

RIVER DELL REGIONAL SCHOOL DISTRICT



Content: Mathematics
Course: Prealgebra
Alignment: 2023 NJSL
BOE Born On: August 21, 2023

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Introduction

PreAlgebra is an accelerated math course, which combines 7th grade and 8th grade math standards, leading to Algebra 1 in 8th grade. The course uses skills from K-6 mathematics to represent data through algebraic expressions and equations. Students will extend their understanding of operations with fractions and decimals by simplifying expressions and solving equations that involve positive and negative rational numbers. Students will analyze proportional relationships and use them to solve real-world and mathematical problems. They will learn about linear relationships by examining tables, graphs, and equations of lines. Students will use properties of operations to generate equivalent expressions. The difference between an expression and an equation will be apparent through their work with simplifying expressions, including expressions involving exponents, radicals, and scientific notation.

Mission

River Dell's curricula is designed to promote student achievement through the development of college and career readiness skills with a focus on equal access, inclusivity, and students' individuality. The mission of the curriculum is to prepare students to live and to work in a global society as active citizens and as contributing responsible community members. The program outlined in this curriculum engages students in broad-based, experiential learning that will enhance the development of critical thinking, communication, and analytical/relational skills. This curriculum is constructed to meet students at their developmental level and to support their progression through varied levels of engagement, skill attainment, exploration, inquiry, and analysis assisting them to mature into their authentic selves.

Vision

The mathematics department in the River Dell Regional School District seeks to provide all students with the mathematical skills, understanding, and attitudes that they will need to be successful in their career, in their college work, and daily lives. Students at every level are helped to improve their ability to solve problems, to communicate about mathematics, to reason mathematically, and to make connections within mathematics and between mathematics and other subjects. Our courses provide opportunities for success that encourage all students to develop a positive attitude about mathematics by engaging them in exploring and solving interesting mathematical problems, using mathematics in meaningful ways, by focusing on concepts and understanding, as well as on procedures, and by consistently expecting students to go beyond repetition and memorization to problem solving and understanding.

Scope and Sequence.

Unit 1: Rational Numbers (6 weeks)

Unit 2: Equations and Applications (8 weeks)

Unit 3: Proportional Relationships (9 weeks)

Unit 4: Linear Relationships (8 weeks)

Unit 5: Exponents & Scientific Notation (5 weeks)

Unit 6: Roots, Radicals & Pythagorean Theorem (4 weeks)

Technology

Technology integration is the seamless and effective use of 21st Century technology within an instructional setting to support students and teachers in the learning process with administrative support and evaluation:

Standards 8.1 Computer Science

- Computer Science, previously a strand entitled ‘Computational Thinking: Programming’ in standard 8.2 of the 2014 NJSL-Technology, outlines a comprehensive set of concepts and skills, such as data and analysis, algorithms and programming, and computing systems.

Standard 8.2 Design Thinking

- This standard, previously standard 8.2 Technology Education of the 2014 NJSL – Technology, outlines the technological design concepts and skills essential for technological and engineering literacy. The new framework design, detailed previously, includes Engineering Design, Ethics and Culture, and the Effects of Technology on the Natural world among the disciplinary concepts.

New Jersey Administrative Code Summary and Statutes:

The following sections outline skills and special categories mandated by the state of New Jersey for all K-12 curriculum.

Integration of 21st Century Skills and Themes and Interdisciplinary Connections

District Boards of Education shall be responsible for the review and continuous improvement of curriculum and instruction based upon changes in knowledge, technology, assessment results, and modifications to the NJSL, according to N.J.A.C. 6A:8-2.

1. District Boards of Education shall include interdisciplinary connections throughout the K–12 curriculum.
2. District Boards of Education shall integrate into the curriculum 21st Century themes and skills (N.J.A.C. 6A:8-3.1(c). Twenty-first Century themes and skills integrated into all content standards areas (N.J.A.C. 6A:8-1.1(a)3).

“Twenty-first Century themes and skills” means themes such as global awareness; financial, economic, business, and entrepreneurial literacy; civic literacy; health literacy; learning and innovation skills, including creativity and innovation, critical thinking and problem solving, communication and collaboration; information, media, technology skills; and life and career skills, including flexibility and adaptability, initiative and self-direction, social and cross-cultural skills, productivity and accountability, and leadership and responsibility

Dissection Law: N.J.S.A. 18A:35-4.25 and N.J.S.A. 18A:35-4.24 authorizes parents or guardians to assert the right of their children to refuse to dissect, vivisection, incubate, capture or otherwise harm or destroy animals or any parts thereof as part of a course of instruction.

Amistad Law: N.J.S.A. 18A 52:16A-88 Every Board of Education shall incorporate the information regarding the contributions of African Americans to our country in an appropriate place in the curriculum of elementary and secondary school students.

Holocaust Law: N.J.S.A. 18A:35-28 Every Board of Education shall include instruction on the Holocaust and genocides in an appropriate place in the curriculum of all elementary and secondary school pupils. The instruction shall further emphasize the personal responsibility that each citizen bears to fight racism and hatred whenever and wherever it happens.

LGBT and Disabilities Law: N.J.S.A. 18A:35-4.35 A Board of Education shall include instruction on the political, economic, and social contributions of persons with disabilities and lesbian, gay, bisexual, and transgender people, in an appropriate place in the curriculum of middle school and high school students as part of the district's implementation of the New Jersey Student Learning Standards (N.J.S.A.18A:35-4.36). A Board of Education shall have policies and procedures in place pertaining to the selection of instructional materials to implement the requirements of N.J.S.A. 18A:35-4.35.

Asian Americans and Pacific Islanders: N.J.S.A. S4021 This will ensure that the contributions, history, and heritage of Asian Americans and Pacific Islanders (AAPI) are included in the New Jersey Student Learning Standards for Social Studies for students in kindergarten through Grade 12.

Career Readiness, Life Literacies, and Key Skills (NJSLS-CLKS):

- Standard 9.1 Personal Financial Literacy: This standard outlines the important fiscal knowledge, habits, and skills that must be mastered for students to make informed decisions about personal finance. Financial literacy is an integral component of a student's college and career readiness, enabling students to achieve fulfilling, financially secure, and successful careers.
- Standard 9.2 Career Awareness, Exploration, Preparation and Training. This standard outlines the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.
- Standard 9.3 This standard outlines what students should know and be able to do upon completion of a CTE Program of Study.
- Standard 9.4 Life Literacies and Key Skills. This standard outlines key literacies and technical skills such as critical thinking, global and cultural awareness, and technology literacy* that are critical for students to develop to live and work in an interconnected global economy.

Climate Change

Standards in Action: Climate Change Earth's climate is now changing faster than at any point in the history of modern civilization, primarily as a result of human activities. Global climate change has already resulted in a wide range of impacts across New Jersey and in many sectors of its economy. The addition of academic standards that focus on climate change is important so that all students will have a basic understanding of the climate system, including the natural and human-caused factors that affect it. The underpinnings of climate change span across physical, life, as well as Earth and space sciences. The goal is for students to understand climate science to inform decisions that improve quality of life for themselves, their community, globally and to know how engineering solutions can allow us to mitigate impacts, adapt practices, and build resilient systems.

The topic of climate change can easily be integrated into science classes. At each grade level in which systems thinking, managing uncertainty, and building arguments based on multiple lines of data are included, there are opportunities for students to develop essential knowledge and skills that will help them understand the impacts of climate change on humans, animals, and the environment. For example, in the earlier

grades, students can use data from firsthand investigations of the school-yard habitat to justify recommendations for design improvements to the school-yard habitat for plants, animals, and humans. In the middle grades, students use resources from New Jersey Department of Environmental Protection, the National Oceanic and Atmospheric Administration (NOAA), and National Aeronautics and Space Administration (NASA), to inform their actions as they engage in designing, testing, and modifying an engineered solution to mitigate the impact of climate change on their community. In high school, students can construct models they develop of a proposed solution to mitigate the negative health effects of unusually high summer temperatures resulting from heat islands in cities across the globe and share in the appropriate setting.

Unit I: Rational Numbers (6 Weeks)

Core Ideas	Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers. All students will understand the meaning of numbers, how they may be represented and the relationships among them. They will perform computations and acquire knowledge of the physical world from the point of view of quantitative relationships.		
Essential Questions	How do rational numbers help in describing real world situations? What will addition, subtraction, multiplication, or division of rational numbers tell about the problem? What models for rational numbers would help in showing the relationships in the problem situation?		
Enduring Understanding	There are many different everyday situations that must be represented with rational numbers.		
Practice	<ol style="list-style-type: none"> 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning. 		
Performance Expectations	<ul style="list-style-type: none"> • Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram. • Describe situations in which opposite quantities combine to make 0. • Understand $p + q$ as the number located a distance q from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts. • Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference and apply this principle in real-world contexts. • Apply properties of operations as strategies to add and subtract rational numbers. • Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. • Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts. • Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$. Interpret quotients of rational numbers by describing real-world contexts. • Apply properties of operations as strategies to multiply and divide rational numbers. • Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats. • Solve real-world and mathematical problems involving the four operations with rational numbers. • 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 that repeats eventually into a rational number. • Understand that the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational. 		
NJ Standards	Student Learning Objectives	Suggested Tasks/Activities	Resources/Materials
NJSLS.7.NS.A.1 NJSLS.7.NS.A.1a NJSLS.7.NS.A.1b NJSLS.7.NS.A.1c NJSLS.7.NS.A.1d NJSLS.7.NS.A.2 NJSLS.7.NS.A.2a NJSLS.7.NS.A.2b NJSLS.7.NS.A.2c	<ul style="list-style-type: none"> • Compare and order rational numbers and find their place on a number line. • Classify numbers according to the real number system. • Review the algorithms for adding, subtracting, multiplying, and dividing integers. • Apply the algorithms for adding, subtracting, multiplying, and dividing rational numbers. • Write mathematical sentences to show relationships. • Evaluate expressions using the order of operations. 	<ul style="list-style-type: none"> • Integer Magic Squares • Ordering Integers Desmos Activity • Kahoot Challenge – Real Number System • Quizzizz – Adding & Subtracting Rational Numbers • Quizzizz – Decimal Operations • Multiplying Integers Desmos Activity • Rational Numbers Scavenger Hunt • Rags to Riches Activity • Jeopardy Game Unit 1 	<p>Text: Big Ideas Red</p> <p>Resources include, but are not limited to,</p> <ul style="list-style-type: none"> • Teacher Created Activities • Four Function Calculator • IXL Online Practice • Desmos.com • Teacher Created Video Tutorials

<p>NJSLS.7.NS.A.2d NJSLS.7.NS.A.3 NJSLS.8.NS.A.1 NJSLS.8.NS.A.3</p>	<ul style="list-style-type: none"> Place parenthesis within an equation in order to make the equation true. Use the Commutative Property for addition and multiplication of rational numbers. Simplify expressions, including combining like terms and the Distributive Property. Convert a rational number to a decimal using long division. Solving word problems that involve the four operations with rational numbers. Use positive and negative numbers to graph in four quadrants and to model and answer questions 	<ul style="list-style-type: none"> Meet a Mathematician Activity Mathematicians On This Day Activity 	<ul style="list-style-type: none"> ALEKS Software DeltaMath.com EdPuzzle.com 	
Key Vocabulary	Real Number System, Rational Number, Irrational Number, Whole Numbers, Integers, Positive Number, Negative Number, Horizontal Number Line, Vertical Number Line, Absolute Value, Numerator, Denominator, Terms, Factors, Order of Operations, Reciprocal, Mathematical Sentence, Expressions, Equations, Evaluate, Simplify, Commutative Property, Like Terms, Distributive Property, Convert, Quadrants in the Coordinate Plane, X-Axis, Y-Axis, Difference, Sum, Product, Quotient, Inverse Operation			
Evidence of Learning	Activities, tests, quizzes			
Interdisciplinary Connections	<p>NJSLSA.R1. Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.</p> <p>NJSLSA.R2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.</p> <p>NJSLSA.R4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.</p> <p>NJSLSA.W1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.</p>			
Diversity, Equity, & Inclusion	Students will be exposed to mathematicians that are from diverse backgrounds and are experts in the field. We will examine mathematical contributions from around the world and the impact on various cultures, past and present.			
Computer Science and Design Thinking	8.1.8.DA.4: Transform data to remove errors and improve the accuracy of the data for analysis.			
Career Readiness, Life Literacies, and Key Skills	<p>9.1.8.CP.1: Compare prices for the same goods or services.</p> <p>9.1.8.FP.2: Evaluate the role of emotions, attitudes, and behavior (rational and irrational) in making financial decisions.</p> <p>9.1.8.PB.6: Construct a budget to save for short-term, long term, and charitable goals.</p> <p>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.</p> <p>9.2.8.CAP.11: Analyze potential career opportunities by considering different types of resources, including occupation databases, and state and national labor market statistics.</p> <p>9.2.8.CAP.18: Explain how personal behavior, appearance, attitudes, and other choices may impact the job application process.</p> <p>9.4.8.CT.2: Develop multiple solutions to a problem and evaluate short- and long-term effects to determine the most plausible option.</p> <p>9.4.8.GCA.1: Model how to navigate cultural differences with sensitivity and respect.</p> <p>9.4.8.GCA.2: Demonstrate openness to diverse ideas and perspectives through active discussions to achieve a group goal.</p>			
Social Emotional Learning	<p>SELF-AWARENESS: The abilities to understand one’s own emotions, thoughts, and values and how they influence behavior across contexts.</p> <p>SELF-MANAGEMENT: The abilities to manage one’s emotions, thoughts, and behaviors effectively in different situations and to achieve goals and aspirations.</p> <p>SOCIAL AWARENESS: The abilities to understand the perspectives of and empathize with others, including those from diverse backgrounds, cultures, & contexts.</p> <p>RELATIONSHIP SKILLS: The abilities to establish and maintain healthy and supportive relationships and to effectively navigate settings with diverse individuals and groups.</p> <p>RESPONSIBLE DECISION-MAKING: The abilities to make caring and constructive choices about personal behavior and social interactions across diverse situations.</p>			
Differentiation				
Resources/Materials	ELL (English Language Learners)	Special Education	At Risk	Enrichment

	<ul style="list-style-type: none"> • Provide translated notes and key vocabulary terms • Provide images of key vocabulary terms and concepts • Word banks • Bilingual dictionaries • Assistive translator technology • Sentence frames • Simplified notes • Reduced homework • Simplified word problems • Graphic organizers • Matched sentences or procedures with pictures • Alternative presentation options • 1-2 sentence short responses • Shortened written assignments • Modified tests • Provide notes when student request • Reduce project workload • Short summaries 	<ul style="list-style-type: none"> • Display reminders • Checklist of materials and tasks (printed out or digitally accessible) • Timelines and Calendar for benchmark goals for assignments/assessments/short-term goals (Planner Microsoft) • Assistive technology (dictation, immersive reader, etc...) • Flash cards • Teacher notes • Graphic organizer • Clear parameters and student workspace • Timer to monitor task and duration • Study guides • Guided notes • Choices for alternative assignments • Students are asked to come for extra help to review/retake assessment and homework assignments • Students are allowed time and a half on assessments • Provide the student with frequent check-ins during class-time work • Visual cue or signs • Rephrase of questions and directions • Partner or group work on skill development • Assistance by instructional videos or curated videos online 	<ul style="list-style-type: none"> • Students are asked to come for extra help to review/retake assessment and homework assignments • Students are allowed time and a half on assessments • Provide the student with frequent check-ins during class-time work • Scaffolding assignments • Chunking of materials • Allow for errors • Pre-teach materials • Supply teacher demo • Rephrase of questions and directions • Visual cue or signs • Small group assistance or collaboration • Partner or group work on skill development • Assistance by instructional videos or curated videos online • Guide with options for student goal setting • Use of timer or a clock to monitor time of student activity 	<ul style="list-style-type: none"> • problem sets that challenge and involve higher level thinking • Inquiry lead discussions and activities • More complex tasks and projects • Higher level questioning and techniques • Student demonstration and explanation • Provide opportunities for students to set personal goals, keep records and monitor their own learning progress • Multiple assessments given in different domains, that showcase student interests, strengths, and needs • Use multiple approaches to accelerate learning within and outside of the school setting • Use enrichment options to extend and deepen learning opportunities within and outside of the school setting • Use individualized learning options such as mentorships, internships, online courses, and independent study
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Unit 2: Equations and Applications (8 Weeks)

Core Ideas	Expressions and Equations can be used to solve real life and mathematical problems. Using properties of operations, we can create equivalent expressions to solve equations.		
Essential Questions	How do you solve mathematical problems using numerical and algebraic expressions and equations? How are real-life problems solved using mathematical equations?		
Enduring Understanding	Using variables to represent quantities in real-world or mathematical problems provides a systematic approach to solving problems. Symbolic representation and manipulation are essential skills in algebra		
Practice	<ol style="list-style-type: none"> 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning. 		
Performance Expectations	<ul style="list-style-type: none"> • Apply properties of operations as strategies to add, subtract, factor, and expand linear expression with rational coefficients. • Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. • Use variables to represent quantities in a real-world or mathematical problem and construct simple equations and inequalities to solve problems by reasoning about the quantities. • Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. • Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. • Solve linear equations in one variable. • 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). • Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms. 		
NJ Standards	Student Learning Objectives	Suggested Tasks/Activities	Resources/Materials
NJSLS.7.EE.A.1 NJSLS.7.EE.B.3 NJSLS.7.EE.B.4 NJSLS.7.EE.B.4.a NJSLS.7.EE.B.4.b NJSLS.8.EE.C.7 NJSLS.8.EE.C.7.a NJSLS.8.EE.C.7.b	<ul style="list-style-type: none"> • Apply properties of operations as strategies to add, subtract, factor, and expand linear expression with rational coefficients. • Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. • Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate. • Assess the reasonableness of answers using mental computation and estimation strategies. • Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. • Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. • Solve equations of basic forms fluently. 	<ul style="list-style-type: none"> • Algebraic Expressions Puzzle • CLT & Distributive Property Matching Activity • Distributive Property Desmos Activity • Two Step Equations Puzzle • Math Playground Balancing Equations Activity • Solving Multistep Equations Scavenger Hunt • Equations VBS Coloring Match • Color Square • Kahoot Challenge • Mystery Picture Activity • Solving & Graphing Inequalities Desmos Activity • Quizzizz Translating & Solving 2 Step Equations • Bouncing Ball Activity • Problem Solving Desmos • Rags to Riches Activity • Meet a Mathematician Activity 	<p>Text: Big Ideas Red</p> <p>Resources include, but are not limited to,</p> <ul style="list-style-type: none"> • Teacher Created Activities • Four Function Calculator • IXL Online Practice • Desmos.com • Teacher Created Video Tutorials • ALEKS Software • DeltaMath.com • EdPuzzle.com

	<ul style="list-style-type: none"> • Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. • Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and r are specific rational numbers. • Graph the solution set of the inequality and interpret it in the context of the problem. • Solve equations with one variable, including those with no solution or infinitely many solutions. • Use solutions of equations to make predictions and decisions. • Solve inequalities with one variable and graph the solution set on a number line. • Solve compound inequalities and graph the solution set on a number line. • Solve absolute value equations and inequalities and graph the solution set on a number line. • Solve real world problems that require equations or inequalities. 	<ul style="list-style-type: none"> • Mathematicians On This Day Activity 	
Key Vocabulary	Equations, inequalities, equivalent expressions, equivalent equations, solution, solution set, literal equation, isolate, compound inequality, absolute value equation, absolute value inequality, tip, discount, commission, mark-up, mark-down, simple interest, consecutive numbers, break-even		
Evidence of Learning	Activities, tests, quizzes		
Interdisciplinary Connections	<p>NJSLSA.R1. Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.</p> <p>NJSLSA.R2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.</p> <p>NJSLSA.R4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.</p> <p>NJSLSA.W1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.</p>		
Diversity, Equity, & Inclusion	Students will be exposed to mathematicians that are from diverse backgrounds and are experts in the field. We will examine mathematical contributions from around the world and the impact on various cultures, past and present.		
Computer Science and Design Thinking	<p>8.1.8.A.1 Demonstrate knowledge of a real world problem using digital tools</p> <p>8.1.8.A.3 Use and/or develop a simulation that provides an environment to solve a real world problem or theory</p> <p>8.1.8.A.4 Graph and calculate data with a spread sheet and present a summary of the results</p> <p>8.1.8.E.1 Effectively use a variety of search tools and filters in professional public databases to find information to solve real world problems</p> <p>8.1.8.F.1 Explore a local issue, by using digital tools to collect and analyze data to find a solution and make an informed decision.</p> <p>8.2.8.ED.3: Develop a proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, graphical/technical sketch).</p>		
Career Readiness, Life Literacies, and Key Skills	<p>9.1.8.B.1 Distinguish among cash, check, credit card, and debit card.</p> <p>9.1.8.B.2 Construct a simple personal savings and spending plan based on various sources of income.</p> <p>9.1.8.B.3 Justify the concept of “paying yourself first” as a financial savings strategy.</p> <p>9.1.8.B.4 Relate the concept of deferred gratification to [investment,] meeting financial goals, and building wealth.</p> <p>9.1.8.B.7 Construct a budget to save for long-term, short term, and charitable goals.</p> <p>9.1.8.A.2 Implement problem- solving strategies to solve a problem in school or the community.</p> <p>9.1.8.C.2 Demonstrate the use of compromise, consensus, and community building strategies for carrying out different tasks, assignments, and projects.</p> <p>9.1.8.D.3 Use effective communication skills face to face and online interactions with peers and adults from home and from diverse cultures.</p> <p>9.1.8.E.2 Analyze the role of digital media in sales and marketing and in delivering cultural, political, and other societal methods.</p> <p>9.1.8.F.1 Demonstrate how productivity and accountability contribute to realizing individual or group goals within or outside the classroom.</p> <p>9.1.8.A.2 Relate how career choices, education choices, skills, entrepreneurship, and economic conditions affect income.</p> <p>9.1.8.A.3 Differentiate among ways that workers can improve earning power through the acquisition of new knowledge and skills.</p> <p>9.1.8.A.5 Relate how the demand for certain skills determines an individual’s earning power.</p> <p>9.1.8.CP.1: Compare prices for the same goods or services.</p> <p>9.1.8.CP.5: Compare the financial products and services available to borrowers relative to their credit worthiness.</p>		

	<p>9.1.8.FP.3: Explain how self-regulation is important to managing money (e.g., delayed gratification, impulse buying, peer pressure, etc.).</p> <p>9.1.8.PB.5: Identify factors that affect one’s goals, including peers, culture, location, and past experiences.</p> <p>9.4.8.CI.3: Examine challenges that may exist in the adoption of new ideas (e.g., 2.1.8.SSH, 6.1.8.CivicsPD.2).</p> <p>9.4.8.CI.4: Explore the role of creativity and innovation in career pathways and industries.</p>
Social Emotional Learning	<p>SELF-AWARENESS: The abilities to understand one’s own emotions, thoughts, and values and how they influence behavior across contexts.</p> <p>SELF-MANAGEMENT: The abilities to manage one’s emotions, thoughts, and behaviors effectively in different situations and to achieve goals and aspirations.</p> <p>SOCIAL AWARENESS: The abilities to understand the perspectives of and empathize with others, including those from diverse backgrounds, cultures, & contexts.</p> <p>RELATIONSHIP SKILLS: The abilities to establish and maintain healthy and supportive relationships and to effectively navigate settings with diverse individuals and groups.</p> <p>RESPONSIBLE DECISION-MAKING: The abilities to make caring and constructive choices about personal behavior and social interactions across diverse situations.</p>

Differentiation

Resources/Materials	ELL (English Language Learners)	Special Education	At Risk	Enrichment
	<ul style="list-style-type: none"> • Provide translated notes and key vocabulary terms • Provide images of key vocabulary terms and concepts • Word banks • Bilingual dictionaries • Assistive translator technology • Sentence frames • Simplified notes • Reduced homework • Simplified word problems • Graphic organizers • Matched sentences or procedures with pictures • Alternative presentation options • 1-2 sentence short responses • Shortened written assignments • Modified tests • Provide notes when student request • Reduce project workload • Short summaries 	<ul style="list-style-type: none"> • Display reminders • Checklist of materials and tasks (printed out or digitally accessible) • Timelines and Calendar for benchmark goals for assignments/assessments/short-term goals (Planner Microsoft) • Assistive technology (dictation, immersive reader, etc...) • Flash cards • Teacher notes • Graphic organizer • Clear parameters and student workspace • Timer to monitor task and duration • Study guides • Guided notes • Choices for alternative assignments • Students are asked to come for extra help to review/retake assessment and homework assignments • Students are allowed time and a half on assessments • Provide the student with frequent check-ins during class-time work • Visual cue or signs • Rephrase of questions and directions 	<ul style="list-style-type: none"> • Students are asked to come for extra help to review/retake assessment and homework assignments • Students are allowed time and a half on assessments • Provide the student with frequent check-ins during class-time work • Scaffolding assignments • Chunking of materials • Allow for errors • Pre-teach materials • Supply teacher demo • Rephrase of questions and directions • Visual cue or signs • Small group assistance or collaboration • Partner or group work on skill development • Assistance by instructional videos or curated videos online • Guide with options for student goal setting 	<ul style="list-style-type: none"> • problem sets that challenge and involve higher level thinking • Inquiry lead discussions and activities • More complex tasks and projects • Higher level questioning and techniques • Student demonstration and explanation • Provide opportunities for students to set personal goals, keep records and monitor their own learning progress • Multiple assessments given in different domains, that showcase student interests, strengths, and needs • Use multiple approaches to accelerate learning within and outside of the school setting • Use enrichment options to extend and deepen learning opportunities within and outside of the school setting • Use individualized learning options such as mentorships, internships, online courses, and independent study

		<ul style="list-style-type: none">• Partner or group work on skill development• Assistance by instructional videos or curated videos online	<ul style="list-style-type: none">• Use of timer or a clock to monitor time of student activity	
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Unit 3: Proportional Relationships (9 Weeks)

Core Ideas	A proportion is a relationship of equality between two ratios that can be represented in a variety of ways.		
Essential Questions	<p>How can you determine whether two quantities are in a proportional relationship?</p> <p>How can you identify the constant of proportionality in tables, graphs, equations, diagrams, and verbal representations?</p> <p>How can you use proportional reasoning to solve real-world problems?</p> <p>How can you represent a relationship between two quantities?</p> <p>How can you write a ratio to represent a situation, and what does that ratio mean?</p> <p>Does switching the numbers in the ratio change the description of the ratio relationship?</p> <p>How can you determine and label appropriately the unit rate of any ratio?</p>		
Enduring Understanding	Quantities can be analyzed using unit rates, ratios, and percent. These forms of analysis allow us to solve real-world problems, using proportional reasoning.		
Practice	<ol style="list-style-type: none"> 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning. 		
Performance Expectations	<ul style="list-style-type: none"> • Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. • Recognize and represent proportional relationships between quantities. • Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin. • Represent proportional relationships by equations. • Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error. • Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. • Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale. 		
NJ Standards	Student Learning Objectives	Suggested Tasks/Activities	Resources/Materials
<p>NJSLS.7.RP.A.1</p> <p>NJSLS.7.RP.A.2</p> <p>NJSLS.7.RP.A.2.a</p> <p>NJSLS.7.RP.A.2.c</p> <p>NJSLS.7.RP.A.3</p> <p>NJSLS.7.EE.A.2</p> <p>NJSLS.7.G.A.1</p>	<ul style="list-style-type: none"> • Find two different unit rates for any given ratio, including those measured in like or different quantities. • Represent related data in tables using proportional reasoning. • Write an equation to represent the pattern in a table of related variables. • Solve for the unknown part of a proportion when one part of two equal ratios is unknown. • Set up and solve proportions that arise in applications, including the following: <ul style="list-style-type: none"> • Simple interest • Tax • Markups/ Markdowns • Gratuities and Commissions • Fees • Percent of Increase/Decrease • Percent Error 	<ul style="list-style-type: none"> • Reveal Activity • Pixel Activity: Tax, Tip, Discount • Pixel Activity: Percent Proportion • Simple Interest Word Activity • Cups Games – Mixed Review • Who Killed Mr. Percent Activity • Algebraic Proportions Desmos Activity • Meet a Mathematician Activity • Mathematicians On This Day Activity 	<p>Text: Big Ideas Red</p> <p>Resources include, but are not limited to,</p> <ul style="list-style-type: none"> • Teacher Created Activities • Four Function Calculator • IXL Online Practice • Desmos.com • Teacher Created Video Tutorials • ALEKS Software • DeltaMath.com • EdPuzzle.com

	<ul style="list-style-type: none"> • Write an equation to represent the pattern in a table of related variables. • Decide whether quantities are proportional by graphing on a coordinate plane and observing whether the line is straight and passing through the origin. • Explain what a coordinate point, (x, y), on the line of a graph of proportional relationship represents. • Use scale factors and ratios to determine relationships among the side lengths of similar figures. • Use scale drawings to compute actual lengths and areas. • Construct similar polygons. • Find the lengths of missing sides of similar polygons using ratios and/or scale factors. • Reproduce a scale drawing at a different scale. 		
Key Vocabulary	Ratio, value of a ration, equivalent ratios, rate, unit rate, equivalent rates, proportional, proportion equation, cross product, simple interest, principal, tax, mark-ups, mark-downs, gratuities, commission, percent increase, percent decrease, percent error, constant of proportionality, scale factor, similar figures, corresponding sides, scale drawings		
Evidence of Learning	Activities, tests, quizzes		
Interdisciplinary Connections	<p>NJSLSA.R1. Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.</p> <p>NJSLSA.R2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.</p> <p>NJSLSA.R4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.</p> <p>NJSLSA.W1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.</p>		
Diversity, Equity, & Inclusion	Students will be exposed to mathematicians that are from diverse backgrounds and are experts in the field. We will examine mathematical contributions from around the world and the impact on various cultures, past and present.		
Computer Science and Design Thinking	<p>8.1.8.DA.4: Transform data to remove errors and improve the accuracy of the data for analysis.</p> <p>8.2.8.ED.3: Develop a proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, graphical/technical sketch).</p> <p>8.1.8.A.1 Demonstrate knowledge of a real world problem using digital tools.</p> <p>8.1.8.A.3 Use and/or develop a simulation that provides an environment to solve a real world problem or theory.</p> <p>8.1.8.A.4 Graph and calculate data with a spread sheet and present a summary of the results.</p> <p>8.1.8.E.1 Effectively use a variety of search tools and filters in professional public databases to find information to solve real world problems.</p> <p>8.1.8.F.1 Explore a local issue, by using digital tools to collect and analyze data to find a solution and make an informed decision.</p>		
Career Readiness, Life Literacies, and Key Skills	<p>9.1.8.CR.3: Relate the importance of consumer, business, and government responsibility to the economy and personal finance.</p> <p>9.1.8.CP.1: Compare prices for the same goods or services.</p> <p>9.1.8.CP.2: Analyze how spending habits affect one’s ability to save.</p> <p>9.1.8.EG.2: Explain why various sources of income are taxed differently.</p> <p>9.1.8.FP.6: Compare and contrast advertising messages to understand what they are trying to accomplish.</p> <p>9.1.8.FP.7: Identify the techniques and effects of deceptive advertising.</p> <p>9.1.8.FP.2: Evaluate the role of emotions, attitudes, and behavior (Rational and irrational) in making financial decisions.</p> <p>9.1.8.FP.5: Determine how spending, investing, and using credit wisely contributes to financial well-being.</p> <p>9.2.8.CAP.11: Analyze potential career opportunities by considering different types of resources, including occupation databases, and state and national labor market statistics.</p>		
Social Emotional Learning	<p>SELF-AWARENESS: The abilities to understand one’s own emotions, thoughts, and values and how they influence behavior across contexts.</p> <p>SELF-MANAGEMENT: The abilities to manage one’s emotions, thoughts, and behaviors effectively in different situations and to achieve goals and aspirations.</p> <p>SOCIAL AWARENESS: The abilities to understand the perspectives of and empathize with others, including those from diverse backgrounds, cultures, & contexts.</p> <p>RELATIONSHIP SKILLS: The abilities to establish and maintain healthy and supportive relationships and to effectively navigate settings with diverse individuals and groups.</p> <p>RESPONSIBLE DECISION-MAKING: The abilities to make caring and constructive choices about personal behavior and social interactions across diverse situations.</p>		

Differentiation

Resources/Materials	ELL (English Language Learners)	Special Education	At Risk	Enrichment
	<ul style="list-style-type: none"> • Provide translated notes and key vocabulary terms • Provide images of key vocabulary terms and concepts • Word banks • Bilingual dictionaries • Assistive translator technology • Sentence frames • Simplified notes • Reduced homework • Simplified word problems • Graphic organizers • Matched sentences or procedures with pictures • Alternative presentation options • 1-2 sentence short responses • Shortened written assignments • Modified tests • Provide notes when student request • Reduce project workload • Short summaries 	<ul style="list-style-type: none"> • Display reminders • Checklist of materials and tasks (printed out or digitally accessible) • Timelines and Calendar for benchmark goals for assignments/assessments/short-term goals (Planner Microsoft) • Assistive technology (dictation, immersive reader, etc...) • Flash cards • Teacher notes • Graphic organizer • Clear parameters and student workspace • Timer to monitor task and duration • Study guides • Guided notes • Choices for alternative assignments • Students are asked to come for extra help to review/retake assessment and homework assignments • Students are allowed time and a half on assessments • Provide the student with frequent check-ins during class-time work • Visual cue or signs • Rephrase of questions and directions • Partner or group work on skill development • Assistance by instructional videos or curated videos online 	<ul style="list-style-type: none"> • Students are asked to come for extra help to review/retake assessment and homework assignments • Students are allowed time and a half on assessments • Provide the student with frequent check-ins during class-time work • Scaffolding assignments • Chunking of materials • Allow for errors • Pre-teach materials • Supply teacher demo • Rephrase of questions and directions • Visual cue or signs • Small group assistance or collaboration • Partner or group work on skill development • Assistance by instructional videos or curated videos online • Guide with options for student goal setting • Use of timer or a clock to monitor time of student activity 	<ul style="list-style-type: none"> • problem sets that challenge and involve higher level thinking • Inquiry lead discussions and activities • More complex tasks and projects • Higher level questioning and techniques • Student demonstration and explanation • Provide opportunities for students to set personal goals, keep records and monitor their own learning progress • Multiple assessments given in different domains, that showcase student interests, strengths, and needs • Use multiple approaches to accelerate learning within and outside of the school setting • Use enrichment options to extend and deepen learning opportunities within and outside of the school setting • Use individualized learning options such as mentorships, internships, online courses, and independent study

Unit 4: Linear Relationships (8 Weeks)

Core Ideas	A linear relationship is any relationship between two variables that creates a line when graphed in the coordinate plane.		
Essential Questions	<p>How do you determine whether a given set of data is linear?</p> <p>How can you identify the constant of proportionality in tables, graphs, equations, diagrams, and verbal representations?</p> <p>How can linear relationships be displayed and analyzed with tables, graphs, and equations?</p>		
Enduring Understanding	Linear relationships are defined by a constant rate of change, called slope. Those relationships can be represented in math through tables, graphs, and equations.		
Practice	<ol style="list-style-type: none"> 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning. 		
Performance Expectations	<ul style="list-style-type: none"> • Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. • Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points $(0, 0)$ and $(1, r)$ where r is the unit rate. • 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. • 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. 		
NJ Standards	Student Learning Objectives	Suggested Tasks/Activities	Resources/Materials
NJSLS.7.RP.A.2.b NJSLS.7.RP.A.2.d NJSLS.8.EE.B.5 NJSLS.8.EE.B.6	<ul style="list-style-type: none"> • Write an equation to represent the pattern in a table of related variables. • Decide whether quantities are proportional by graphing on a coordinate plane and observing whether the line is straight and passing through the origin. • Explain what a coordinate point, (x, y), on the line of a graph of proportional relationship represents. • Construct tables and graphs to display linear relationships between variables. • Observe how a change in the relationship between two variables affects the table, graph, and equation. • Use algebraic symbols to write equations relating variables (direct variations). • Interpret a given scenario to determine a linear or non-linear relationship. • Write and graph linear equations slope-intercept form. • Write equations to represent linear relationships. • Write the equation of a line, given appropriate data (i.e. slope & intercept, x- & y-intercepts, two points, parallel or perpendicular to a given linear equation and a point). • Graph a linear equation, stating the slope and intercepts. 	<ul style="list-style-type: none"> • Writing Equations from Tables Activity • Kahoot Challenge: Proportions, Tables, Graphs, & Equations • QR Code Activity • Marble & Table Activity • Pixel Activity: Determining Constant of Proportionality • Slope Name Graphs Activity • Slope Dude Video Activity • Table, Graph, Equation Matching Activity • X- and Y-intercepts Activity • Super Mario Linear Equations Desmos Activity • Breakout! Linear Equations Desmos Activity • Graphing Linear Inequalities Desmos Activity • Illustrative Math Activity: Peaches & Plums • Illustrative Math Activity: Who Has the Best Job? • Meet a Mathematician Activity • Mathematicians On This Day Activity 	<p>Text: Big Ideas Red</p> <p>Resources include, but are not limited to,</p> <ul style="list-style-type: none"> • Teacher Created Activities • Four Function Calculator • IXL Online Practice • Desmos.com • Teacher Created Video Tutorials • ALEKS Software • DeltaMath.com • EdPuzzle.com
Key Vocabulary	Proportionality, constant of proportionality, linear equation, y-intercept, rate, slope, rise, run, x-intercept, slope-intercept form, standard form, point-slope form, linear equation graph		
Evidence of Learning	Activities, tests, quizzes		

Interdisciplinary Connections	NJSLSA.R2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas. NJSLSA.R4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone. NJSLSA.W1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
Diversity, Equity, & Inclusion	Students will be exposed to mathematicians that are from diverse backgrounds and are experts in the field. We will examine mathematical contributions from around the world and the impact on various cultures, past and present.
Computer Science and Design Thinking	8.1.8.A.1 Demonstrate knowledge of a real world problem using digital tools. 8.1.8.A.3 Use and/or develop a simulation that provides an environment to solve a real world problem or theory. 8.1.8.A.4 Graph and calculate data with a spread sheet and present a summary of the results. 8.1.8.E.1 Effectively use a variety of search tools and filters in professional public databases to find information to solve real world problems. 8.1.8.F.1 Explore a local issue, by using digital tools to collect and analyze data to find a solution and make an informed decision.
Career Readiness, Life Literacies, and Key Skills	9.1.8.B.1 Distinguish among cash, check, credit card, and debit card. 9.1.8.B.2 Construct a simple personal savings and spending plan based on various sources of income. 9.1.8.B.3 Justify the concept of “paying yourself first” as a financial savings strategy. 9.1.8.B.4 Relate the concept of deferred gratification to [investment,] meeting financial goals, and building wealth. 9.1.8.B.7 Construct a budget to save for long-term, short term, and charitable goals.
Social Emotional Learning	SELF-AWARENESS: The abilities to understand one’s own emotions, thoughts, and values and how they influence behavior across contexts. SELF-MANAGEMENT: The abilities to manage one’s emotions, thoughts, and behaviors effectively in different situations and to achieve goals and aspirations. SOCIAL AWARENESS: The abilities to understand the perspectives of and empathize with others, including those from diverse backgrounds, cultures, & contexts. RELATIONSHIP SKILLS: The abilities to establish and maintain healthy and supportive relationships and to effectively navigate settings with diverse individuals and groups. RESPONSIBLE DECISION-MAKING: The abilities to make caring and constructive choices about personal behavior and social interactions across diverse situations.

Differentiation

Resources/Materials	ELL (English Language Learners)	Special Education	At Risk	Enrichment
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		<ul style="list-style-type: none">• Students are asked to come for extra help to review/retake assessment and homework assignments• Students are allowed time and a half on assessments• Provide the student with frequent check-ins during class-time work• Visual cue or signs• Rephrase of questions and directions• Partner or group work on skill development• Assistance by instructional videos or curated videos online	<ul style="list-style-type: none">• Assistance by instructional videos or curated videos online• Guide with options for student goal setting• Use of timer or a clock to monitor time of student activity	<ul style="list-style-type: none">• Use enrichment options to extend and deepen learning opportunities within and outside of the school setting• Use individualized learning options such as mentorships, internships, online courses, and independent study
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Unit 5: Exponents & Scientific Notation (5 Weeks)

Core Ideas	Exponents represent repeated multiplication. Exponential relationships therefore, depict rapid increase or decrease.
Essential Questions	How do the rules of algebra pertain to simplifying and evaluating exponential expressions? How does scientific notation allow for expressing very small or very large numbers in an efficient way? What are the rules for operation with scientific notations?
Enduring Understanding	Understand the concept of scientific notation, with negative exponents representing very small numbers and positive exponents representing very large numbers, respectively. Understand that the base of a power determines whether the sign of the exponent represents an overall growth or reduction.
Practice	<ol style="list-style-type: none"> 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.
Performance Expectations	<ul style="list-style-type: none"> • Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $32 \times 3^{-5} = 3^{-3} = 1/33 = 1/27$. • 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. • 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. • 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.

NJ Standards	Student Learning Objectives	Suggested Tasks/Activities	Resources/Materials
NJSLS.8.EE.A.1 NJSLS.8.EE.A.2 NJSLS.8.EE.A.3 NJSLS.8.EE.A.4	<ul style="list-style-type: none"> • Express a product of identical factors in both exponential form and standards form. • Perform operations with exponents in numeric and algebraic expressions, including integer exponents. • Use the properties of exponents to simplify numeric or algebraic expressions involving exponents. • Convert between scientific notation and decimal notation. • Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notations are used. • Memorize and recall perfect squares and perfect cubes. • Understand positive and negative exponents. • Understand the conceptual foundation for the properties of exponents. • Understand that the base of a power determines whether the sign of the exponent represents an overall growth or reduction. • Understand the concept of scientific notation, with negative exponents representing very small numbers and positive exponents representing very large numbers, respectively. 	<ul style="list-style-type: none"> • Intro to Exponents Desmos Activity • Exponent Rules Match Up Activity • Exponents Review Game • Exponential Expressions Card Sort Activity • Scientific Notation Maze • Scientific Notation Bingo • Bigger or Smaller Matching Activity • Meet a Mathematician Activity • Mathematicians On This Day Activity 	Text: Big Ideas Red Resources include, but are not limited to, <ul style="list-style-type: none"> • Teacher Created Activities • Four Function Calculator • IXL Online Practice • Desmos.com • Teacher Created Video Tutorials • ALEKS Software • DeltaMath.com • EdPuzzle.com

	<ul style="list-style-type: none"> Gain an intuitive understanding of basic exponential growth patterns. 			
Key Vocabulary	Power, base, exponent, repeated multiplication, properties of powers, exponential form, standard form, scientific notation, estimation, simplify, evaluate			
Evidence of Learning	Activities, tests, quizzes			
Interdisciplinary Connections	<p>NJSLSA.R1. Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.</p> <p>NJSLSA.R2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.</p> <p>NJSLSA.R4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.</p> <p>NJSLSA.W1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.</p>			
Diversity, Equity, & Inclusion	Students will be exposed to mathematicians that are from diverse backgrounds and are experts in the field. We will examine mathematical contributions from around the world and the impact on various cultures, past and present.			
Computer Science and Design Thinking	<p>8.1.8.A.1 Demonstrate knowledge of a real world problem using digital tools.</p> <p>8.1.8.A.3 Use and/or develop a simulation that provides an environment to solve a real world problem or theory.</p> <p>8.1.8.A.4 Graph and calculate data with a spread sheet and present a summary of the results.</p> <p>8.1.8.E.1 Effectively use a variety of search tools and filters in professional public databases to find information to solve real world problems.</p> <p>8.1.8.F.1 Explore a local issue, by using digital tools to collect and analyze data to find a solution and make an informed decision.</p>			
Career Readiness, Life Literacies, and Key Skills	<p>9.1.8.B.1 Distinguish among cash, check, credit card, and debit card.</p> <p>9.1.8.B.2 Construct a simple personal savings and spending plan based on various sources of income.</p> <p>9.1.8.B.3 Justify the concept of “paying yourself first” as a financial savings strategy.</p> <p>9.1.8.B.4 Relate the concept of deferred gratification to [investment,] meeting financial goals, and building wealth.</p> <p>9.1.8.B.7 Construct a budget to save for long-term, short term, and charitable goals.</p>			
Social Emotional Learning	<p>SELF-AWARENESS: The abilities to understand one’s own emotions, thoughts, and values and how they influence behavior across contexts.</p> <p>SELF-MANAGEMENT: The abilities to manage one’s emotions, thoughts, and behaviors effectively in different situations and to achieve goals and aspirations.</p> <p>SOCIAL AWARENESS: The abilities to understand the perspectives of and empathize with others, including those from diverse backgrounds, cultures, & contexts.</p> <p>RELATIONSHIP SKILLS: The abilities to establish and maintain healthy and supportive relationships and to effectively navigate settings with diverse individuals and groups.</p> <p>RESPONSIBLE DECISION-MAKING: The abilities to make caring and constructive choices about personal behavior and social interactions across diverse situations.</p>			
Differentiation				
Resources/Materials	ELL (English Language Learners)	Special Education	At Risk	Enrichment
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	<ul style="list-style-type: none"> • Reduced homework • Simplified word problems • Graphic organizers • Matched sentences or procedures with pictures • Alternative presentation options • 1-2 sentence short responses • Shortened written assignments • Modified tests • Provide notes when student request • Reduce project workload • Short summaries 	<ul style="list-style-type: none"> • Assistive technology (dictation, immersive reader, etc...) • Flash cards • Teacher notes • Graphic organizer • Clear parameters and student workspace • Timer to monitor task and duration • Study guides • Guided notes • Choices for alternative assignments • Students are asked to come for extra help to review/retake assessment and homework assignments • Students are allowed time and a half on assessments • Provide the student with frequent check-ins during class-time work • Visual cue or signs • Rephrase of questions and directions • Partner or group work on skill development • Assistance by instructional videos or curated videos online 	<ul style="list-style-type: none"> • Scaffolding assignments • Chunking of materials • Allow for errors • Pre-teach materials • Supply teacher demo • Rephrase of questions and directions • Visual cue or signs • Small group assistance or collaboration • Partner or group work on skill development • Assistance by instructional videos or curated videos online • Guide with options for student goal setting • Use of timer or a clock to monitor time of student activity 	<ul style="list-style-type: none"> • Student demonstration and explanation • Provide opportunities for students to set personal goals, keep records and monitor their own learning progress • Multiple assessments given in different domains, that showcase student interests, strengths, and needs • Use multiple approaches to accelerate learning within and outside of the school setting • Use enrichment options to extend and deepen learning opportunities within and outside of the school setting • Use individualized learning options such as mentorships, internships, online courses, and independent study
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Unit 6: Root, Radicals and Pythagorean Theorem (4 Weeks)

Core Ideas	Applications using radicals are fundamental to creating the world around us.		
Essential Questions	<p>How do the rules of algebra pertain to simplifying and evaluating radical expressions?</p> <p>How do you simplify an expression involving radicals?</p> <p>Given a real-world problem, what conditions are necessary to apply the Pythagorean Theorem? And, what information can be obtained by its use?</p> <p>How can the Pythagorean Theorem be used to find the distance between two points in the coordinate plane?</p>		
Enduring Understanding	<p>A square root of a number is a number that, when multiplied by itself, equals the given number.</p> <p>A perfect square is a number with integers as its square roots.</p> <p>The Pythagorean Theorem explains the relationship among the sides of any given right triangle.</p>		
Practice	<ol style="list-style-type: none"> 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning. 		
Performance Expectations	<ul style="list-style-type: none"> • 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). • Simplify numerical radicals, limiting to square roots (ie nonperfect squares) • 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. • Explain a proof of the Pythagorean Theorem and its converse. • Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. • Apply the Pythagorean Theorem to find the distance between two points in a coordinate system. 		
NJ Standards	Student Learning Objectives	Suggested Tasks/Activities	Resources/Materials
<p>NJSLS.8.NS.A.2</p> <p>NJSLS.8.EE.A.1.a</p> <p>NJSLS.8.EE.A.1.b</p> <p>NJSLS.8.G.B.6</p> <p>NJSLS.8.G.B.7</p> <p>NJSLS.8.G.B.8</p>	<ul style="list-style-type: none"> • Estimate the values of square roots that are irrational numbers. • Evaluate square and cube roots of small perfect squares and cubes, respectively. • Simplifying expressions involving radicals with index of two. • Simplify radical expressions including addition, subtractions, multiplication, or division (include radical conjugates to rationalize a denominator). • Use square root and cube root symbols to solve equations of the form $x^2=p$ and $x^3=p$, where p is a positive rational number. • Apply knowledge of radicals to isolate a variable, if the variable is squared in the original equation. Find unknown side lengths of right triangles using the Pythagorean Theorem. • Use the Pythagorean Theorem to find the distance between two points on a grid. • Determine whether a triangle is a right triangle based on the lengths of its sides (optional). • Estimate the values of square roots that are irrational numbers. • Estimate lengths of side lengths of right triangles using square roots. • Solve real world problems by applying the Pythagorean Theorem to a problem situation. 	<ul style="list-style-type: none"> • Understanding & Estimating Square Roots Desmos Activity • Simplifying Radicals Desmos Activity • Like Radicals Sorting Activity • Color Coding Roots & Radicals Activity • Proving the Pythagorean Theorem Paper Cutting Activity • Pythagorean Theorem Desmos Activity • Distance Desmos Activity • Pixel Activity: Pythagorean Theorem • Meet a Mathematician Activity • Mathematicians On This Day Activity 	<p>Text: Big Ideas Red</p> <p>Resources include, but are not limited to,</p> <ul style="list-style-type: none"> • Teacher Created Activities • Four Function Calculator • IXL Online Practice • Desmos.com • Teacher Created Video Tutorials • ALEKS Software • DeltaMath.com • EdPuzzle.com

	<ul style="list-style-type: none"> Evaluate square and cube roots of small perfect squares and cubes, respectively. Find the distance between two points in the coordinate plane by using the Pythagorean Theorem. 			
Key Vocabulary	Square root, perfect square, radical sign, radicand, index of a radical, theorem, right triangle, legs, hypotenuse, distance between two points, cube root, perfect cube, irrational number, simplify, evaluate, solve			
Evidence of Learning	Activities, tests, quizzes			
Interdisciplinary Connections	<p>NJSLSA.R4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.</p> <p>NJSLSA.W1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.</p> <p>NJSLSA.R1. Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.</p> <p>NJSLSA.R2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.</p>			
Diversity, Equity, & Inclusion	Students will be exposed to mathematicians that are from diverse backgrounds and are experts in the field. We will examine mathematical contributions from around the world and the impact on various cultures, past and present.			
Computer Science and Design Thinking	<p>8.1.8.A.1 Demonstrate knowledge of a real world problem using digital tools.</p> <p>8.1.8.A.3 Use and/or develop a simulation that provides an environment to solve a real world problem or theory.</p> <p>8.1.8.A.4 Graph and calculate data with a spread sheet and present a summary of the results.</p> <p>8.1.8.E.1 Effectively use a variety of search tools and filters in professional public databases to find information to solve real world problems.</p> <p>8.1.8.F.1 Explore a local issue, by using digital tools to collect and analyze data to find a solution and make an informed decision, Media Literacy.</p>			
Career Readiness, Life Literacies, and Key Skills	<p>9.1.8.B.1 Distinguish among cash, check, credit card, and debit card.</p> <p>9.1.8.B.2 Construct a simple personal savings and spending plan based on various sources of income.</p> <p>9.1.8.B.3 Justify the concept of “paying yourself first” as a financial savings strategy.</p> <p>9.1.8.B.4 Relate the concept of deferred gratification to [investment,] meeting financial goals, and building wealth.</p> <p>9.1.8.B.7 Construct a budget to save for long-term, short term, and charitable goals..</p>			
Social Emotional Learning	<p>SELF-AWARENESS: The abilities to understand one’s own emotions, thoughts, and values and how they influence behavior across contexts.</p> <p>SELF-MANAGEMENT: The abilities to manage one’s emotions, thoughts, and behaviors effectively in different situations and to achieve goals and aspirations.</p> <p>SOCIAL AWARENESS: The abilities to understand the perspectives of and empathize with others, including those from diverse backgrounds, cultures, & contexts.</p> <p>RELATIONSHIP SKILLS: The abilities to establish and maintain healthy and supportive relationships and to effectively navigate settings with diverse individuals and groups.</p> <p>RESPONSIBLE DECISION-MAKING: The abilities to make caring and constructive choices about personal behavior and social interactions across diverse situations.</p>			
Differentiation				
Resources/Materials	ELL (English Language Learners)	Special Education	At Risk	Enrichment
	<ul style="list-style-type: none"> Provide translated notes and key vocabulary terms Provide images of key vocabulary terms and concepts Word banks Bilingual dictionaries Assistive translator technology Sentence frames Simplified notes 	<ul style="list-style-type: none"> Display reminders Checklist of materials and tasks (printed out or digitally accessible) Timelines and Calendar for benchmark goals for assignments/assessments/short-term goals (Planner Microsoft) 	<ul style="list-style-type: none"> Students are asked to come for extra help to review/retake assessment and homework assignments Students are allowed time and a half on assessments Provide the student with frequent check-ins during class-time work 	<ul style="list-style-type: none"> problem sets that challenge and involve higher level thinking Inquiry lead discussions and activities More complex tasks and projects Higher level questioning and techniques

	<ul style="list-style-type: none"> • Reduced homework • Simplified word problems • Graphic organizers • Matched sentences or procedures with pictures • Alternative presentation options • 1-2 sentence short responses • Shortened written assignments • Modified tests • Provide notes when student request • Reduce project workload • Short summaries 	<ul style="list-style-type: none"> • Assistive technology (dictation, immersive reader, etc...) • Flash cards • Teacher notes • Graphic organizer • Clear parameters and student workspace • Timer to monitor task and duration • Study guides • Guided notes • Choices for alternative assignments • Students are asked to come for extra help to review/retake assessment and homework assignments • Students are allowed time and a half on assessments • Provide the student with frequent check-ins during class-time work • Visual cue or signs • Rephrase of questions and directions • Partner or group work on skill development • Assistance by instructional videos or curated videos online 	<ul style="list-style-type: none"> • Scaffolding assignments • Chunking of materials • Allow for errors • Pre-teach materials • Supply teacher demo • Rephrase of questions and directions • Visual cue or signs • Small group assistance or collaboration • Partner or group work on skill development • Assistance by instructional videos or curated videos online • Guide with options for student goal setting • Use of timer or a clock to monitor time of student activity 	<ul style="list-style-type: none"> • Student demonstration and explanation • Provide opportunities for students to set personal goals, keep records and monitor their own learning progress • Multiple assessments given in different domains, that showcase student interests, strengths, and needs • Use multiple approaches to accelerate learning within and outside of the school setting • Use enrichment options to extend and deepen learning opportunities within and outside of the school setting • Use individualized learning options such as mentorships, internships, online courses, and independent study
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