MOUNT HOLLY TOWNSHIP SCHOOL DISTRICT
EIGHTH GRADE MATHEMATICS CURRICULUM

2016 Mathematics Standards with companion June 2020 NJSLS
Board Approval: September 28, 2022

District Administration

Mr. Robert Mungo	Superintendent
Mrs. Amie Dougherty	Director of Curriculum and Instruction
Mrs. Tifanie Pierce	Director of Special Services
Mrs. Carolyn McDonald	Director of Equity and Student Services
Mr. Daniel Finn	Principal 5-8
Mr. Thomas Braddock	Principal 2-4
Mrs. Nicole Peoples	Principal PreK-2
Mrs. Kinny Nahal	Assist Principal 5-8
Mrs. Evon DiGangi	School Business Administrator

Mount Holly Township Board of Education

Mrs. Janet DiFolco	Board President
Ms. Jennifer Mushinsky	Board Vice-President
Mrs. Brianna Banks	Board Member
Mrs. Janene Ciotti	Board Member
Mr. William Monk	Board Member

Board Approval Date: September 28, 2022

New Jersey Mathematics Standards:
2016 New Jersey Student Learning Standards - Mathematics

New Jersey Computer Science and Design Thinking Standards
2020 New Jersery Student Learning Standards: Computer Science and Design Thinking

New Jersey Career Readiness, Life Literacies, and Key Skills Standards
2020 New Jersey Student Learning Standards: Career Readiness, Life Literacies & Key Skills

Grade Eight Pacing Guide

Mathematics Curriculum	**Grade 8**

Interdisciplinary Connections: The Mathematics Program, My Math/Glencoe Math, links mathematics instruction across multiple disciplines. These interdisciplinary standards are incorporated into each grade level, providing purposeful application and meaningful learning.

Math Discipline	*Connection to other Disciplines*
Domain 1: NS. The Number System	NJSLSA.R3. Analyze how and why individuals, events, and ideas develop and interact over the course of a text. NJSLSA.R7. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words. NJSLSA.W1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. NJSLSA.SL1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively. NJSLSA.SL2. Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally. NJSLSA.SL5. Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.

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Domain 2: EE. Expressions and Equations	NJSLSA.R3. Analyze how and why individuals, events, and ideas develop and interact over the course of a text. NJSLSA.R7. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words. NJSLSA.W1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. NJSLSA.SL1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively. NJSLSA.SL2. Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally. NJSLSA.SL5. Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations. MS-PS1-4. Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.
Domain 3: F. Functions	NJSLSA.R3. Analyze how and why individuals, events, and ideas develop and interact over the course of a text. NJSLSA.R7. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words. NJSLSA.W1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. NJSLSA.SL1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively. NJSLSA.SL2. Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally. NJSLSA.SL5. Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.
Domain 4: G. Geometry	NJSLSA.R3. Analyze how and why individuals, events, and ideas develop and interact over the course of a text. NJSLSA.R7. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.

	NJSLSA.W1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. NJSLSA.SL1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively. NJSLSA.SL2. Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally. NJSLSA.SL5. Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.
Domain 5: SP. Statistics and Probability	NJSLSA.R3. Analyze how and why individuals, events, and ideas develop and interact over the course of a text. NJSLSA.R7. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words. NJSLSA.W1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. NJSLSA.SL1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively. NJSLSA.SL2. Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally. NJSLSA.SL5. Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations. MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. MS-LS2-2. Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.

Computer Science and Design Thinking	
Core Ideas	**Performance Expectations**

People use digital devices and tools to automate the collection, use, and transformation of data. The manner in which data is collected and transformed is influenced by the type of digital device(s) available and the intended use of the data.	8.1.8.DA.1: Organize and transform data collected using computational tools to make it usable for a specific purpose.
Computer models can be used to simulate events, examine theories and inferences, or make predictions.	• 8.1.8.DA.5: Test, analyze, and refine computational models. • 8.1.8.DA.6: Analyze climate change computational models and propose refinements.
Individuals design algorithms that are reusable in many situations. Algorithms that are readable are easier to follow, test, and debug.	8.1.8.AP.1: Design and illustrate algorithms that solve complex problems using flowcharts and/or pseudocode.
Career Readiness, Life Literacies, and Key Skills	
Financial Institutions/Psychology	
Core Ideas	**Performance Expectations**
There are a variety of factors that influence how well suited a financial institution and/or service will be in meeting an individual's financial needs.	9.1.8.FI.1: Identify the factors to consider when selecting various financial service providers. 9.1.8.FI.2: Determine the most appropriate use of various financial products and services to borrow and access money for making purchases (e.g., ATM, debit cards, credit cards, check books, online/mobile banking). 9.1.8.FI.3: Evaluate the most appropriate financial institutions to assist with meeting various personal financial needs and goals. 9.1.8.FI.4: Analyze the interest rates and fees associated with financial products.

An individual's values and emotions will influence the ability to modify financial behavior (when appropriate), which will impact one's financial well-being.	9.1.8.FP.1: Describe the impact of personal values on various financial scenarios. 9.1.8.FP.2: Evaluate the role of emotions, attitudes, and behavior (rational and irrational) in making financial decisions. 9.1.8.FP.3: Explain how self-regulation is important to managing money (e.g., delayed gratification, impulse buying, peer pressure, etc.). 9.1.8.FP.4: Analyze how familial and cultural values influence savings rates, spending, and other financial decisions. 9.1.8.FP.5: Determine how spending, investing, and using credit wisely contributes to financial well-being.
Planning and Budgeting	
A budget aligned with an individual's financial goals can help prepare for life events.	9.1.8.PB.1: Predict future expenses or opportunities that should be included in the budget planning process. 9.1.8.PB.2: Explain how different circumstances can affect one's personal budget. 9.1.8.PB.3: Explain how to create budget that aligns with financial goals. 9.1.8.PB.4: Construct a simple personal savings and spending plan based on various sources of income and different stages of life (e.g. teenager, young adult, family).
Saving money can impact an individual's ability to address emergencies and accomplish their short-and long-term goals.	9.1.5.PB.2: Describe choices consumers have with money (e.g., save, spend, donate).
Career Awareness, Exploration, Preparation, and Training	
An individual's strengths, lifestyle goals, choices, and interests affect employment and income	9.2.8.CAP.1: Identify offerings such as high school and county career and technical school courses, apprenticeships, military programs, and dual enrollment courses that support career or occupational areas of interest.

	9.2.8.CAP.2: Develop a plan that includes information about career areas of interest. 9.2.8.CAP.3: Explain how career choices, educational choices, skills, economic conditions, and personal behavior affect income. 9.2.8.CAP.4: Explain how an individual's online behavior (e.g., social networking, photo exchanges, video postings) may impact opportunities for employment or advancement.
There are resources to help an individual create a business plan to start or expand a business.	9.2.8.CAP.20: Identify the items to consider when estimating the cost of funding a business.
Diversity, Equity, and Inclusion:	
Culturally Responsive Practices in Mathematics Education: **8 Powerful Ways to Promote Equity in the Classroom** **Who Do You Call On? Rooting Out Implicit Bias'** **Why Representation Matters**	
Examining Poverty, Inequity, and Hidden Biases: Lessons addressing financial psychology in Grades 6-8 will include explicit media, lessons, and topics related to the following **essential questions:** ● What problems arise when we relate to people as members of a group, rather than as unique individuals? ● How do power and privilege shape the relationships people have with each other as well as with institutions? ● How is empathy a seed of social action?	Resources: Ben DeSoto 'Understanding Poverty' exhibit Why Chicken Means So Much to Me How Rich are the Super Rich? Average Household Income Graphic Inventing a Better World Lesson

Domain 1: Number Sense 8.NS	
	Chapter 1:

NJ 2016 Student Learning Standards: Mathematics Grade 7

8.NS A. Know that there are numbers that are not rational, and approximate them by rational numbers.

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 (e.g., π^2). *For example, by truncating the decimal expansion of $\sqrt{2}$, show that $\sqrt{2}$ is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.*

NJDOE Mathematics Curricular Framework Guide Document and Supports Mathematics Curricular Framework	**Mathematical Practices** **MP. The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.** **highlight appropriate indicators for unit/domain** MP.1. Make sense of problems and persevere in solving them. MP.2. Reason abstractly and quantitatively. MP.3. Construct viable arguments and critique the reasoning of others. MP.4. Model with mathematics.

	MP.5. Use appropriate tools strategically. MP.6. Attend to precision. MP.7. Look for and make use of structure. MP.8. Look for and express regularity in repeated reasoning.
Career Readiness, Life Literacies, and Key Skills Integration **NJSLS - CRLLKS 2020** **highlight appropriate indicators for unit/domain** CRLLKS1. Act as a responsible and contributing community members and employee. CRLLKS2. Attend to financial well-being. CRLLKS3. Consider the environmental, social and economic impacts of decisions. CRLLKS4. Demonstrate creativity and innovation. CRLLKS5. Utilize critical thinking to make sense of problems and persevere in solving them CRLLKS6. Model integrity, ethical leadership and effective management. CRLLKS7. Plan education and career paths aligned to personal goals. CRLLKS8. Use technology to enhance productivity increase collaboration and communicate effectively.persevere in solving them. CRLLKS9. Work productively in teams while using cultural/global competence.	**21st Century Student Outcomes** http://www.battelleforkids.org/networks/p21 **Learning and Innovation Skills** **highlight appropriate indicators for unit/domain** Think Creatively Work Creatively with Others Implement Innovations Reason effectively Use Systems Thinking Make Judgments and Decisions Solve Problems Communicate Clearly Collaborate with Others **Life and Career Skills** **highlight appropriate indicators for unit/domain** Adapt to Change Be Flexible Manage Goals and Time Work Independently Be Self-directed Learners Interact Effectively with Others Work Effectively in Diverse Teams

Enduring Understandings	**Essential Questions**
• Interpret the real number system • Write rational numbers as terminating or repeating decimals • Locate irrational numbers on a number line • Add, subtract multiply and divide integers	• What are rational and irrational numbers? • How do we differentiate between the two? • Where do irrational numbers go on the number line?
Content Knowledge Square roots, cube roots, location on number line	**Skills** 1. Locate rational numbers on the number line 2. Approximate the value of irrational numbers on a number line 3. Compare rational and irrational numbers on a number line

Primary and Supplementary Resources

Glencoe Math Resources
Glencoe Math Grade 8 Student book
Glencoe Math Grade 8 Teacher's Edition

Glencoe Math Online Resources

EdConnect Login

NJSLA Mathematics Operational Evidence Statements
https://docs.google.com/spreadsheets/d/18M5r1jk4P729fTpAlWAzrw1gE6tken233I-Yk0U712M/edit#gid=554025491

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NJSLA Released Items
https://nj.digitalitemlibrary.com/home
https://resources.newmeridiancorp.org/

Illustrative Mathematics

iReady
i-Ready makes differentiated instruction a practical reality for teachers and students. *i-Ready*:

- integrates powerful assessments and rich insights with effective and engaging instruction in reading and mathematics to address students' individual needs.
- empowers teachers every day to make more informed instructional decisions.
- motivates students with access to their own personalized path to growth.

XtraMath

- This program helps students practice their math facts for addition, subtraction, multiplication, and addition.
- Can individualize the fluency skills for each student.
- Can run reports to determine progress.

Khan Academy

- a set of online tools that help educate students. The organization produces short lessons in the form of YouTube videos.
- Its website also includes supplementary practice exercises and materials for educators.

8th grade Flip Book:
https://drive.google.com/file/d/1qLIJ6fcXmVIwnajFZqF-lkYzv0ZaPxe4/view?usp=sharing

101 Math Discourse Questions:
http://www.casamples.com/downloads/100MathDiscourseQuestions_Printable.pdf

Asking Effective Questions
http://www.edu.gov.on.ca/eng/literacynumeracy/inspire/research/CBS_AskingEffectiveQuestions.pdf

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Fluency Support for Grades 6-8
https://drive.google.com/file/d/1rNBWYvsveLgDm3JwOx1Ace1iH4aKonyR/view?usp=sharing

Achieve the Core Coherence Map
https://achievethecore.org/coherence-map/8

Assessments:

- ➢ Pre-Assessments
- ➢ Quizzes
- ➢ Mid Chapter Assessments
- ➢ End of Chapter Assessments
- ➢ Performance Tasks
- ➢ Benchmark Tests

Differentiation in the Mathematics Classroom

Special Education Students

- ➢ Chunk content
- ➢ Small group instruction
- ➢ Notes packets/graphic organizers provided
- ➢ Anchor charts/multiplication charts/reference sheets provided
- ➢ Calculators provided as needed
- ➢ Modified assessments/assignments and extra time given
- ➢ YouTube clips used to supplement content visually
- ➢ Number Lines
- ➢ Vocabulary Enrichment

English Language Learners

- ➢ Create Vocabulary Banks
- ➢ Use manipulatives
- ➢ Modify teacher talk and practice wait time
- ➢ Elicit nonverbal responses, like a thumbs up or down
- ➢ Use sentence frames
- ➢ Comprehensible input
- ➢ Contextualized instruction
- ➢ A low-anxiety learning environment
- ➢ Meaningful engagement in learning activities

At-Risk Students

- ➢ Reduce the number of problems given
- ➢ Provide calculators
- ➢ Give extra time

504 Students

- ➢ Provide a checklist of the steps needed to complete the problem

➢ Individualized instruction ➢ One-on-one check in ➢ Communicate with family ➢ iReady	➢ Provide place value charts ➢ Provide lots of white-space to make it less busy ➢ If still struggling, reteach and retest
Gifted and Talented Students ➢ Use more-challenging numbers ➢ Add additional steps by combining standards ➢ Introduce the next-grade-level standard ➢ Know Their Interests – Start by having students complete an interest inventory like this one Student Interest Survey ➢ Keep Them Active - Gifted students often need to have the ability to move when learning ➢ Offer Flexible Seating - Try to offer different seating options for students: beanbag chairs, carpet squares, pillows, director chairs … the list can go on and on. ➢ Share Current Events - Current events are important to incorporate into gifted programming. We want these students to be thinking about how they can use their talents to solve real-world problems. ➢ Practice Like Professionals - Allow students to practice like the professionals. Use the same processes that professionals use. ➢ Locate Authentic Audiences - The work students create should have a real audience and be appreciated by those who authentically would benefit from its completion. Younger students are a great first authentic audience.	

Domain 2: Expressions and Equations 8.EE	
	Chapter 1: Lessons 2-10 Chapter 2: Lessons 1-5 Chapter 3: Lessons 1-8 (preparation) Chapter 5: Lessons 5-7 Chapter 7: Lesson 6
NJ 2016 Student Learning Standards: Mathematics Grade 7 **8.EE** **A. Work with radicals and integer exponents.**	

1. Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$.

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 √2 is irrational.

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 3×10^8 and the population of the world as 7×10^9 , and determine that the world population is more than 20 times larger.

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.

B. Understand the connections between proportional relationships, lines, and linear equations.

5. Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.

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.

C. Analyze and solve linear equations and pairs of simultaneous linear equations.

7. Solve linear equations in one variable. a. 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). b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.

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.	
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Career Readiness, Life Literacies, and Key Skills Integration **NJSLS - CRLLKS 2020** **highlight appropriate indicators for unit/domain**	**21st Century Student Outcomes** http://www.battelleforkids.org/networks/p21 **Learning and Innovation Skills** **highlight appropriate indicators for unit/domain**

CRLLKS1. Act as a responsible and contributing community members and employee. CRLLKS2. Attend to financial well-being. CRLLKS3. Consider the environmental, social and economic impacts of decisions. CRLLKS4. Demonstrate creativity and innovation. CRLLKS5. Utilize critical thinking to make sense of problems and persevere in solving them CRLLKS6. Model integrity, ethical leadership and effective management. CRLLKS7. Plan education and career paths aligned to personal goals. CRLLKS8. Use technology to enhance productivity increase collaboration and communicate effectively.persevere in solving them. CRLLKS9. Work productively in teams while using cultural/global competence.	Think Creatively Work Creatively with Others Implement Innovations Reason effectively Use Systems Thinking Make Judgments and Decisions Solve Problems Communicate Clearly Collaborate with Others **Life and Career Skills** **highlight appropriate indicators for unit/domain** Adapt to Change Be Flexible Manage Goals and Time Work Independently Be Self-directed Learners Interact Effectively with Others Work Effectively in Diverse Teams
Enduring Understandings ● Algebraic expressions and equations are used to model real-life problems and represent quantitative relationships, so that the numbers and symbols can be mindfully manipulated to reach a solution or make sense of the quantitative relationship.	**Essential Questions** ● How can algebraic expressions and equations be used to model, analyze and solve mathematical situations?
Content Knowledge 8.EE.1(Exponents)	**Skills** ● Determine the properties of integer exponents by

	exploring patterns and applying understanding of properties of whole number exponents. ● Use the properties of integer exponents to simplify expressions.
8.EE.2 (Cubed and squared root)	● Recognize taking a square root as the inverse of squaring a number. ● Recognize taking a cube root as the inverse of cubing a number. ● Evaluate the square root of a perfect square. ● Evaluate the cube root of a perfect cube. ● Justify that the square root of a non perfect square will be irrational.
8.EE.3 (Scientific Notation)	● Write an estimation of a large quantity by expressing it as the product of a single digit number and a positive power of ten. ● Write an estimation of a small quantity by expressing it as the product of a single digit number and a negative power of ten. ● Compare quantities written as the product of a single digit number and a power of ten by stating their multiplicative relationships.
8.EE.4 (Scientific Notation)	● Add and subtract two numbers written in scientific notation ● Multiply and divide two numbers written in scientific notation. ● Select the appropriate units for measuring derived measurements when comparing quantities written in scientific notation. ● Identify and interpret the various ways scientific notation

8.EE.5 (Proportional relationships) 8.EE.6 (Lines, linear equations and slope) 8.EE.7 (linear equations)	is displayed on calculators and through computer software. ● Graph a proportional relationship in the coordinate plane ● Interpret the unit rate of a proportional relationship as the slope of a graph. ● Justify that the graph of a proportional relationship will always intersect the origin (0,0) of the graph. ● Use a graph, a table or an equation to determine the unit rate of a proportional relationship and use the unit rate to make comparisons between various proportional relationships. ● Create right triangles by drawing a horizontal line segment and a vertical line segment from any two points on a non-vertical line in the coordinate plane. ● Justify these right triangles are similar by comparing the ratios of the length of the corresponding legs. ● Justify that since the triangles are similar, the ratio of all corresponding hypotenuse representing the slope of a line will be equivalent. ● Justify that an equation in the form y=mx will represent the graph of a proportional relationship with a slope of m and a y-intercept of 0. ● Justify that in an equation in the form y=mx+b represents the graph of a linear relationship with a slope of m and a y-intercept of b. ● Use the properties of real numbers to determine the solution of a linear equation. ● Simplify linear equation by using the distributive property and/or combining like terms. ● Give examples of linear equations with one solution,

8.EE.8 (Systems of equations)	infinitely many solutions, or no solution. ● Explain how a line represents the infinite number of solutions to a linear equation with two variables. ● Explain how the point(s) of intersection of two graphs will represent the solution to the system of two linear equations because that/those points are solutions to both equations. ● Use algebraic reasoning(simple substitution) and the properties of real numbers to solve a system of linear equations. ● Use the graph of two linear equations to estimate the solution of the system. ● Use mathematical reasoning to solve simple systems of linear equations. ● Solve real-world problems and mathematical problems dealing with systems of linear equations and interpret the solution in the context of the problem.

Primary and Supplementary Resources

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Glencoe Math Grade 8 Teacher's Edition

Glencoe Math Online Resources

EdConnect Login

NJSLA Mathematics Operational Evidence Statements
https://docs.google.com/spreadsheets/d/18M5r1jk4P729fTpAlWAzrw1gE6tken233I-Yk0U712M/edit#gid=554025491

NJSLA Released Items

https://nj.digitalitemlibrary.com/home
https://resources.newmeridiancorp.org/

Illustrative Mathematics

iReady
i-Ready makes differentiated instruction a practical reality for teachers and students. *i-Ready*:

- integrates powerful assessments and rich insights with effective and engaging instruction in reading and mathematics to address students' individual needs.
- empowers teachers every day to make more informed instructional decisions.
- motivates students with access to their own personalized path to growth.

XtraMath

- This program helps students practice their math facts for addition, subtraction, multiplication, and addition.
- Can individualize the fluency skills for each student.
- Can run reports to determine progress.

Khan Academy

- a set of online tools that help educate students. The organization produces short lessons in the form of YouTube videos.
- Its website also includes supplementary practice exercises and materials for educators.

8th grade Flip Book:
https://schools.peoriaud.k12.az.us/sites/desertharbor/College%20and%20Career%20Readiness%20StandardsFormerly%20Com/Common%20Core%20Math%20Flip%20Books/8th%20Grade%20math%20%20Flipbook.pdf

North Carolina Dept of Ed. Wikispaces:
http://maccss.ncdpi.wikispaces.net/Middle+School

101 Math Discourse Questions:
http://www.casamples.com/downloads/100MathDiscourseQuestions_Printable.pdf

Asking Effective Questions
http://www.edu.gov.on.ca/eng/literacynumeracy/inspire/research/CBS_AskingEffectiveQuestions.pdf

Fluency Support for Grades 6-8
https://www.engageny.org/resource/mathematics-fluency-support-grades-6-8

Achieve the Core Coherence Map
https://achievethecore.org/coherence-map/8

Assessments:
- ➢ Quiz 1
- ➢ Quiz 2
- ➢ Mid Chapter Assessment
- ➢ End of Chapter Assessment
- ➢ Performance Task
- ➢ Benchmark Assessment
- ➢ Exit tickets

Differentiation in the Mathematics Classroom

Special Education Students
- ➢ Chunk content
- ➢ Small group instruction
- ➢ Notes packets/graphic organizers provided
- ➢ Anchor charts/multiplication charts/reference sheets provided
- ➢ Calculators provided as needed
- ➢ Modified assessments/assignments and extra time given
- ➢ YouTube clips used to supplement content visually
- ➢ Number Lines
- ➢ Vocabulary Enrichment

English Language Learners
- ➢ Create Vocabulary Banks
- ➢ Use manipulatives
- ➢ Modify teacher talk and practice wait time
- ➢ Elicit nonverbal responses, like a thumbs up or down
- ➢ Use sentence frames
- ➢ Comprehensible input
- ➢ Contextualized instruction
- ➢ A low-anxiety learning environment
- ➢ Meaningful engagement in learning activities

At-Risk Students

- ➢ Reduce the number of problems given
- ➢ Provide calculators
- ➢ Give extra time
- ➢ Individualized instruction
- ➢ One-on-one check in
- ➢ Communicate with family
- ➢ iReady

504 Students

- ➢ Provide a checklist of the steps needed to complete the problem
- ➢ Provide place value charts
- ➢ Provide lots of white-space to make it less busy
- ➢ If still struggling, reteach and retest

Gifted and Talented Students

- ➢ Use more-challenging numbers
- ➢ Add additional steps by combining standards
- ➢ Introduce the next-grade-level standard
- ➢ Know Their Interests – Start by having students complete an interest inventory like this one Student Interest Survey
- ➢ Keep Them Active - Gifted students often need to have the ability to move when learning
- ➢ Offer Flexible Seating - Try to offer different seating options for students: beanbag chairs, carpet squares, pillows, director chairs … the list can go on and on.
- ➢ Share Current Events - Current events are important to incorporate into gifted programming. We want these students to be thinking about how they can use their talents to solve real-world problems.
- ➢ Practice Like Professionals - Allow students to practice like the professionals. Use the same processes that professionals use.
- ➢ Locate Authentic Audiences - The work students create should have a real audience and be appreciated by those who authentically would benefit from its completion. Younger students are a great first authentic audience.

Domain 3: Functions 8.F	
	Chapter 3: Lessons 3 and 4 Chapter 4: Lessons 1-9

NJ 2016 Student Learning Standards: Mathematics Grade 7

8.F

A. Define, evaluate, and compare functions.

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.[1]

2. 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). *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.*

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.*

B. Use functions to model relationships between quantities.

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.

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.

NJDOE Mathematics Curricular Framework	Mathematical Practices

Guide Document and Supports Mathematics Curricular Framework	**MP. The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.** **highlight appropriate indicators for unit/domain** MP.1. Make sense of problems and persevere in solving them. MP.2. Reason abstractly and quantitatively. MP.3. Construct viable arguments and critique the reasoning of others. MP.4. Model with mathematics. MP.5. Use appropriate tools strategically. MP.6. Attend to precision. MP.7. Look for and make use of structure. MP.8. Look for and express regularity in repeated reasoning.
Career Readiness, Life Literacies, and Key Skills Integration **NJSLS - CRLLKS 2020** **highlight appropriate indicators for unit/domain** CRLLKS1. Act as a responsible and contributing community members and employee. CRLLKS2. Attend to financial well-being. CRLLKS3. Consider the environmental, social and economic impacts of decisions. CRLLKS4. Demonstrate creativity and innovation. CRLLKS5. Utilize critical thinking to make sense of problems and persevere in solving them	**21st Century Student Outcomes** http://www.battelleforkids.org/networks/p21 **Learning and Innovation Skills** **highlight appropriate indicators for unit/domain** Think Creatively Work Creatively with Others Implement Innovations Reason effectively Use Systems Thinking Make Judgments and Decisions Solve Problems Communicate Clearly Collaborate with Others

CRLLKS6. Model integrity, ethical leadership and effective management. CRLLKS7. Plan education and career paths aligned to personal goals. CRLLKS8. Use technology to enhance productivity increase collaboration and communicate effectively.persevere in solving them. CRLLKS9. Work productively in teams while using cultural/global competence.	**Life and Career Skills** **highlight appropriate indicators for unit/domain** Adapt to Change Be Flexible Manage Goals and Time Work Independently Be Self-directed Learners Interact Effectively with Others Work Effectively in Diverse Teams
Enduring Understandings ● The characteristics of functions and their representations are useful in making sense of patterns and solving problems involving quantitative relationships.	**Essential Questions** ● How are functions useful?
Content Knowledge 8.F.1 (Understanding relations and functions) 8.F.2 (Comparing Two Functions)	**Skills** ● Explain that a function represents a relationship between an input and an output where the output depends on the input, therefore, there can only be one output for each input. ● Show the relationship between the inputs and outputs of a function by graphing them as ordered pairs on a coordinate plane. ● Determine the properties of a function written in algebraic form (e.g., rate of change, meaning of y-intercept, linear, non-linear). ● Determine the properties of a function represented as a

8.F.3 (Linear and Non-linear Functions)	graph. ● Determine the properties of a function when given the input and output in a table. ● Determine the properties of a function when given the situation verbally. ● Compare the properties of two functions that are represented differently (e.g., as an equation, in a table, graphically or a verbal representation.) ● Explain why the equation y=mx+b represents a linear function and interpret the slope and y-intercept in relation to the function. ● Give examples of relationships that are non-linear functions. ● Analyze the rate of change between input and output values to determine if the function is linear or non-linear. ● Create a table of values that can be defined as a non-linear function.
8.F.4 (Representing Functions)	● Write a linear function that models a given situation given verbally as a table of x- and y- values or as a graph. ● Define the initial value of the function in relation to the situation. ● Define the rate of change in relation to the situation. ● Define the y-intercept in relation to the situation. ● Explain any constraints on the domain in relation to the situation.
8.F.5 (Graphing Functions)	● Match the graph of functions to a given situation. ● Write a story that describes the functional relationship between two variables depicted on a graph. ● Create a graph of functions that describes the relationship

	between two variables.

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Illustrative Mathematics

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- Can individualize the fluency skills for each student.

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- ➢ a set of online tools that help educate students. The organization produces short lessons in the form of YouTube videos.
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Differentiation in the Mathematics Classroom

Special Education Students

- ➢ Chunk content
- ➢ Small group instruction
- ➢ Notes packets/graphic organizers provided
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- ➢ Modified assessments/assignments and extra time given
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504 Students

- ➢ Provide a checklist of the steps needed to complete the problem
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Gifted and Talented Students

- ➢ Use more-challenging numbers
- ➢ Add additional steps by combining standards
- ➢ Introduce the next-grade-level standard
- ➢ Know Their Interests – Start by having students complete an interest inventory like this one Student Interest Survey

- ➢ Keep Them Active - Gifted students often need to have the ability to move when learning
- ➢ Offer Flexible Seating - Try to offer different seating options for students: beanbag chairs, carpet squares, pillows, director chairs … the list can go on and on.
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- ➢ Practice Like Professionals - Allow students to practice like the professionals. Use the same processes that professionals use.
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Domain 4: Geometry 8.G	
Pacing Guide **Grade 8** Mathematics Pacing Guide THIS IS GRADE 7	Chapter 5: Lessons 1-7 Chapter 6: Lessons 1-4 Chapter 7: Lessons 1-5 and 7 Chapter 8: Lessons 1-6
NJ 2016 Student Learning Standards: Mathematics Grade 7	

8.G

A. Understand congruence and similarity using physical models, transparencies, or geometry software.

1. Verify experimentally the properties of rotations, reflections, and translations:

a. Lines are transformed to lines, and line segments to line segments of the same length.

b. Angles are transformed to angles of the same measure.

c. Parallel lines are transformed to parallel lines.

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.

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.*

B. Understand and apply the Pythagorean Theorem.

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.

C. Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.

9. Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.

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Enduring Understandings ● Geometric attributes (such as shapes, lines, angles, figures, and planes) provide descriptive information about an object's properties and position in space and support visualization and problem solving.	**Essential Questions** ● How does geometry better describe objects?
Content Knowledge 8.G.1(Geometric Transformations)	**Skills** ● Verify- by measuring and comparing lengths, angle measures, and parallelism of a figure and its image - that after a figure has been translated, corresponding lines and line segments remain the same length, corresponding angles have the same measure, and corresponding parallel lines remain parallel. ● Verify- by measuring and comparing lengths, angle measures, and parallelism of a figure and its image - that after a figure has been reflected, corresponding lines and line segments remain the same length, corresponding angles have the same measure, and corresponding

	parallel lines remain parallel. ● Verify- by measuring and comparing lengths, angle measures, and parallelism of a figure and its image - that after a figure has been rotated, corresponding lines and line segments remain the same length, corresponding angles have the same measure, and corresponding parallel lines remain parallel.
8.G.2 (Congruent Figures)	● Explain how transformations can be used to prove that two figures are congruent ● Perform a series of transformations (reflections, rotations, and/or translations) to prove or disprove that two figures are congruent.
8.G.3 (Dilations)	● Describe the changes occurring to the x- and y-coordinates of a figure after a translation. ● Describe the changes occurring to the x- and y-coordinates of a figure after a reflection. ● Describe the changes occurring to the x- and y-coordinates of a figure after a rotation. ● Describe the changes occurring to the x- and y-coordinates of a figure after a dilation.
8.G.4 (Similar Figures)	● Explain how transformations can be used to prove that two figures are similar. ● Describe a series of transformations to prove or disprove that two given figures are similar.
8.G.5 (relating similar/congruent figures to transformations)	● Informally prove the sum of any triangle's interior angles will have the same measure as a straight angle (i.e., by tearing off the three corners of a triangle and arranging

	them to form a 180º straight angle). ● Informally prove that the sum of any polygon's exterior angles will be 360º ● Make conjecture regarding the relationships and measurements of the angles created when two parallel lines are cut by a transversal. ● Apply proven relationships to establish minimal properties to justify similarity.
8.G.6 (converse of Pythagorean Theorem)	● Use visual models to demonstrate the relationship of the three side lengths of any right angle. ● Use algebraic reasoning to relate the visual model to the Pythagorean Theorem. ● Use the Pythagorean Theorem to determine if a given triangle is a right triangle.
8.G.7 (Pythagorean Theorem)	● Apply the pythagorean theorem to find an unknown side length of a right triangle. ● Draw a diagram and use the Pythagorean Theorem to solve real world problems involving right triangles. ● Draw a diagram to find right triangles in a three-dimensional figure and use the pythagorean theorem to calculate the various dimensions.
8.G.8 (Distance Formula)	● Connect any two points on a coordinate grid to a third point so that the three points form a right triangle. ● I can use the right triangle and the Pythagorean Theorem to find the distance between the original two points.
8.G.9 (Volume)	● Describe the similarity between finding the volume of a cylinder and the volume of a right prism. ● Recall the formula to find the volume of a cylinder.

	• Informally prove the relationship between the volume of a cylinder and the volume of a cone with the same base. • Recall the formula to find the volume of a sphere and the the volume of a circumscribed cylinder. • Recall the formula to find the volume of a sphere. • Use the formulas to find the volume of cylinders, cones, and spheres. • Solve real-world problems involving the volume of cylinders, cones and spheres.

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English Language Learners
- ➢ Create Vocabulary Banks
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- ➢ Provide a checklist of the steps needed to complete the problem
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Domain 5: Statistics and Probability 8.SP	
Pacing Guide **Grade 8** Mathematics Pacing Guide THIS IS GRADE 7	Chapter 9:

NJ 2016 Student Learning Standards: Mathematics Grade 7

8.SP

A. Investigate patterns of association in bivariate data.

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. 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.

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.*

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?*

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Enduring Understandings	**Essential Questions**

● The rules of probability can lead to more valid and reliable predictions about the likelihood of an event occurring.	● How is probability used to make informed decisions about uncertain events?
Content Knowledge 8.SP.1 (Scatter Plots) 8.SP.2 (Model Linear Associations) 8.SP.3 (Model Linear Associations)	**Skills** ● Plot ordered pairs on a coordinate grid representing the relationship between two data sets. ● Describe patterns in the plotted points such as clustering, outliers, positive and negative association, and linear or nonlinear association and describe the pattern in the context of the measurement data. ● Interpret the patterns of association in the context of the data sample. ● Recognize whether data plotted on a scatter plot have a linear association. ● Draw a straight trend line to approximate the linear relationship between the plotted points of data sets. ● Make inferences regarding the reliability of the trend line by noting the closeness of the data points to the line. ● Determine the equation of the trend line that approximates the linear relationship between the plotted points of two data sets. ● Interpret the y-intercept of the equation in the context of the collected data. ● Interpret the slope of the equation in the context of the collected data. ● Use the equation of the trend line to summarize the given data and make the predictions regarding additional data

8.SP.4 (Two-Way Tables)	points ● Create a two-way table to record the frequencies of bivariate categorical values ● Determine the relative frequency for rows and/or columns of a two-way table. ● Use the relative frequency and context of the problem to describe possible associations between the two sets of data.

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- ➢ Provide place value charts
- ➢ Provide lots of white-space to make it less busy
- ➢ If still struggling, reteach and retest

➢ Communicate with family ➢ iReady	

Gifted and Talented Students

- ➢ Use more-challenging numbers
- ➢ Add additional steps by combining standards
- ➢ Introduce the next-grade-level standard
- ➢ Know Their Interests – Start by having students complete an interest inventory like this one Student Interest Survey
- ➢ Keep Them Active - Gifted students often need to have the ability to move when learning
- ➢ Offer Flexible Seating - Try to offer different seating options for students: beanbag chairs, carpet squares, pillows, director chairs … the list can go on and on.
- ➢ Share Current Events - Current events are important to incorporate into gifted programming. We want these students to be thinking about how they can use their talents to solve real-world problems.
- ➢ Practice Like Professionals - Allow students to practice like the professionals. Use the same processes that professionals use.
- ➢ Locate Authentic Audiences - The work students create should have a real audience and be appreciated by those who authentically would benefit from its completion. Younger students are a great first authentic audience.