz #2**	4 days
Review and Cumulative Assessment	2 days

Curriculum Development Resources: · http://njctl.org/courses/math/8th-grade-math/

Math 8 Curriculum Unit 4	
Title: Graphing, Systems, Modeling, and Functions	
Subject: Math 8	**Length of Time:** 12 weeks (37 days)
Unit 4 Summary: Unit 4 Part 1 covers how to graph and write linear equations. Students will develop the relationship of the slope and points on a line and write linear equations in Point-Slope form and Slope-Intercept form. Students will also learn how write the equation of a line with different given quantities. They can use these different graphs to solve the equation as well. Unit 4 Part 2 uses graphing, elimination, and substitution to solve systems of equations. Situations will be modeled with systems and solved. Unit 4 Part 3 will allow students to interpret functions. They will also construct graphs from two quantities that form a linear relationship and describe the relationship using that graph. Unit 4 Part 4 will allow students to understand how functions operate and relates to a graph. They will compare properties of two functions and represent functions in multiple ways. They will be introduced to slope-intercept form and recognize that the graph will be a straight line.	
Learning Targets	

PARCC ■ Major Clusters; ▣ Supporting Clusters; ○ Additional Clusters	
Standard #s:	**Standards:**
8.EE.5	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.
8.EE.6	Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation y = mx for a line through the origin and the equation y = mx + b for a line intercepting the vertical axis at b
8.F.1	Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.
8.EE.8	Analyze and solve pairs of simultaneous linear equations. a. 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. b. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. For example, 3x + 2y = 5 and 3x + 2y = 6 have no solution because 3x + 2y cannot simultaneously be 5 and 6. c. Solve real-world and mathematical problems leading to two linear equations in two variables. For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair
8.F.2	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change*.
8.F.3	Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. *For example, the function $A = s^2$ giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line*.
8.F.4	Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.
8.F.5	Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.
Technology 8.1.5.D.1	Understand and model appropriate online behaviors related to cyber safety, cyber bullying, cyber security, and cyber ethics including appropriate use of social media.
Technology 8.1.5.D.4	Assess the credibility and accuracy of digital content.

Technology 8.1.5.E.1	Effectively use a variety of search tools and filters in professional public databases to find information to solve a real world problem.
Technology 8.2.8.C.8	Develop a proposal for a chosen solution that include models (physical, graphical or mathematical) to communicate the solution to peers.
Technology 8.2.8.A.2	Examine a system, consider how each part relates to other parts, and discuss a part to redesign to improve the system.
Standards for Mathematical Practice	
Standard#:	**Standard:**
MP1	Making 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.
Modifications	
Standards-based grading, reassessments, differentiate assignments, scaffold instruction, study guides, peer/teacher tutoring assistance, tiered assignments, modify pace, lesson tutorial videos, performance assessments, modified rubrics, assessment modified for IDEA, add enrichment activities, add extension activities to projects, challenge activities, etc.	
Interdisciplinary Connections	
Science, Language Arts, Social Studies, Art, and Technology	
Integration of 21st Century Themes and Skills	
21st Century Skills ● Financial, Economic, Business, and Entrepreneurial Literacy **21st Century Themes** ● Critical Thinking and Problem Solving	

- Communication and Collaboration
- Life and Career Skills
- Information Literacy
- ICT Literacy

Title: Functions	
Subject: Math 8	**Length of Time:** 3 weeks (15 days)
Unit 4 Part 4 Summary: Unit 4 Part 4 will allow students to understand how functions operate and relates to a graph. They will compare properties of two functions and represent functions in multiple ways. They will be introduced to slope-intercept form and recognize that the graph will be a straight line.	
Learning Targets	
PARCC ■ Major Clusters; ■ Supporting Clusters; ○ Additional Clusters	
Domain: Functions	
Cluster: Define, evaluate, and compare functions.	
Standard #s:	**Standards:**
8.F.1	Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.
8.F.3	Interpret the equation y = mx + b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. For example, the function $A = s^2$ giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line.
Cluster: Use functions to model relationships between quantities	
Standard #s:	**Standards:**
8.F.5	Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.
Unit 4 Part 4 Essential Question: · What is a function? · How are functions represented? · What can a relationship between numbers tell about a problem?	**Unit 4 Part 4 Enduring Understanding:** · Properties of functions and their graphs are similar but not identical. · Slope-intercept form is an easy way of graphing functions.
Unit 4 Part 4 Objectives:	

· Students will understand what a function is and its corresponding graph. · Students will compare properties of different functions and relate the information to real world situations. · Students will graph slope-intercept form of a line.
Evidence of Learning
Formative Assessments: · Questioning strategies used throughout the unit. · 3 Quizzes
Summative Assessment: · Cumulative Assessment
Lesson Plan

Topics	Timeframe
Topic #1: Relationships and Functions Lab – Intro to Functions (either group or individual)	3 days
Topic #2: Domain and Range (2.4 in HM textbook) **Quiz #1**	3 days
Topic #3: Vertical Line Test (2.4 in HM textbook) **Quiz #2**	3 days
Topic #4: Linear Vs. Non-Linear Functions (8.1 in HM textbook) **Quiz #3**	3 days
Review and Cumulative Assessment	3 days

Curriculum Development Resources: · https://njctl.org/courses/math/8th-grade-math/

Math 8 Curriculum Unit 5	
Title: Data Displays and Analysis	
Subject: Math 8	**Length of Time:** 2 weeks (10 days)
Unit 5 Summary: Unit 5 will allow students to analyze scatter plots and interpret data into a graph. Students will be able to understand different patterns and lines of best fit within graphs. They will use linear models and two variable data to explain real life situations and to help them examine frequencies and bivariate data.	
Learning Targets	
PARCC ■ Major Clusters; ▣ Supporting Clusters; Additional Clusters	
Domain: Functions	
Cluster: Understand congruence and similarity using physical models, transparencies, or geometry software	
Standard #s:	**Standards:**

8.SP.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.
8.SP.2	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 by judging the closeness of the data points to the line.
8.SP.3	Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.
8.SP.4	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. For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?
Technology 8.1.5.D.1	Understand and model appropriate online behaviors related to cyber safety, cyber bullying, cyber security, and cyber ethics including appropriate use of social media.
● Technology 8.1.5.D.4	Assess the credibility and accuracy of digital content.
● Technology 8.1.5.E.1	Effectively use a variety of search tools and filters in professional public databases to find information to solve a real world problem.
● Technology 8.2.8.C.7	Collaborate with peers and experts in the field to research and develop a product using the design process, data analysis and trends, and maintain a design log with annotated sketches to record the developmental cycle.
● Technology 8.2.8.C.8	Develop a proposal for a chosen solution that include models (physical, graphical or mathematical) to communicate the solution to peers.

Unit 5 Essential Question: ● How can information from a problem be represented in a way to see a pattern or a frequency? ● What is a line of best fit and how can it simply a conclusion? ● Are interpretation and prediction an accurate conclusion for a problem?	**Unit 5 Enduring Understanding:** ● Scatter plots, line of best fit, and frequencies all help interpret data within a problem. ● Patterns can be modeled using different graphs. ● Straight lines are widely used to model relationships.

Unit 5 Objectives:
- Student will be able to graph scatter plots.
- Students will interpret and examine data to come to a conclusion.

- Students will know about line of best fit and two variable data relationships.
- Students will understand patterns of association in bivariate categorical data.
- Students will use frequency to solve real life problems and make predictions for future ones.

Evidence of Learning

Formative Assessments:

- Questioning strategies used throughout the unit.
- Quizzes

Summative Assessment:

- Cumulative Assessment

Pacing Guide

Topics	Timeframe
Topic #1: Two Variable Data Lab: RAFT – Stars on the HR Diagram **Quiz #1**	2 days
Topic #2: Line of Best Fit Lab: Illustrative Mathematics – Bird Eggs (9.1 and 9.2 in HM textbook) **Quiz #2**	2 days
Topic #3: Determining the Prediction Equation (Technology Lab p. 394) **Quiz #3**	2 days
Topic #4: Two Way Table (Extension p. 396) **Quiz #4**	2 days
Review and Cumulative Assessment	2 days

Curriculum Development Resources:

- https://njctl.org/courses/math/8th-grade-math/
- http://www.raftbayarea.org/ideas/Stars%20on%20the%20HR%20Diagram.pdf
- http://www.illustrativemathematics.org/illustrations/41

Standards for Mathematical Practice

Standard#:	Standard:
MP1	Making 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.

Modifications

Standards-based grading, reassessments, differentiate assignments, scaffold instruction, study guides, peer/teacher tutoring assistance, tiered assignments, modify pace, lesson tutorial videos, performance assessments, modified rubrics, assessment modified for IDEA, add enrichment activities, add extension activities to projects, challenge activities, etc.

Interdisciplinary Connections

Science, Language Arts, and Technology

Integration of 21st Century Themes and Skills

21st Century Skills

- Financial, Economic, Business, and Entrepreneurial Literacy

21st Century Themes

- Critical Thinking and Problem Solving
- Communication and Collaboration
- Life and Career Skills
- Information Literacy
- ICT Literacy