Mathematics

Grade 6

The Ewing Public Schools
2099 Pennington Road
Ewing, NJ 08618

BOE Approval Date: February 25, 2019 Michael Nitti
Revised by: Don Wahlers Superintendent

In accordance with The Ewing Public Schools' Policy 2230, Course Guides, this curriculum has been reviewed and found to be in compliance with all policies and all affirmative action criteria.

Course Description and Rationale

This course is the first of a three-year sequence of courses designed to prepare students for a rigorous college preparatory high school mathematics course.

On a daily basis, students use problem-solving strategies, questioning, investigating, analyzing critically, gathering and constructing evidence, and communicating rigorous arguments justifying their thinking. Under teacher guidance students learn in collaboration with others while sharing information, expertise, and ideas. The course helps students to develop multiple strategies to solve problems and to recognize the connections between concepts. The lessons in the course meet all of the content standards and embed the "Mathematical Practices" of the New Jersey Student Learning Standards

This course will help student discover, learn and grow in their ability to:

- Collect, organize, and display data in multiple ways.
- Analyze data using measures of central tendency.
- Represent data sets using various methods and analyze how changes in data impact the representation.
- Represent and compare quantities using manipulatives, diagrams, and number expressions.
- Represent multiplication using rectangular arrays.
- Represent integers on number lines and with manipulatives.
- Make sense of multiple representations of portions (decimal, fraction, percent) and convert from one form to the other.
- Compare fractions and generate equivalent fractions.
- Recognize ratios in tables and graphs and solve corresponding problems.
- Use ratios to describe relationships with similar plane figures and other situations.
- Use models and standard algorithms for computations with fractions and decimals.
- Simplify variable expressions by combining like terms and using the Distributive Property.
- Evaluate variable expressions and solve simple equations and inequalities.
- Solve distance, rate, and time problems.
- Solve percent problems including those with discounts, interest, and tips.
- Compute area, surface area, and volume of rectangular solids.
- Represent solids using nets..

This curriculum is structured to include best practices in cooperative learning, problem-based learning, and spaced-mixed practice to actively involve every student in the process of learning mathematics. The goal is to meet our District Math Vision:

> *The Ewing Public Schools will deliver an instructional program in mathematics where students are actively engaged in the discovery of math concepts and are applying these concepts in ways that they find meaningful and relevant.*
>
> *Ewing students will be mathematical thinkers who can reason, communicate and solve problems.*
>
> *Ultimately, Ewing students will master and will be able to utilize these math concepts and skills throughout their lives.*

Textbook:

Core Connections 1, 2nd ed. Version 5.0, Copyright 2013 by College Preparatory Mathematics.

Mathematics-Grade 6 Course Overview

Overview	Standards for Mathematical Content	Unit Focus	Standards for Mathematical Practice

Unit 1
Introduction and Representation
 	
Pacing: 10 Days
	NJSLS.6.EE.1
	NJSLS.6.G.1
	NJSLS.6.NS.4
	NJSLS.6.SP.4
		• Introduce some of the big concepts of this math course, such as:
		  ○ organizing data
		  ○ using mathematical reasoning to make predictions.
		• Develop multiple ways to represent mathematical ideas using:
		  ○ Numbers
		  ○ Symbols
		  ○ Diagrams
		  ○ Words
		  ○ various kinds of tables
			MP.1 Make sense of problems and persevere in solving them.
			
			MP.2 Reason abstractly and quantitatively.
			
			MP.3 Construct viable arguments & 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.

Unit 1: Suggested Open Educational Resources	NJSLS.6.EE.1 NJSLS.6.G.1 NJSLS.6.NS.4 NJSLS.6.SP.4		
Unit 2 **Arithmetic Strategies and Area** **Pacing: 15 Days**	NJSLS.6.EE.3 NJSLS.6.G.1 NJSLS.6.NS.4 NJSLS.6.SP.4	• Analyze the strengths and weaknesses of various graphical representations of data. • Define and measure the area of rectangles and shapes that can be broken into rectangles. • Use a generic rectangle to multiply, both on paper and mentally. • Find the greatest common factor of selected numbers.	
Unit 2: Suggested Open Educational Resources	NJSLS.6.EE.3 NJSLS.6.G.1 NJSLS.6.NS.4 NJSLS.6.SP.4		

Overview	Standards for Mathematical Content	Unit Focus	Standards for Mathematical Practice
Unit 3 **Portions and Integers** **Pacing: 25 Days**	NJSLS.6.G.3 NJSLS.6.NS.3 NJSLS.6.NS.5 NJSLS.6.NS.6 • NJSLS.6.NS.6a • NJSLS.6.NS.6b • NJSLS.6.NS.6c NJSLS.6.NS.7 • NJSLS.6.NS.7a • NJSLS.6.NS.7b • NJSLS.6.NS.7c • NJSLS.6.NS.7d NJSLS.6.NS.8 NJSLS.6.RP.1 NJSLS.RP.3 • NJSLS.6.RP.3c • NJSLS.RP.3d	• Find equivalent fractions using multiplicative identity. • Use percents, decimals, and fractions to describe a portion of a whole. • Represent portions as percents, decimals, and fractions with pictures, symbols, and words. • Find the decimal form of a number when it is given as a percent or fraction. • Connect ratios to portions as a way to represent comparisons of parts. • Add positive and negative integers and rational numbers. • Find the absolute value of a number.	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments & 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.
Unit 3: Suggested Open Educational Resources	NJSLS.6.G.3 NJSLS.6.NS.3 NJSLS.6.NS.5 NJSLS.6.NS.6 NJSLS.6.NS.7 NJSLS.6.NS.8 NJSLS.6.RP.1 NJSLS.6.RP.3		
Unit 4 **Variables and Ratios** **Pacing: 20 Days**	NJSLS.6.EE.2 • NJSLS.6.EE.2a • NJSLS.6.EE.2c NJSLS.6.EE.4 NJSLS.6.EE.6 NJSLS.6.RP.1	• Use variables to generalize and to represent unknown quantities. • Write multiple expressions to describe a pattern and recognize whether the expressions are equivalent. • Find the value of an algebraic expression when the value of the variable is known. • Enlarge and reduce figures while maintaining their shapes. • Use ratios to describe relationships between similar shapes.	
Unit 4: Suggested Open Educational Resources	NJSLS.6.EE.2 NJSLS.6.EE.4 NJSLS.6.EE.6 NJSLS.6.RP.1		

Overview	Standards for Mathematical Content	Unit Focus	Standards for Mathematical Practice
Unit 5 **Multiplying Fractions and Area** **Pacing: 20 Days**	NJSLS.6.G.1 NJSLS.6.NS.1 NJSLS.6.NS.3 NJSLS .6.RP.3 • NJSLS.6.RP.3c	• Learn how to calculate a part of another part. • Discover how to multiply fractions, mixed numbers, and decimals. • Find the areas of shapes, including rectangles, triangles, parallelograms, and trapezoids. • Break a complex shape into smaller pieces to find area.	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments & 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.
Unit 5: Suggested Open Educational Resources	NJSLS.6.G.1 NJSLS.6.NS.1 NJSLS.6.NS.3 NJSLS.6.RP.3		
Unit 6 **Dividing and Building Expressions** **Pacing: 25 Days**	NJSLS.6.EE.1 NJSLS.6.EE.2 • NJSLS.6.EE.2b • NJSLS.6.EE.2c NJSLS.6.EE.3 NJSLS.6.EE.4 NJSLS.6.EE.6 NJSLS.6.NS.1 NJSLS.6.NS.2	• Represent division of fractions using diagrams. • Divide whole and mixed numbers by fractions. • Use the Order of Operations to find the correct value of a numerical expression. • Combine like terms and simplify algebraic expressions. • Use a variable to represent any number.	
Unit 6: Suggested Open Educational Resources	NJSLS.6.EE.1 NJSLS.6.EE.2 NJSLS.6.EE.3 NJSLS.6.EE.4 NJSLS.6.EE.6 NJSLS.6.NS.1 NJSLS.6.NS.2		

Overview	Standards for Mathematical Content	Unit Focus	Standards for Mathematical Practice
Unit 7 **Ratios and Operations** **Pacing: 25 Days**	NJSLS.6.EE.2 • NJSLS.6.EE.2a NJSLS.6.EE.3 NJSLS.6.EE.5 NJSLS.6.EE.6 NJSLS.6.EE.7 NJSLS.6.NS.1 NJSLS.6.NS.3 NJSLS.6.RP.2 NJSLS.6.RP.3. • NJSLS.6.RP.3a • NJSLS.6.RP.3b	• Calculate rates, including unit rates. • Compare ratios and rates with different units. • Divide more efficiently with fractions, mixed numbers, and decimals. • Rewrite expressions by combining like terms and using the Distributive Property.	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments & 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.
Unit 7: Suggested Open Educational Resources	NJSLS.6.EE.2 NJSLS.6.EE.3 NJSLS.6.EE.5 NJSLS.6.EE.6 NJSLS.6.EE.7 NJSLS.6.NS.1 NJSLS.6.NS.3 NJSLS.6.RP.2 NJSLS.6.RP.3		
Unit 8 **Statistics and Multiplication Equations** **Pacing: 20 Days**	NJSLS.6.EE.7 NJSLS.6.EE.9 NJSLS.6.SP.1 NJSLS.6.SP.2 NJSLS.6.SP.3 NJSLS.6.SP.4 NJSLS.6.SP.5 • NJSLS.6.SP.5a • NJSLS.6.SP.5b • NJSLS.6.SP.5c • NJSLS.6.SP.5d	• Use measures of central tendency, histograms, stem-and-leaf plots, and box plots to represent and compare data. • Consider the shape and spread of data both through a visual display and through calculations. • Decide if a question is a statistical question. • Solve problems involving distance, rate, and time. • Convert units so that they are the same and then use them to compare rates.	
Unit 8: Suggested Open Educational Resources	NJSLS.6.EE.7 NJSLS.6.EE.9 NJSLS.6.SP.1 NJSLS.6.SP.2 NJSLS.6.SP.3 NJSLS.6.SP.4 NJSLS.6.SP.5		

Overview	Standards for Mathematical Content	Unit Focus	Standards for Mathematical Practice
Unit 9 **Volume and Percents** **Pacing: 20 Days**	NJSLS.6.G.2 NJSLS.6.G.4 NJSLS.6.RP.3 • NJSLS.6.RP.3c	• Find the volume of three-dimensional solids, known as right prisms. • Find the surface area and volume of a rectangular prism. • Calculate percents using pencil and paper as well as mental math strategies	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments & 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.
Unit 9: Suggested Open Educational Resources	NJSLS.6.G.2 NJSLS.6.G.4 NJSLS.6.RP.3		

Unit 1 Introduction and Representation		
Content Standards	**Suggested Standards for Mathematical Practice**	**Critical Knowledge & Skills**
NJSLS.6.EE.1. Write and evaluate numerical expressions involving whole-number exponents. NJSLS.6.G.1. Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems. NJSLS.6.NS.4. Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. *For example, express 36 + 8 as 4 (9 + 2).* NJSLS.6.SP.4. Display numerical data in plots on a number line, including dot plots, histograms, and box plots.	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments & 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.	Concepts – Students will understand: • Histograms • Scatter plots. • Perimeter • Area • Patterns • Data • Prime numbers • Composite numbers • Factors • Multiples • Prime factors • Exponents Skills - Students are able to: • Analyze strengths and weaknesses of histograms and scatter plots. • Look at the relationships between perimeter and area and experiment with changing area while keeping perimeter the same. • Extend a pattern and generalize in order to make a prediction. • Generate questions about data and explore ways to organize data to answer different questions. • Make and justify a conjecture as they make sense of a logic problem. • Decompose quantities into sums of multiple parts and represent them with words, symbols and diagrams. • Decompose numbers in multiple ways and compare values of numerical expressions and quantities using appropriate symbol notation. • Represent whole numbers with rectangular arrays and categorize numbers as prime, composite, odd, and/or even. • Extended multiplication table to further develop their understanding of factors, factor pairs and properties of numbers. Students will write numbers as products of their prime factors using exponents.

Unit 1 Introduction and Representation	
District/School Formative Assessment Plan	**District/School Summative Assessment Plan**
Formative assessment informs instruction and is ongoing throughout a unit to determine how students are progressing against the standards. The district identifies three areas of knowledge attainment that should be continually assessed: Assessing securely held knowledge: (previously held knowledge where mastery or near mastery is expected) • Targeted skill based anticipatory set • Short Diagnostic prior to new concepts Assessing developing knowledge: (recently learned knowledge where student has not achieved mastery and current instruction is building upon) • What Have I Learned Activity • Participation Quiz • Partner Quiz • Peer Check • Learning Log Assessing learning in progress: (knowledge that currently being learned and assessing where students are in that learning process) • Carousel-Station Rotation • Exit Slip Gallery Walk • Participation Quiz • Think-Pair-Share Alternative Assessments: • Tools I can Use Activity • Math Chat • Red Light, Green Light	*Summative assessment is an opportunity for students to demonstrate mastery of the skills taught during a particular unit.* • Chapter Quiz • Chapter Test • Common quarterly and/or unit exams *Benchmark assessments:* • Summarize Understanding Activity • Common Mid-Term assessments • Common Final assessments Alternative Assessments: • Portfolio Performance Based Tasks

Unit 1 Introduction and Representation

District Resources

District/school resources and supplementary resources that are texts as well as digital resources used to support the instruction.

- College Preparatory Mathematics program (primary)
- District developed lessons or mini-lessons
- District developed pre-assessments
- Technology integrated lesson activities

Enrichments and Supplements

Enrichments:

Ambassador	Dyad	Gallery Walk
Hot Seat	Math Chat	Peer Edit
Reciprocal Teaching	Silent Debate	Swap Meet
Traveling Salesman	Whiparound	

Supplements:

Ambassador	Around the World	Index Card Huddle
Dyad	Fishbowl	Fortune Cookie
Gallery Walk	Hot Potato	Hot Seat
Huddle	I Spy	Jigsaw
Listening Post	Math Chat	Numbered Heads
Pairs Check	Peer Edit	Reciprocal Teaching
Silent Debate	Swap Meet	Teammates Consult
Traveling Salesman	Tuning Protocol	Walk and Talk
Whip Around: I Have…Who Has…		

Instructional Activities

Visualizing Information
Perimeter and Area Relationships
Describing and Extending Patterns
Representing Data
Making Sense of a Logic Problem
Multiple Representations
Representing Comparisons
Characteristics of Numbers
Products, Factors, and Factor Pairs
Mathematicians Report Project

Recommended Instructional Strategies

This is a place to capture areas of standards integration and instructional best practices.

- Continually assess student progress through formative assessment and provide timely and relevant feedback. Formative Assessment strategies include:
  - Develop questions for each lesson that will provide information about ongoing student understanding and that allow you to provide valuable and useful feedback to students during the learning task.
  - Provide students with opportunities to revise their work products based on feedback received from their peers or teacher.
  - Ask questions that prompt student-to-student discussion. When working in groups direct questions to students who are less engaged.
  - Monitor collaborative work and discussions to collect evidence of student understandings and misconceptions.
  - Encourage students to provide constructive feedback on their peer's work products.
  - Identify when to provide immediate clarification to redirect discussions and when to allow for productive struggle. Decide when to provide clarification and address misconceptions during the lesson/activity.
- Provide a safe place to struggle. Students are more likely to engage and grapple with daily activities if they believe it will lead to their personal growth and progress. Productive struggle strategies include:

    - Students need to have a connection with their instructors, and students also need targeted feedback letting them know whether they are right or wrong. The classroom environment is a place where students can take risks and know that in order to attain mastery we must first work through our mistakes. Through this process students will develop perseverance and a deeper understanding of the material.
    - Create a classroom environment where students can take academic risks. Solicit multiple student responses to promote a positive exchange of ideas that result in a shared understanding. Refrain from immediate validation of student responses that hinder active student discussion.
    - Use mistakes and misconceptions that students express as a positive starting point for developing deeper understanding of a concept.
    - Plan for multiple opportunities for students to engage in productive struggle within a unit in order foster the development of perseverance and grit over time.
- Incorporate mixed-spaced practice into daily lessons and activities. A mixed practice schedule requires that students learn not only how to perform each procedure but also learn to strategically choose an approach for a variety of problem types. Spacing intrinsically ensures that the problems within each practice set include a mixture of different types and there are no more than a few practice problems of each kind within each practice set.
    - Systematically arrange practice problems throughout the lessons, chapters, and units so they are both distributed and mixed.
    - Prepare students to know not only how to solve each kind of problem but also which procedure was appropriate for each kind of problem.
    - Ensure that a majority of a practice set consists of securely held or developing knowledge. Practice problems that address learning in progress should never represent a majority of a practice set.
    - Students should achieve better understanding of the topic as subsequent lessons are taught; a mixed-spaced format provides opportunities to practice and assess these developing skills over the course of the chapter and unit.
- When planning lessons, prioritize core concepts, problems, and activities that best support learning in progress as students move through the instructional unit (lesson-section-chapter-unit).
    - Select standards-based activities and learning tasks that provide an introduction to concepts (launch), multiple representations (exploration), and practice and closure (summary).
    - Embedded within tasks and activities should be teacher led opportunities for demonstrations, guided practice, and individual/small-group instruction as needed.
- Use processes to develop and hone critical thinking skills in students. Critical thinking can de defined as the mental processes, strategies, and representations people use to solve problems, make decisions, and learn new concepts. Engage students in modeling and reasoning tasks that develop critical reasoning by:
    - Provide opportunity and support for meaningful student discussion during activities and tasks.
    - Plan for students to demonstrate understanding through both verbal and written forms.
    - Engage students in constructing viable arguments, critiquing the reasoning of others, and presenting explanatory presentations.
    - Engage students in modeling tasks that allow them to make assumptions and approximations, simplify complicated situations, identify and compare relationships, and use models as an approach to solve problems.
    - Continually assess student capacity to demonstrate understanding through higher-order modeling and reasoning tasks. Provide time for peer and teacher feedback that support ongoing learning.
- Use technology to enhance student learning in ways that support curricular objectives and help students reach intended learning outcomes. Instructional technology can be used as a *teaching* tool to improve communication and presentation of ideas. Technology can also be used as a student *learning* tool where students engage in active learning and use the technology in ways that enrich the learning experience. Technology integration can be achieved by:
    - Incorporating the routine and transparent use of technology in daily lessons.
    - Using technology applications that engage students in modeling and reasoning tasks (examples include, Desmos.com, Kahoot.it, Padlet.com, graphing calculators, etc…)
    - Using technology as a tool to present and communicate ideas, research information, and formatively/summatively assess student learning.

Unit 1 Introduction and Representation	
Career Readiness, Life Literacies, and Key Skills	**Interdisciplinary Connections**

Reference: http://www.p21.org/our-work/p21-framework
• Career Awareness and Planning
  ◦ An individual's strengths, lifestyle goals, choices, and interests affect employment and income.
  ◦ Communication skills and responsible behavior in addition to education, experience, certifications, and skills are all factors that affect employment and income.
• Creativity and Innovation
  ◦ Gathering and evaluating knowledge and information from a variety of sources, including global perspectives, fosters creativity and innovative thinking.
• Critical Thinking and Problem-solving
  ◦ Multiple solutions exist to solve a problem.
  ◦ An essential aspect of problem solving is being able to self-reflect on why possible solutions for solving problems were or were not successful.
• Digital Citizenship
  ◦ Digital communities are used by Individuals to share information, organize, and engage around issues and topics of interest.
  ◦ Digital technology and data can be leveraged by communities to address effects of climate change.
• Global and Cultural Awareness
  ◦ Awareness of and appreciation for cultural differences is critical to avoid barriers to productive and positive interaction.
• Information and Media Literacy
  ◦ Digital tools make it possible to analyze and interpret data, including text, images, and sound. These tools allow for broad concepts and data to be more effectively communicated.
  ◦ Sources of information are evaluated for accuracy and relevance when considering the use of information.
  ◦ There are ethical and unethical uses of information and media.
• Technology Literacy
  ○ Some digital tools are appropriate for gathering, organizing, analyzing, and presenting information, while other types of digital tools are appropriate for creating text, visualizations, models, and communicating with others.
	Connection to English Language Arts:
	Students are expected to develop viable arguments and to critique the reasoning of others. This performance expectation is present in ELA and math practice standards as well as NGSS science and engineering practices. Also, inherent in all three sets of standards is an expectation to research and communicate information and enduring understandings.
	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.
	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.W2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
	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.
	
	Connection to Technology:
	Students will use digital tools to explore, model, synthesize and evaluate mathematical concepts. Technology should enhance and enrich the learning experience and provide students with new and alternative ways to access mathematical content. (NJSLS Technology 8.1)

Instructional Technology Resources	
This is a place to capture examples of instructional technology strategies and resources. • Desmos • Kahoot • CPM Lesson Videos • 3-Act Lessons	

Unit 2 Arithmetic Strategies and Area		
Content Standards	**Suggested Standards for Mathematical Practice**	**Critical Knowledge & Skills**
NJSLS.6.EE.3. Apply the properties of operations to generate equivalent expressions. *For example, apply the distributive property to the expression 3(2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6(4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y.* NJSLS.6.G.1. Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems. NJSLS.6.NS.4. Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. *For example, express 36 + 8 as 4 (9 + 2).* NJSLS.6.SP.4. Display numerical data in plots on a number line, including dot plots, histograms, and box plots.	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments & 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.	Concepts – Students will understand: • Graphical representations of data. • Stem-and-leaf plots • Histogram. • Area of a closed two-dimensional region. • Standard units of measurement of area • Perimeter • Generic rectangle • Multiplication of multi-digit numbers with models • Generic rectangles • Greatest common factor (GCF) • Distributive Property Skills - Students are able to: • Analyze the strengths and weaknesses of various graphical representations of data. • Collect data and how to display the data in a stem-and-leaf plot and a histogram. • Explore the concept of area and develop strategies for measuring the area of a closed two-dimensional region. • Extend their understanding of area with the introduction of standard units of measure. • Develop an understanding of composing and decomposing area and begin to look at how this affects perimeter within the context of Base Ten Blocks. • Use generic rectangle area models to represent multiplication of multi-digit numbers. • Use generic rectangles to multiply multi-digit numbers. • Define greatest common factor (GCF) and use it to find the dimensions of generic rectangles. • Use generic rectangles and factoring to discover and then apply the Distributive Property to multi-digit products.

Unit 2 Arithmetic Strategies and Area	
District/School Formative Assessment Plan	**District/School Summative Assessment Plan**
Formative assessment informs instruction and is ongoing throughout a unit to determine how students are progressing against the standards. The district identifies three areas of knowledge attainment that should be continually assessed: Assessing securely held knowledge: (previously held knowledge where mastery or near mastery is expected) • Targeted skill based anticipatory set • Short Diagnostic prior to new concepts Assessing developing knowledge: (recently learned knowledge where student has not achieved mastery and current instruction is building upon) • What Have I Learned Activity • Participation Quiz • Partner Quiz • Peer Check • Learning Log Assessing learning in progress: (knowledge that currently being learned and assessing where students are in that learning process) • Carousel-Station Rotation • Exit Slip Gallery Walk • Participation Quiz • Think-Pair-Share Alternative Assessments: • Tools I can Use Activity • Math Chat • Red Light, Green Light	*Summative assessment is an opportunity for students to demonstrate mastery of the skills taught during a particular unit.* • Chapter Quiz • Chapter Test • Common quarterly and/or unit exams *Benchmark assessments:* • Summarize Understanding Activity • Common Mid-Term assessments • Common Final assessments Alternative Assessments: • Portfolio Performance Based Tasks

Unit 2 Arithmetic Strategies and Area

District Resources

District/school resources and supplementary resources that are texts as well as digital resources used to support the instruction.

- College Preparatory Mathematics program (primary)
- District developed lessons or mini-lessons
- District developed pre-assessments
- Technology integrated lesson activities

Enrichments and Supplements

Enrichments:

Ambassador	Dyad	Gallery Walk
Hot Seat	Math Chat	Peer Edit
Reciprocal Teaching	Silent Debate	Swap Meet
Traveling Salesman	Whiparound	

Supplements:

Ambassador	Around the World	Index Card Huddle
Dyad	Fishbowl	Fortune Cookie
Gallery Walk	Hot Potato	Hot Seat
Huddle	I Spy	Jigsaw
Listening Post	Math Chat	Numbered Heads
Pairs Check	Peer Edit	Reciprocal Teaching
Silent Debate	Swap Meet	Teammates Consult
Traveling Salesman	Tuning Protocol	Walk and Talk
Whip Around: I Have…Who Has…		

Instructional Activities

Dot Plots and Bar Graphs
Histograms and Stem-and-Leaf Plots
Exploring Area
Square Units and Area of Rectangles
Area and Perimeter
Using Rectangles to Multiply
Using Generic Rectangles
Generic Rectangles and Greatest Common Factor
Distributive Property

Recommended Instructional Strategies

This is a place to capture areas of standards integration and instructional best practices.

- Continually assess student progress through formative assessment and provide timely and relevant feedback. Formative Assessment strategies include:
  - Develop questions for each lesson that will provide information about ongoing student understanding and that allow you to provide valuable and useful feedback to students during the learning task.
  - Provide students with opportunities to revise their work products based on feedback received from their peers or teacher.
  - Ask questions that prompt student-to-student discussion. When working in groups direct questions to students who are less engaged.
  - Monitor collaborative work and discussions to collect evidence of student understandings and misconceptions.
  - Encourage students to provide constructive feedback on their peer's work products.
  - Identify when to provide immediate clarification to redirect discussions and when to allow for productive struggle. Decide when to provide clarification and address misconceptions during the lesson/activity.
- Provide a safe place to struggle. Students are more likely to engage and grapple with daily activities if they believe it will lead to their personal growth and progress. Productive struggle strategies include:

    - Students need to have a connection with their instructors, and students also need targeted feedback letting them know whether they are right or wrong. The classroom environment is a place where students can take risks and know that in order to attain mastery we must first work through our mistakes. Through this process students will develop perseverance and a deeper understanding of the material.
    - Create a classroom environment where students can take academic risks. Solicit multiple student responses to promote a positive exchange of ideas that result in a shared understanding. Refrain from immediate validation of student responses that hinder active student discussion.
    - Use mistakes and misconceptions that students express as a positive starting point for developing deeper understanding of a concept.
    - Plan for multiple opportunities for students to engage in productive struggle within a unit in order foster the development of perseverance and grit over time.
- Incorporate mixed-spaced practice into daily lessons and activities. A mixed practice schedule requires that students learn not only how to perform each procedure but also learn to strategically choose an approach for a variety of problem types. Spacing intrinsically ensures that the problems within each practice set include a mixture of different types and there are no more than a few practice problems of each kind within each practice set.
    - Systematically arrange practice problems throughout the lessons, chapters, and units so they are both distributed and mixed.
    - Prepare students to know not only how to solve each kind of problem but also which procedure was appropriate for each kind of problem.
    - Ensure that a majority of a practice set consists of securely held or developing knowledge. Practice problems that address learning in progress should never represent a majority of a practice set.
    - Students should achieve better understanding of the topic as subsequent lessons are taught; a mixed-spaced format provides opportunities to practice and assess these developing skills over the course of the chapter and unit.
- When planning lessons, prioritize core concepts, problems, and activities that best support learning in progress as students move through the instructional unit (lesson-section-chapter-unit).
    - Select standards-based activities and learning tasks that provide an introduction to concepts (launch), multiple representations (exploration), and practice and closure (summary).
    - Embedded within tasks and activities should be teacher led opportunities for demonstrations, guided practice, and individual/small-group instruction as needed.
- Use processes to develop and hone critical thinking skills in students. Critical thinking can de defined as the mental processes, strategies, and representations people use to solve problems, make decisions, and learn new concepts. Engage students in modeling and reasoning tasks that develop critical reasoning by:
    - Provide opportunity and support for meaningful student discussion during activities and tasks.
    - Plan for students to demonstrate understanding through both verbal and written forms.
    - Engage students in constructing viable arguments, critiquing the reasoning of others, and presenting explanatory presentations.
    - Engage students in modeling tasks that allow them to make assumptions and approximations, simplify complicated situations, identify and compare relationships, and use models as an approach to solve problems.
    - Continually assess student capacity to demonstrate understanding through higher-order modeling and reasoning tasks. Provide time for peer and teacher feedback that support ongoing learning.
- Use technology to enhance student learning in ways that support curricular objectives and help students reach intended learning outcomes. Instructional technology can be used as a *teaching* tool to improve communication and presentation of ideas. Technology can also be used as a student *learning* tool where students engage in active learning and use the technology in ways that enrich the learning experience. Technology integration can be achieved by:
    - Incorporating the routine and transparent use of technology in daily lessons.
    - Using technology applications that engage students in modeling and reasoning tasks (examples include, Desmos.com, Kahoot.it, Padlet.com, graphing calculators, etc…)
    - Using technology as a tool to present and communicate ideas, research information, and formatively/summatively assess student learning.

Unit 2 Arithmetic Strategies and Area	
Career Readiness, Life Literacies, and Key Skills	**Interdisciplinary Connections**

Reference: http://www.p21.org/our-work/p21-framework
• Career Awareness and Planning
  ◦ An individual's strengths, lifestyle goals, choices, and interests affect employment and income.
  ◦ Communication skills and responsible behavior in addition to education, experience, certifications, and skills are all factors that affect employment and income.
• Creativity and Innovation
  ◦ Gathering and evaluating knowledge and information from a variety of sources, including global perspectives, fosters creativity and innovative thinking.
• Critical Thinking and Problem-solving
  ◦ Multiple solutions exist to solve a problem.
  ◦ An essential aspect of problem solving is being able to self-reflect on why possible solutions for solving problems were or were not successful.
• Digital Citizenship
  ◦ Digital communities are used by Individuals to share information, organize, and engage around issues and topics of interest.
  ◦ Digital technology and data can be leveraged by communities to address effects of climate change.
• Global and Cultural Awareness
  ◦ Awareness of and appreciation for cultural differences is critical to avoid barriers to productive and positive interaction.
• Information and Media Literacy
  ◦ Digital tools make it possible to analyze and interpret data, including text, images, and sound. These tools allow for broad concepts and data to be more effectively communicated.
  ◦ Sources of information are evaluated for accuracy and relevance when considering the use of information.
  ◦ There are ethical and unethical uses of information and media.
• Technology Literacy
  ○ Some digital tools are appropriate for gathering, organizing, analyzing, and presenting information, while other types of digital tools are appropriate for creating text, visualizations, models, and communicating with others.
	Connection to English Language Arts:
	Students are expected to develop viable arguments and to critique the reasoning of others. This performance expectation is present in ELA and math practice standards as well as NGSS science and engineering practices. Also, inherent in all three sets of standards is an expectation to research and communicate information and enduring understandings.
	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.
	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.W2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
	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.
	
	Connection to Technology:
	Students will use digital tools to explore, model, synthesize and evaluate mathematical concepts. Technology should enhance and enrich the learning experience and provide students with new and alternative ways to access mathematical content. (NJSLS Technology 8.1)

Instructional Technology Resources	
This is a place to capture examples of instructional technology strategies and resources. • Desmos • Kahoot • CPM Lesson Videos • 3-Act Lessons	

Unit 3 Portions and Integers		
Content Standards	**Suggested Standards for Mathematical Practice**	**Critical Knowledge & Skills**
NJSLS.6.G.3. Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems. NJSLS.6.NS.3. Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. NJSLS.6.NS.5. Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation. NJSLS.6.NS.6. Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates. • NJSLS.6.NS.6a. Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., –(–3) = 3, and that 0 is its own opposite. • NJSLS.6.NS.6b. Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes. • NJSLS.6.NS.6c. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane. NJSLS.6.NS.7. Understand ordering and absolute value of rational numbers. • NJSLS.6.NS.7a. Interpret statements of inequality as statements about the relative	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments & 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.	Concepts – Students will understand: • Multiplicative identity. • Percents as portions of a whole. • The connections between fractions, percents and decimals • Ratios • Rational numbers • Inequalities • Absolute value • Reflection Skills - Students are able to: • Create equivalent fractions by using the multiplicative identity. • Develop an understanding of percents as a way to express and compare portions of a whole. • Recognize the connections between fractions and percents as they relate to decimals and decimal language. • Develop methods representing portions as percents, fractions, decimals, and descriptions with words. Students will make sense of the standard algorithm for adding and subtracting decimals. • Develop efficient methods to move between equivalent forms of portions of wholes based on their earlier work with the 100% block model, specifically from fractions to decimals and from percents to decimals. • Introduced to the concept of a ratio and use ratio language to describe a relationship between two quantities. They will use diagrams and ratio tables to represent ratios. • Informally connect movement along a number line with the addition and subtraction of positive numbers. They will recognize opposites. • Position rational numbers on a number line and will make statements about their relative size using inequalities. • Consider absolute value as distance from zero and understand the meaning of zero within a context. They will compare rational numbers using inequalities in contextual situations.

Unit 3 Portions and Integers		
Content Standards	**Suggested Standards for Mathematical Practice**	**Critical Knowledge & Skills**
position of two numbers on a number line diagram. *For example, interpret –3 > –7 as a statement that –3 is located to the right of –7 on a number line oriented from left to right.* • NJSLS.6.NS.7b. Write, interpret, and explain statements of order for rational numbers in real-world contexts. *For example, write –3º C > –7º C to express the fact that –3º C is warmer than –7º C.* • NJSLS.6.NS.7c. Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. *For example, for an account balance of –30 dollars, write |–30| = 30 to describe the size of the debt in dollars.* • NJSLS.6.NS.7d. Distinguish comparisons of absolute value from statements about order. *For example, recognize that an account balance less than –30 dollars represents a debt greater than 30 dollars.* NJSLS.6.NS.8. Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate. NJSLS.6.RP.1. Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. *For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."* NJSLS.6.RP.3. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. • NJSLS.6.RP.3c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent. • 6.RP.3d. Use ratio reasoning to convert measurement units; manipulate and transform		• Draw polygons on a coordinate plane given coordinates for the vertices. They will use the coordinates to find the length of a side joining points with the same *x*- or the same *y*-coordinate. Students will also recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.

Unit 3 Portions and Integers		
Content Standards	**Suggested Standards for Mathematical Practice**	**Critical Knowledge & Skills**
units appropriately when multiplying or dividing quantities		

Unit 3 Portions and Integers	
District/School Formative Assessment Plan	**District/School Summative Assessment Plan**
Formative assessment informs instruction and is ongoing throughout a unit to determine how students are progressing against the standards. The district identifies three areas of knowledge attainment that should be continually assessed: Assessing securely held knowledge: (previously held knowledge where mastery or near mastery is expected) • Targeted skill based anticipatory set • Short Diagnostic prior to new concepts Assessing developing knowledge: (recently learned knowledge where student has not achieved mastery and current instruction is building upon) • What Have I Learned Activity • Participation Quiz • Partner Quiz • Peer Check • Learning Log Assessing learning in progress: (knowledge that currently being learned and assessing where students are in that learning process) • Carousel-Station Rotation • Exit Slip Gallery Walk • Participation Quiz • Think-Pair-Share Alternative Assessments: • Tools I can Use Activity • Math Chat • Red Light, Green Light	*Summative assessment is an opportunity for students to demonstrate mastery of the skills taught during a particular unit.* • Chapter Quiz • Chapter Test • Common quarterly and/or unit exams *Benchmark assessments:* • Summarize Understanding Activity • Common Mid-Term assessments • Common Final assessments Alternative Assessments: • Portfolio Performance Based Tasks

Unit 3 Portions and Integers

District Resources

District/school resources and supplementary resources that are texts as well as digital resources used to support the instruction.

- College Preparatory Mathematics program (primary)
- District developed lessons or mini-lessons
- District developed pre-assessments
- Technology integrated lesson activities

Enrichments and Supplements

Enrichments:

Ambassador	Dyad	Gallery Walk
Hot Seat	Math Chat	Peer Edit
Reciprocal Teaching	Silent Debate	Swap Meet
Traveling Salesman	Whiparound	

Supplements:

Ambassador	Around the World	Index Card Huddle
Dyad	Fishbowl	Fortune Cookie
Gallery Walk	Hot Potato	Hot Seat
Huddle	I Spy	Jigsaw
Listening Post	Math Chat	Numbered Heads
Pairs Check	Peer Edit	Reciprocal Teaching
Silent Debate	Swap Meet	Teammates Consult
Traveling Salesman	Tuning Protocol	Walk and Talk
Whip Around: I Have…Who Has…		

Instructional Activities

Using the Multiplicative Identity
Portions as Percents
Connecting Percents with Decimals and Fractions
Multiple Representations of a Portion
Completing the Web
Investigating Ratios
Addition, Subtraction, and Opposites
Locating Negative Numbers
Absolute Value
Length on a Coordinate Graph

Recommended Instructional Strategies

This is a place to capture areas of standards integration and instructional best practices.

- Continually assess student progress through formative assessment and provide timely and relevant feedback. Formative Assessment strategies include:
  - Develop questions for each lesson that will provide information about ongoing student understanding and that allow you to provide valuable and useful feedback to students during the learning task.
  - Provide students with opportunities to revise their work products based on feedback received from their peers or teacher.
  - Ask questions that prompt student-to-student discussion. When working in groups direct questions to students who are less engaged.
  - Monitor collaborative work and discussions to collect evidence of student understandings and misconceptions.
  - Encourage students to provide constructive feedback on their peer's work products.
  - Identify when to provide immediate clarification to redirect discussions and when to allow for productive struggle. Decide when to provide clarification and address misconceptions during the lesson/activity.
- Provide a safe place to struggle. Students are more likely to engage and grapple with daily activities if they believe it will lead to their personal growth and progress. Productive struggle strategies include:

- Students need to have a connection with their instructors, and students also need targeted feedback letting them know whether they are right or wrong. The classroom environment is a place where students can take risks and know that in order to attain mastery we must first work through our mistakes. Through this process students will develop perseverance and a deeper understanding of the material.
- Create a classroom environment where students can take academic risks. Solicit multiple student responses to promote a positive exchange of ideas that result in a shared understanding. Refrain from immediate validation of student responses that hinder active student discussion.
- Use mistakes and misconceptions that students express as a positive starting point for developing deeper understanding of a concept.
- Plan for multiple opportunities for students to engage in productive struggle within a unit in order foster the development of perseverance and grit over time.

- Incorporate mixed-spaced practice into daily lessons and activities. A mixed practice schedule requires that students learn not only how to perform each procedure but also learn to strategically choose an approach for a variety of problem types. Spacing intrinsically ensures that the problems within each practice set include a mixture of different types and there are no more than a few practice problems of each kind within each practice set.
  - Systematically arrange practice problems throughout the lessons, chapters, and units so they are both distributed and mixed.
  - Prepare students to know not only how to solve each kind of problem but also which procedure was appropriate for each kind of problem.
  - Ensure that a majority of a practice set consists of securely held or developing knowledge. Practice problems that address learning in progress should never represent a majority of a practice set.
  - Students should achieve better understanding of the topic as subsequent lessons are taught; a mixed-spaced format provides opportunities to practice and assess these developing skills over the course of the chapter and unit.
- When planning lessons, prioritize core concepts, problems, and activities that best support learning in progress as students move through the instructional unit (lesson-section-chapter-unit).
  - Select standards-based activities and learning tasks that provide an introduction to concepts (launch), multiple representations (exploration), and practice and closure (summary).
  - Embedded within tasks and activities should be teacher led opportunities for demonstrations, guided practice, and individual/small-group instruction as needed.
- Use processes to develop and hone critical thinking skills in students. Critical thinking can de defined as the mental processes, strategies, and representations people use to solve problems, make decisions, and learn new concepts. Engage students in modeling and reasoning tasks that develop critical reasoning by:
  - Provide opportunity and support for meaningful student discussion during activities and tasks.
  - Plan for students to demonstrate understanding through both verbal and written forms.
  - Engage students in constructing viable arguments, critiquing the reasoning of others, and presenting explanatory presentations.
  - Engage students in modeling tasks that allow them to make assumptions and approximations, simplify complicated situations, identify and compare relationships, and use models as an approach to solve problems.
  - Continually assess student capacity to demonstrate understanding through higher-order modeling and reasoning tasks. Provide time for peer and teacher feedback that support ongoing learning.
- Use technology to enhance student learning in ways that support curricular objectives and help students reach intended learning outcomes. Instructional technology can be used as a *teaching* tool to improve communication and presentation of ideas. Technology can also be used as a student *learning* tool where students engage in active learning and use the technology in ways that enrich the learning experience. Technology integration can be achieved by:
  - Incorporating the routine and transparent use of technology in daily lessons.
  - Using technology applications that engage students in modeling and reasoning tasks (examples include, Desmos.com, Kahoot.it, Padlet.com, graphing calculators, etc…)
  - Using technology as a tool to present and communicate ideas, research information, and formatively/summatively assess student learning.

Unit 3 Portions and Integers	
Career Readiness, Life Literacies, and Key Skills	**Interdisciplinary Connections**

Reference: http://www.p21.org/our-work/p21-framework
• Career Awareness and Planning
  ◦ An individual's strengths, lifestyle goals, choices, and interests affect employment and income.
  ◦ Communication skills and responsible behavior in addition to education, experience, certifications, and skills are all factors that affect employment and income.
• Creativity and Innovation
  ◦ Gathering and evaluating knowledge and information from a variety of sources, including global perspectives, fosters creativity and innovative thinking.
• Critical Thinking and Problem-solving
  ◦ Multiple solutions exist to solve a problem.
  ◦ An essential aspect of problem solving is being able to self-reflect on why possible solutions for solving problems were or were not successful.
• Digital Citizenship
  ◦ Digital communities are used by Individuals to share information, organize, and engage around issues and topics of interest.
  ◦ Digital technology and data can be leveraged by communities to address effects of climate change.
• Global and Cultural Awareness
  ◦ Awareness of and appreciation for cultural differences is critical to avoid barriers to productive and positive interaction.
• Information and Media Literacy
  ◦ Digital tools make it possible to analyze and interpret data, including text, images, and sound. These tools allow for broad concepts and data to be more effectively communicated.
  ◦ Sources of information are evaluated for accuracy and relevance when considering the use of information.
  ◦ There are ethical and unethical uses of information and media.
• Technology Literacy
  ○ Some digital tools are appropriate for gathering, organizing, analyzing, and presenting information, while other types of digital tools are appropriate for creating text, visualizations, models, and communicating with others.
	Connection to English Language Arts:
	Students are expected to develop viable arguments and to critique the reasoning of others. This performance expectation is present in ELA and math practice standards as well as NGSS science and engineering practices. Also, inherent in all three sets of standards is an expectation to research and communicate information and enduring understandings.
	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.
	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.W2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
	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.
	
	Connection to Technology:
	Students will use digital tools to explore, model, synthesize and evaluate mathematical concepts. Technology should enhance and enrich the learning experience and provide students with new and alternative ways to access mathematical content. (NJSLS Technology 8.1)

Instructional Technology Resources	
This is a place to capture examples of instructional technology strategies and resources. • Desmos • Kahoot • CPM Lesson Videos • 3-Act Lessons	

Unit 4 Variables and Ratios		
Content Standards	**Suggested Standards for Mathematical Practice**	**Critical Knowledge & Skills**
NJSLS.6.EE.2. Write, read, and evaluate expressions in which letters stand for numbers. • NJSLS.6.EE.2a. Write expressions that record operations with numbers and with letters standing for numbers. *For example, express the calculation "Subtract y from 5" as 5 – y.* • NJSLS.6.EE.2c. Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). *For example, use the formulas $V = s^3$ and $A = 6s^2$ to find the volume and surface area of a cube with sides of length s = 1/2.* NJSLS.6.EE.4. Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). *For example, the expressions y + y + y and 3y are equivalent because they name the same number regardless of which number y stands for.* NJSLS.6.EE.6. Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. NJSLS.6.RP.1. Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. *For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."*	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments & 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.	Concepts – Students will understand: • Representation of unknown quantities with a variable. • Variable represent a set of solutions. • Equivalent expressions • Image enlargement • Image reduction • Similar figures. Skills - Students are able to: • Represent unknown quantities with a variable. • Informally evaluate expressions and solve for unknowns. • Generate and compare multiple counting strategies. • Make general statements about how to count the number of squares in any figure of a pattern. • Generalize methods for finding the number of small squares in a square frame pattern using words and algebraic expressions. • Use a variable to represent a set of solutions. • Identify that two expressions are equivalent by evaluating them for specific values. • Enlarge an image and examine the relationships between the original image and its enlargement. • Determine that to make a correct enlargement or reduction of a shape, all sides of the shape must be multiplied by the same number. • Use ratios to compare similar figures. • Work with ratios in non-geometric contexts and use them to solve problems.

Unit 4 Variables and Ratios	
District/School Formative Assessment Plan	**District/School Summative Assessment Plan**
Formative assessment informs instruction and is ongoing throughout a unit to determine how students are progressing against the standards. The district identifies three areas of knowledge attainment that should be continually assessed: Assessing securely held knowledge: (previously held knowledge where mastery or near mastery is expected) • Targeted skill based anticipatory set • Short Diagnostic prior to new concepts Assessing developing knowledge: (recently learned knowledge where student has not achieved mastery and current instruction is building upon) • What Have I Learned Activity • Participation Quiz • Partner Quiz • Peer Check • Learning Log Assessing learning in progress: (knowledge that currently being learned and assessing where students are in that learning process) • Carousel-Station Rotation • Exit Slip Gallery Walk • Participation Quiz • Think-Pair-Share Alternative Assessments: • Tools I can Use Activity • Math Chat • Red Light, Green Light	*Summative assessment is an opportunity for students to demonstrate mastery of the skills taught during a particular unit.* • Chapter Quiz • Chapter Test • Common quarterly and/or unit exams *Benchmark assessments:* • Summarize Understanding Activity • Common Mid-Term assessments • Common Final assessments Alternative Assessments: • Portfolio Performance Based Tasks

Unit 4 Variables and Ratios

District Resources

District/school resources and supplementary resources that are texts as well as digital resources used to support the instruction.

- College Preparatory Mathematics program (primary)
- District developed lessons or mini-lessons
- District developed pre-assessments
- Technology integrated lesson activities

Enrichments and Supplements	Instructional Activities
Enrichments: Ambassador, Dyad, Gallery Walk Hot Seat, Math Chat, Peer Edit Reciprocal Teaching, Silent Debate, Swap Meet Traveling Salesman, Whiparound Supplements: Ambassador, Around the World, Index Card Huddle Dyad, Fishbowl, Fortune Cookie Gallery Walk, Hot Potato, Hot Seat Huddle, I Spy, Jigsaw Listening Post, Math Chat, Numbered Heads Pairs Check, Peer Edit, Reciprocal Teaching Silent Debate, Swap Meet, Teammates Consult Traveling Salesman, Tuning Protocol, Walk and Talk Whip Around: I Have…Who Has…	Introduction to Variables Writing Equivalent Expressions Using Variables to Generalize Enlarging Two-Dimensional Shapes Enlarging and Reducing Figures Enlargement and Reduction Ratios Ratios in Other Situations

Recommended Instructional Strategies

This is a place to capture areas of standards integration and instructional best practices.

- Continually assess student progress through formative assessment and provide timely and relevant feedback. Formative Assessment strategies include:
  - Develop questions for each lesson that will provide information about ongoing student understanding and that allow you to provide valuable and useful feedback to students during the learning task.
  - Provide students with opportunities to revise their work products based on feedback received from their peers or teacher.
  - Ask questions that prompt student-to-student discussion. When working in groups direct questions to students who are less engaged.
  - Monitor collaborative work and discussions to collect evidence of student understandings and misconceptions.
  - Encourage students to provide constructive feedback on their peer's work products.
  - Identify when to provide immediate clarification to redirect discussions and when to allow for productive struggle. Decide when to provide clarification and address misconceptions during the lesson/activity.
- Provide a safe place to struggle. Students are more likely to engage and grapple with daily activities if they believe it will lead to their personal growth and progress. Productive struggle strategies include:

- Students need to have a connection with their instructors, and students also need targeted feedback letting them know whether they are right or wrong. The classroom environment is a place where students can take risks and know that in order to attain mastery we must first work through our mistakes. Through this process students will develop perseverance and a deeper understanding of the material.
- Create a classroom environment where students can take academic risks. Solicit multiple student responses to promote a positive exchange of ideas that result in a shared understanding. Refrain from immediate validation of student responses that hinder active student discussion.
- Use mistakes and misconceptions that students express as a positive starting point for developing deeper understanding of a concept.
- Plan for multiple opportunities for students to engage in productive struggle within a unit in order foster the development of perseverance and grit over time.

- Incorporate mixed-spaced practice into daily lessons and activities. A mixed practice schedule requires that students learn not only how to perform each procedure but also learn to strategically choose an approach for a variety of problem types. Spacing intrinsically ensures that the problems within each practice set include a mixture of different types and there are no more than a few practice problems of each kind within each practice set.
  - Systematically arrange practice problems throughout the lessons, chapters, and units so they are both distributed and mixed.
  - Prepare students to know not only how to solve each kind of problem but also which procedure was appropriate for each kind of problem.
  - Ensure that a majority of a practice set consists of securely held or developing knowledge. Practice problems that address learning in progress should never represent a majority of a practice set.
  - Students should achieve better understanding of the topic as subsequent lessons are taught; a mixed-spaced format provides opportunities to practice and assess these developing skills over the course of the chapter and unit.
- When planning lessons, prioritize core concepts, problems, and activities that best support learning in progress as students move through the instructional unit (lesson-section-chapter-unit).
  - Select standards-based activities and learning tasks that provide an introduction to concepts (launch), multiple representations (exploration), and practice and closure (summary).
  - Embedded within tasks and activities should be teacher led opportunities for demonstrations, guided practice, and individual/small-group instruction as needed.
- Use processes to develop and hone critical thinking skills in students. Critical thinking can de defined as the mental processes, strategies, and representations people use to solve problems, make decisions, and learn new concepts. Engage students in modeling and reasoning tasks that develop critical reasoning by:
  - Provide opportunity and support for meaningful student discussion during activities and tasks.
  - Plan for students to demonstrate understanding through both verbal and written forms.
  - Engage students in constructing viable arguments, critiquing the reasoning of others, and presenting explanatory presentations.
  - Engage students in modeling tasks that allow them to make assumptions and approximations, simplify complicated situations, identify and compare relationships, and use models as an approach to solve problems.
  - Continually assess student capacity to demonstrate understanding through higher-order modeling and reasoning tasks. Provide time for peer and teacher feedback that support ongoing learning.
- Use technology to enhance student learning in ways that support curricular objectives and help students reach intended learning outcomes. Instructional technology can be used as a *teaching* tool to improve communication and presentation of ideas. Technology can also be used as a student *learning* tool where students engage in active learning and use the technology in ways that enrich the learning experience. Technology integration can be achieved by:
  - Incorporating the routine and transparent use of technology in daily lessons.
  - Using technology applications that engage students in modeling and reasoning tasks (examples include, Desmos.com, Kahoot.it, Padlet.com, graphing calculators, etc…)
  - Using technology as a tool to present and communicate ideas, research information, and formatively/summatively assess student learning.

Unit 4 Variables and Ratios	
Career Readiness, Life Literacies, and Key Skills	**Interdisciplinary Connections**

Reference: http://www.p21.org/our-work/p21-framework
• Career Awareness and Planning
  ◦ An individual's strengths, lifestyle goals, choices, and interests affect employment and income.
  ◦ Communication skills and responsible behavior in addition to education, experience, certifications, and skills are all factors that affect employment and income.
• Creativity and Innovation
  ◦ Gathering and evaluating knowledge and information from a variety of sources, including global perspectives, fosters creativity and innovative thinking.
• Critical Thinking and Problem-solving
  ◦ Multiple solutions exist to solve a problem.
  ◦ An essential aspect of problem solving is being able to self-reflect on why possible solutions for solving problems were or were not successful.
• Digital Citizenship
  ◦ Digital communities are used by Individuals to share information, organize, and engage around issues and topics of interest.
  ◦ Digital technology and data can be leveraged by communities to address effects of climate change.
• Global and Cultural Awareness
  ◦ Awareness of and appreciation for cultural differences is critical to avoid barriers to productive and positive interaction.
• Information and Media Literacy
  ◦ Digital tools make it possible to analyze and interpret data, including text, images, and sound. These tools allow for broad concepts and data to be more effectively communicated.
  ◦ Sources of information are evaluated for accuracy and relevance when considering the use of information.
  ◦ There are ethical and unethical uses of information and media.
• Technology Literacy
  ○ Some digital tools are appropriate for gathering, organizing, analyzing, and presenting information, while other types of digital tools are appropriate for creating text, visualizations, models, and communicating with others.
	Connection to English Language Arts:
	Students are expected to develop viable arguments and to critique the reasoning of others. This performance expectation is present in ELA and math practice standards as well as NGSS science and engineering practices. Also, inherent in all three sets of standards is an expectation to research and communicate information and enduring understandings.
	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.
	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.W2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
	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.
	
	Connection to Technology:
	Students will use digital tools to explore, model, synthesize and evaluate mathematical concepts. Technology should enhance and enrich the learning experience and provide students with new and alternative ways to access mathematical content. (NJSLS Technology 8.1)

Instructional Technology Resources	
This is a place to capture examples of instructional technology strategies and resources. • Desmos • Kahoot • CPM Lesson Videos • 3-Act Lessons	

Unit 5 Multiplying Fractions and Area		
Content Standards	**Suggested Standards for Mathematical Practice**	**Critical Knowledge & Skills**
NJSLS.6.G.1. Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems. NJSLS.6.NS.1. Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b) ÷ (c/d) = ad/bc.) How much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 3/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi?* NJSLS.6.NS.3. Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. NJSLS.6.RP.3. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. • NJSLS.6.RP.3c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments & 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.	Concepts – Students will understand: • Develop the standard algorithm for multiplication of fractions. • Reasonableness of answers. • Understand that multiplication can increase a quantity or decrease it depending on the multiplier. • Develop the idea of a subproblem and see that problems have multiple solution paths. • Shape decomposition • Shape recomposition • Develop the area formula for a parallelogram. • Recognize that a triangle can be duplicated to create a rectangle or parallelogram Develop strategies for finding the area of trapezoids and will apply their strategies to find the area of a complex shape. Skills - Students are able to: • Extend their understanding of the multiplication operation with fractions and use area models to solve multiplication problems in context. • Use models to multiply with fractions, and develop the standard algorithm for multiplication of fractions. • Apply the standard strategy for fraction multiplication (numerator times numerator over denominator times denominator) • Compare multiplication strategies for mixed numbers, fractions, and decimals and compare the appropriateness of estimations versus exact answers in various contexts. • Multiply fractions, decimals, and percents and assess the reasonableness of answers. • Given a complicated figure, divide it into pieces and convert the pieces to a rectangle so that its area can be calculated more easily. • Work with composite shapes and a technology tool to decompose shapes into smaller rectangles and, when possible, to recompose them as single rectangles in order to find their area. • Develop the area formula for a parallelogram. • Triangle duplication to create a rectangle or parallelogram and use that relationship to develop a formula for the area of a triangle. • Develop strategies for finding the area of trapezoids and will apply their strategies to find the area of a complex shape.

Unit 5 Multiplying Fractions and Area	
District/School Formative Assessment Plan	**District/School Summative Assessment Plan**
Formative assessment informs instruction and is ongoing throughout a unit to determine how students are progressing against the standards. The district identifies three areas of knowledge attainment that should be continually assessed: Assessing securely held knowledge: (previously held knowledge where mastery or near mastery is expected) • Targeted skill based anticipatory set • Short Diagnostic prior to new concepts Assessing developing knowledge: (recently learned knowledge where student has not achieved mastery and current instruction is building upon) • What Have I Learned Activity • Tools I Can Use Activity • Participation Quiz • Partner Quiz • Peer Check • Learning Log Assessing learning in progress: (knowledge that currently being learned and assessing where students are in that learning process) • Carousel-Station Rotation • Exit Slip Gallery Walk • Participation Quiz • Think-Pair-Share Alternative Assessments: • Tools I can Use Activity • Math Chat • Red Light, Green Light	*Summative assessment is an opportunity for students to demonstrate mastery of the skills taught during a particular unit.* • Chapter Quiz • Chapter Test • Common quarterly and/or unit exams *Benchmark assessments:* • Summarize Understanding Activity • Common Mid-Term assessments • Common Final assessments Alternative Assessments: • Portfolio Performance Based Tasks

Unit 5 Multiplying Fractions and Area

District Resources

District/school resources and supplementary resources that are texts as well as digital resources used to support the instruction.

- College Preparatory Mathematics program (primary)
- District developed lessons or mini-lessons
- District developed pre-assessments
- Technology integrated lesson activities

Enrichments and Supplements

Enrichments:

Ambassador	Dyad	Gallery Walk
Hot Seat	Math Chat	Peer Edit
Reciprocal Teaching	Silent Debate	Swap Meet
Traveling Salesman	Whiparound	

Supplements:

Ambassador	Around the World	Index Card Huddle
Dyad	Fishbowl	Fortune Cookie
Gallery Walk	Hot Potato	Hot Seat
Huddle	I Spy	Jigsaw
Listening Post	Math Chat	Numbered Heads
Pairs Check	Peer Edit	Reciprocal Teaching
Silent Debate	Swap Meet	Teammates Consult
Traveling Salesman	Tuning Protocol	Walk and Talk
Whip Around: I Have…Who Has…		

Instructional Activities

Representing Fraction Multiplication
Describing Parts of Parts
Calculating Parts of Parts
Multiplying Mixed Numbers
Making Sense of Decimal Multiplication
Fraction Multiplication Number Sense
Rearranging Areas
Area of a Parallelogram
Area of a Triangle
Area of a Trapezoid

Recommended Instructional Strategies

This is a place to capture areas of standards integration and instructional best practices.

- Continually assess student progress through formative assessment and provide timely and relevant feedback. Formative Assessment strategies include:
  - Develop questions for each lesson that will provide information about ongoing student understanding and that allow you to provide valuable and useful feedback to students during the learning task.
  - Provide students with opportunities to revise their work products based on feedback received from their peers or teacher.
  - Ask questions that prompt student-to-student discussion. When working in groups direct questions to students who are less engaged.
  - Monitor collaborative work and discussions to collect evidence of student understandings and misconceptions.
  - Encourage students to provide constructive feedback on their peer's work products.
  - Identify when to provide immediate clarification to redirect discussions and when to allow for productive struggle. Decide when to provide clarification and address misconceptions during the lesson/activity.
- Provide a safe place to struggle. Students are more likely to engage and grapple with daily activities if they believe it will lead to their personal growth and progress. Productive struggle strategies include:

    - Students need to have a connection with their instructors, and students also need targeted feedback letting them know whether they are right or wrong. The classroom environment is a place where students can take risks and know that in order to attain mastery we must first work through our mistakes. Through this process students will develop perseverance and a deeper understanding of the material.
    - Create a classroom environment where students can take academic risks. Solicit multiple student responses to promote a positive exchange of ideas that result in a shared understanding. Refrain from immediate validation of student responses that hinder active student discussion.
    - Use mistakes and misconceptions that students express as a positive starting point for developing deeper understanding of a concept.
    - Plan for multiple opportunities for students to engage in productive struggle within a unit in order foster the development of perseverance and grit over time.
- Incorporate mixed-spaced practice into daily lessons and activities. A mixed practice schedule requires that students learn not only how to perform each procedure but also learn to strategically choose an approach for a variety of problem types. Spacing intrinsically ensures that the problems within each practice set include a mixture of different types and there are no more than a few practice problems of each kind within each practice set.
    - Systematically arrange practice problems throughout the lessons, chapters, and units so they are both distributed and mixed.
    - Prepare students to know not only how to solve each kind of problem but also which procedure was appropriate for each kind of problem.
    - Ensure that a majority of a practice set consists of securely held or developing knowledge. Practice problems that address learning in progress should never represent a majority of a practice set.
    - Students should achieve better understanding of the topic as subsequent lessons are taught; a mixed-spaced format provides opportunities to practice and assess these developing skills over the course of the chapter and unit.
- When planning lessons, prioritize core concepts, problems, and activities that best support learning in progress as students move through the instructional unit (lesson-section-chapter-unit).
    - Select standards-based activities and learning tasks that provide an introduction to concepts (launch), multiple representations (exploration), and practice and closure (summary).
    - Embedded within tasks and activities should be teacher led opportunities for demonstrations, guided practice, and individual/small-group instruction as needed.
- Use processes to develop and hone critical thinking skills in students. Critical thinking can de defined as the mental processes, strategies, and representations people use to solve problems, make decisions, and learn new concepts. Engage students in modeling and reasoning tasks that develop critical reasoning by:
    - Provide opportunity and support for meaningful student discussion during activities and tasks.
    - Plan for students to demonstrate understanding through both verbal and written forms.
    - Engage students in constructing viable arguments, critiquing the reasoning of others, and presenting explanatory presentations.
    - Engage students in modeling tasks that allow them to make assumptions and approximations, simplify complicated situations, identify and compare relationships, and use models as an approach to solve problems.
    - Continually assess student capacity to demonstrate understanding through higher-order modeling and reasoning tasks. Provide time for peer and teacher feedback that support ongoing learning.
- Use technology to enhance student learning in ways that support curricular objectives and help students reach intended learning outcomes. Instructional technology can be used as a *teaching* tool to improve communication and presentation of ideas. Technology can also be used as a student *learning* tool where students engage in active learning and use the technology in ways that enrich the learning experience. Technology integration can be achieved by:
    - Incorporating the routine and transparent use of technology in daily lessons.
    - Using technology applications that engage students in modeling and reasoning tasks (examples include, Desmos.com, Kahoot.it, Padlet.com, graphing calculators, etc…)
    - Using technology as a tool to present and communicate ideas, research information, and formatively/summatively assess student learning.

Unit 5 Multiplying Fractions and Area	
Career Readiness, Life Literacies, and Key Skills	**Interdisciplinary Connections**

Reference: http://www.p21.org/our-work/p21-framework
• Career Awareness and Planning
  ◦ An individual's strengths, lifestyle goals, choices, and interests affect employment and income.
  ◦ Communication skills and responsible behavior in addition to education, experience, certifications, and skills are all factors that affect employment and income.
• Creativity and Innovation
  ◦ Gathering and evaluating knowledge and information from a variety of sources, including global perspectives, fosters creativity and innovative thinking.
• Critical Thinking and Problem-solving
  ◦ Multiple solutions exist to solve a problem.
  ◦ An essential aspect of problem solving is being able to self-reflect on why possible solutions for solving problems were or were not successful.
• Digital Citizenship
  ◦ Digital communities are used by Individuals to share information, organize, and engage around issues and topics of interest.
  ◦ Digital technology and data can be leveraged by communities to address effects of climate change.
• Global and Cultural Awareness
  ◦ Awareness of and appreciation for cultural differences is critical to avoid barriers to productive and positive interaction.
• Information and Media Literacy
  ◦ Digital tools make it possible to analyze and interpret data, including text, images, and sound. These tools allow for broad concepts and data to be more effectively communicated.
  ◦ Sources of information are evaluated for accuracy and relevance when considering the use of information.
  ◦ There are ethical and unethical uses of information and media.
• Technology Literacy
  ○ Some digital tools are appropriate for gathering, organizing, analyzing, and presenting information, while other types of digital tools are appropriate for creating text, visualizations, models, and communicating with others.
	Connection to English Language Arts:
	Students are expected to develop viable arguments and to critique the reasoning of others. This performance expectation is present in ELA and math practice standards as well as NGSS science and engineering practices. Also, inherent in all three sets of standards is an expectation to research and communicate information and enduring understandings.
	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.
	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.W2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
	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.
	
	Connection to Technology:
	Students will use digital tools to explore, model, synthesize and evaluate mathematical concepts. Technology should enhance and enrich the learning experience and provide students with new and alternative ways to access mathematical content. (NJSLS Technology 8.1)

Instructional Technology Resources	
This is a place to capture examples of instructional technology strategies and resources. • Desmos • Kahoot • CPM Lesson Videos • 3-Act Lessons	

Unit 6 Dividing and Building Expressions		
Content Standards	**Suggested Standards for Mathematical Practice**	**Critical Knowledge & Skills**
NJSLS.6.EE.1. Write and evaluate numerical expressions involving whole-number exponents. NJSLS.6.EE.2. Write, read, and evaluate expressions in which letters stand for numbers. • NJSLS.6.EE.2b. Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. *For example, describe the expression 2 (8 + 7) as a product of two factors; view (8 + 7) as both a single entity and a sum of two terms.* • NJSLS.6.EE.2c. Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). *For example, use the formulas $V = s^3$ and $A = 6s^2$ to find the volume and surface area of a cube with sides of length s = 1/2.* NJSLS.6.EE.3. Apply the properties of operations to generate equivalent expressions. *For example, apply the distributive property to the expression 3(2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6(4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y.* NJSLS.6.EE.4. Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). *For example,*	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments & 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.	Concepts – Students will understand: • Visual fraction models • Determine that a fraction can be seen as one number formed by division • Make sense of the long division algorithm. • Extend understanding of division to include division of fractions by fractions • Order of Operations • Understand that combining like terms is a form of sorting. • Area • Perimeter • Visually demonstrate that *x* can represent any number. • Equivalent expressions Skills - Students are able to: • Divide quantities and represent the result in multiple ways. • Use visual fraction models and equations to represent division. • Cconstruct various visual models to represent division problems. • Identify problems that can be solved using division. • Use multiplication to check division. • Represent division problems in multiple ways. • Evaluating real-world formulas for given values using Order of Operations. • Evaluate expressions with whole-number exponents. • Use variables to represent unknown lengths. • Find the area of algebra tiles using variables and constants and will practice combining like terms in the context of finding the areas of collections of algebra tiles. • Find the lengths of the sides of algebra tiles and combine like terms as they find perimeters. • Continue combining like terms to generate equivalent expressions by finding the perimeter of complex figures composed of algebra tiles. • Visually demonstrate that *x* can represent any number. • Apply knowledge about creating equivalent expressions by combining like terms, and evaluating expressions including expressions with exponents.

Unit 6 Dividing and Building Expressions		
Content Standards	**Suggested Standards for Mathematical Practice**	**Critical Knowledge & Skills**
the expressions y + y + y and 3y are equivalent because they name the same number regardless of which number y stands for. NJSLS.6.EE.6. Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. NJSLS.6.NS.1. Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b) ÷ (c/d) = ad/bc.) How much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 3/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi?* NJSLS.6.NS.2. Fluently divide multi-digit numbers using the standard algorithm.		

Unit 6 Dividing and Building Expressions	
District/School Formative Assessment Plan	**District/School Summative Assessment Plan**
Formative assessment informs instruction and is ongoing throughout a unit to determine how students are progressing against the standards. The district identifies three areas of knowledge attainment that should be continually assessed: Assessing securely held knowledge: (previously held knowledge where mastery or near mastery is expected) • Targeted skill based anticipatory set • Short Diagnostic prior to new concepts Assessing developing knowledge: (recently learned knowledge where student has not achieved mastery and current instruction is building upon) • What Have I Learned Activity • Participation Quiz • Partner Quiz • Peer Check • Learning Log Assessing learning in progress: (knowledge that currently being learned and assessing where students are in that learning process) • Carousel-Station Rotation • Exit Slip Gallery Walk • Participation Quiz • Think-Pair-Share Alternative Assessments: • Tools I can Use Activity • Math Chat • Red Light, Green Light	*Summative assessment is an opportunity for students to demonstrate mastery of the skills taught during a particular unit.* • Chapter Quiz • Chapter Test • Common quarterly and/or unit exams *Benchmark assessments:* • Summarize Understanding Activity • Common Mid-Term assessments • Common Final assessments Alternative Assessments: • Portfolio Performance Based Tasks

Unit 6 Dividing and Building Expressions

District Resources

District/school resources and supplementary resources that are texts as well as digital resources used to support the instruction.

- College Preparatory Mathematics program (primary)
- District developed lessons or mini-lessons
- District developed pre-assessments
- Technology integrated lesson activities

Enrichments and Supplements	Instructional Activities
Enrichments: Ambassador, Dyad, Gallery Walk, Hot Seat, Math Chat, Peer Edit, Reciprocal Teaching, Silent Debate, Swap Meet, Traveling Salesman, Whiparound Supplements: Ambassador, Around the World, Index Card Huddle, Dyad, Fishbowl, Fortune Cookie, Gallery Walk, Hot Potato, Hot Seat, Huddle, I Spy, Jigsaw, Listening Post, Math Chat, Numbered Heads, Pairs Check, Peer Edit, Reciprocal Teaching, Silent Debate, Swap Meet, Teammates Consult, Traveling Salesman, Tuning Protocol, Walk and Talk, Whip Around: I Have…Who Has…	Dividing Fractions as Division Problems Problem Solving with Division Solving Problems Involving Fraction Order of Operations Area of a Rectangular Shape Naming Perimeters of Algebra Tiles Combining Like Terms Evaluating Algebraic Expressions

Recommended Instructional Strategies

This is a place to capture areas of standards integration and instructional best practices.

- Continually assess student progress through formative assessment and provide timely and relevant feedback. Formative Assessment strategies include:
  - Develop questions for each lesson that will provide information about ongoing student understanding and that allow you to provide valuable and useful feedback to students during the learning task.
  - Provide students with opportunities to revise their work products based on feedback received from their peers or teacher.
  - Ask questions that prompt student-to-student discussion. When working in groups direct questions to students who are less engaged.
  - Monitor collaborative work and discussions to collect evidence of student understandings and misconceptions.
  - Encourage students to provide constructive feedback on their peer's work products.
  - Identify when to provide immediate clarification to redirect discussions and when to allow for productive struggle. Decide when to provide clarification and address misconceptions during the lesson/activity.
- Provide a safe place to struggle. Students are more likely to engage and grapple with daily activities if they believe it will lead to their personal growth and progress. Productive struggle strategies include:

    - Students need to have a connection with their instructors, and students also need targeted feedback letting them know whether they are right or wrong. The classroom environment is a place where students can take risks and know that in order to attain mastery we must first work through our mistakes. Through this process students will develop perseverance and a deeper understanding of the material.
    - Create a classroom environment where students can take academic risks. Solicit multiple student responses to promote a positive exchange of ideas that result in a shared understanding. Refrain from immediate validation of student responses that hinder active student discussion.
    - Use mistakes and misconceptions that students express as a positive starting point for developing deeper understanding of a concept.
    - Plan for multiple opportunities for students to engage in productive struggle within a unit in order foster the development of perseverance and grit over time.
- Incorporate mixed-spaced practice into daily lessons and activities. A mixed practice schedule requires that students learn not only how to perform each procedure but also learn to strategically choose an approach for a variety of problem types. Spacing intrinsically ensures that the problems within each practice set include a mixture of different types and there are no more than a few practice problems of each kind within each practice set.
    - Systematically arrange practice problems throughout the lessons, chapters, and units so they are both distributed and mixed.
    - Prepare students to know not only how to solve each kind of problem but also which procedure was appropriate for each kind of problem.
    - Ensure that a majority of a practice set consists of securely held or developing knowledge. Practice problems that address learning in progress should never represent a majority of a practice set.
    - Students should achieve better understanding of the topic as subsequent lessons are taught; a mixed-spaced format provides opportunities to practice and assess these developing skills over the course of the chapter and unit.
- When planning lessons, prioritize core concepts, problems, and activities that best support learning in progress as students move through the instructional unit (lesson-section-chapter-unit).
    - Select standards-based activities and learning tasks that provide an introduction to concepts (launch), multiple representations (exploration), and practice and closure (summary).
    - Embedded within tasks and activities should be teacher led opportunities for demonstrations, guided practice, and individual/small-group instruction as needed.
- Use processes to develop and hone critical thinking skills in students. Critical thinking can de defined as the mental processes, strategies, and representations people use to solve problems, make decisions, and learn new concepts. Engage students in modeling and reasoning tasks that develop critical reasoning by:
    - Provide opportunity and support for meaningful student discussion during activities and tasks.
    - Plan for students to demonstrate understanding through both verbal and written forms.
    - Engage students in constructing viable arguments, critiquing the reasoning of others, and presenting explanatory presentations.
    - Engage students in modeling tasks that allow them to make assumptions and approximations, simplify complicated situations, identify and compare relationships, and use models as an approach to solve problems.
    - Continually assess student capacity to demonstrate understanding through higher-order modeling and reasoning tasks. Provide time for peer and teacher feedback that support ongoing learning.
- Use technology to enhance student learning in ways that support curricular objectives and help students reach intended learning outcomes. Instructional technology can be used as a *teaching* tool to improve communication and presentation of ideas. Technology can also be used as a student *learning* tool where students engage in active learning and use the technology in ways that enrich the learning experience. Technology integration can be achieved by:
    - Incorporating the routine and transparent use of technology in daily lessons.
    - Using technology applications that engage students in modeling and reasoning tasks (examples include, Desmos.com, Kahoot.it, Padlet.com, graphing calculators, etc…)
    - Using technology as a tool to present and communicate ideas, research information, and formatively/summatively assess student learning.

Unit 6 Dividing and Building Expressions	
Career Readiness, Life Literacies, and Key Skills	**Interdisciplinary Connections**

Reference: http://www.p21.org/our-work/p21-framework
• Career Awareness and Planning
  ◦ An individual's strengths, lifestyle goals, choices, and interests affect employment and income.
  ◦ Communication skills and responsible behavior in addition to education, experience, certifications, and skills are all factors that affect employment and income.
• Creativity and Innovation
  ◦ Gathering and evaluating knowledge and information from a variety of sources, including global perspectives, fosters creativity and innovative thinking.
• Critical Thinking and Problem-solving
  ◦ Multiple solutions exist to solve a problem.
  ◦ An essential aspect of problem solving is being able to self-reflect on why possible solutions for solving problems were or were not successful.
• Digital Citizenship
  ◦ Digital communities are used by Individuals to share information, organize, and engage around issues and topics of interest.
  ◦ Digital technology and data can be leveraged by communities to address effects of climate change.
• Global and Cultural Awareness
  ◦ Awareness of and appreciation for cultural differences is critical to avoid barriers to productive and positive interaction.
• Information and Media Literacy
  ◦ Digital tools make it possible to analyze and interpret data, including text, images, and sound. These tools allow for broad concepts and data to be more effectively communicated.
  ◦ Sources of information are evaluated for accuracy and relevance when considering the use of information.
  ◦ There are ethical and unethical uses of information and media.
• Technology Literacy
  ○ Some digital tools are appropriate for gathering, organizing, analyzing, and presenting information, while other types of digital tools are appropriate for creating text, visualizations, models, and communicating with others.
	Connection to English Language Arts:
	Students are expected to develop viable arguments and to critique the reasoning of others. This performance expectation is present in ELA and math practice standards as well as NGSS science and engineering practices. Also, inherent in all three sets of standards is an expectation to research and communicate information and enduring understandings.
	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.
	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.W2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
	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.
	
	Connection to Technology:
	Students will use digital tools to explore, model, synthesize and evaluate mathematical concepts. Technology should enhance and enrich the learning experience and provide students with new and alternative ways to access mathematical content. (NJSLS Technology 8.1)

Instructional Technology Resources	
This is a place to capture examples of instructional technology strategies and resources. • Desmos • Kahoot • CPM Lesson Videos • 3-Act Lessons	

Unit 7 Ratios and Operations		
Content Standards	**Suggested Standards for Mathematical Practice**	**Critical Knowledge & Skills**
NJSLS.6.EE.2. Write, read, and evaluate expressions in which letters stand for numbers. • NJSLS.6.EE.2a. Write expressions that record operations with numbers and with letters standing for numbers. *For example, express the calculation "Subtract y from 5" as 5 – y.* NJSLS.6.EE.3. Apply the properties of operations to generate equivalent expressions. *For example, apply the distributive property to the expression 3(2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6(4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y.* NJSLS.6.EE.5. Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true. NJSLS.6.EE.6. Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. NJSLS.6.EE.7. Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q and x are all nonnegative rational numbers. NJSLS.6.EE.8. Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams. NJSLS.6.NS.1. Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments & 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.	Concepts – Students will understand: • Unit rates • Unit Conversion • Rates • How a common denominator works for fraction division • Make sense of multiplying by the reciprocal of the divisor ("invert and multiply") strategy for fraction division. • How the **Giant One** strategy works. • How fraction division connects to decimal division. • How ratios connect with fraction division. • Distributive Property • Parts of an expression • That the solution to an equation or inequality is(are) the value(s) for the variable which make the equation true Skills - Students are able to: • Compare rates that are not expressed as unit rates. • Convert ratios into different units in order to compare rates • Use tables and graphs to compare rates when numerical comparisons are cumbersome. • Calculate and compare unit rates by reading tables and graphs. • Analyze and apply the common denominator method of fraction division. • Use the multiplying by the reciprocal of the divisor ("invert and multiply") strategy for fraction division. • Divide fractions using a Giant One strategy. • Apply inverse operations to numbers and algebraic expressions in order to represent the steps in a math "magic trick." • Translate math steps into algebraic expressions and begin to explore the Distributive Property to create equivalent pictures and expressions. • Write expressions that record operations with numbers and letters. • Translate math steps into the Distributive Property. • Use the Distributive Property "in reverse." • Use mathematics terminology from previous lessons to identify parts of expressions.

Unit 7 Ratios and Operations		
Content Standards	**Suggested Standards for Mathematical Practice**	**Critical Knowledge & Skills**
visual fraction models and equations to represent the problem. *For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b) ÷ (c/d) = ad/bc.) How much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 3/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi?* NJSLS.6.NS.3. Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. NJSLS.6.RP.2. Understand the concept of a unit rate *a*/*b* associated with a ratio *a*:*b* with $b \neq 0$, and use rate language in the context of a ratio relationship. *For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar." "We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger."*(non complex fractions) NJSLS.6.RP.3. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. • NJSLS.6.RP.3a. Make tables of equivalent ratios relating quantities with whole number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios. NJSLS.6.RP.3b. Solve unit rate problems including those involving unit pricing and constant speed. *For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?*.		• Create equations and inequalities of the form $x + a = b$ and $x + a > b$ to represent real-world situations in which a value is unknown. • Understand that the solution to an equation or inequality is(are) the value(s) for the variable which make the equation true and will confirm this by testing values from a given set. • Informally solve equations and inequalities intuitively, representing solutions on a number line.

Unit 7 Ratios and Operations	
District/School Formative Assessment Plan	**District/School Summative Assessment Plan**
Formative assessment informs instruction and is ongoing throughout a unit to determine how students are progressing against the standards. The district identifies three areas of knowledge attainment that should be continually assessed: Assessing securely held knowledge: (previously held knowledge where mastery or near mastery is expected) • Targeted skill based anticipatory set • Short Diagnostic prior to new concepts Assessing developing knowledge: (recently learned knowledge where student has not achieved mastery and current instruction is building upon) • What Have I Learned Activity • Participation Quiz • Partner Quiz • Peer Check • Learning Log Assessing learning in progress: (knowledge that currently being learned and assessing where students are in that learning process) • Carousel-Station Rotation • Exit Slip Gallery Walk • Participation Quiz • Think-Pair-Share Alternative Assessments: • Tools I can Use Activity • Math Chat • Red Light, Green Light	*Summative assessment is an opportunity for students to demonstrate mastery of the skills taught during a particular unit.* • Chapter Quiz • Chapter Test • Common quarterly and/or unit exams *Benchmark assessments:* • Summarize Understanding Activity • Common Mid-Term assessments • Common Final assessments Alternative Assessments: • Portfolio Performance Based Tasks

Unit 7 Ratios and Operations

District Resources

District/school resources and supplementary resources that are texts as well as digital resources used to support the instruction.

- College Preparatory Mathematics program (primary)
- District developed lessons or mini-lessons
- District developed pre-assessments
- Technology integrated lesson activities

Enrichments and Supplements

Enrichments:

Ambassador	Dyad	Gallery Walk
Hot Seat	Math Chat	Peer Edit
Reciprocal Teaching	Silent Debate	Swap Meet
Traveling Salesman	Whiparound	

Supplements:

Ambassador	Around the World	Index Card Huddle
Dyad	Fishbowl	Fortune Cookie
Gallery Walk	Hot Potato	Hot Seat
Huddle	I Spy	Jigsaw
Listening Post	Math Chat	Numbered Heads
Pairs Check	Peer Edit	Reciprocal Teaching
Silent Debate	Swap Meet	Teammates Consult
Traveling Salesman	Tuning Protocol	Walk and Talk
Whip Around: I Have…Who Has…		

Instructional Activities

Comparing Rates
Comparing Rates with Tables and Graphs
Unit
Analyzing Strategies for Dividing Fractions
Another Strategy for Division
Division with Fractions and Decimals
Fraction Division as Ratios
Inverse Operations
Distributive Property
Distributive Property and Expressions Vocabulary
Writing Algebraic Equations and Inequalities

Recommended Instructional Strategies

This is a place to capture areas of standards integration and instructional best practices.

- Continually assess student progress through formative assessment and provide timely and relevant feedback. Formative Assessment strategies include:
  - Develop questions for each lesson that will provide information about ongoing student understanding and that allow you to provide valuable and useful feedback to students during the learning task.
  - Provide students with opportunities to revise their work products based on feedback received from their peers or teacher.
  - Ask questions that prompt student-to-student discussion. When working in groups direct questions to students who are less engaged.
  - Monitor collaborative work and discussions to collect evidence of student understandings and misconceptions.
  - Encourage students to provide constructive feedback on their peer's work products.
  - Identify when to provide immediate clarification to redirect discussions and when to allow for productive struggle. Decide when to provide clarification and address misconceptions during the lesson/activity.
- Provide a safe place to struggle. Students are more likely to engage and grapple with daily activities if they believe it will lead to their personal growth and progress. Productive struggle strategies include:

    - Students need to have a connection with their instructors, and students also need targeted feedback letting them know whether they are right or wrong. The classroom environment is a place where students can take risks and know that in order to attain mastery we must first work through our mistakes. Through this process students will develop perseverance and a deeper understanding of the material.
    - Create a classroom environment where students can take academic risks. Solicit multiple student responses to promote a positive exchange of ideas that result in a shared understanding. Refrain from immediate validation of student responses that hinder active student discussion.
    - Use mistakes and misconceptions that students express as a positive starting point for developing deeper understanding of a concept.
    - Plan for multiple opportunities for students to engage in productive struggle within a unit in order foster the development of perseverance and grit over time.
- Incorporate mixed-spaced practice into daily lessons and activities. A mixed practice schedule requires that students learn not only how to perform each procedure but also learn to strategically choose an approach for a variety of problem types. Spacing intrinsically ensures that the problems within each practice set include a mixture of different types and there are no more than a few practice problems of each kind within each practice set.
    - Systematically arrange practice problems throughout the lessons, chapters, and units so they are both distributed and mixed.
    - Prepare students to know not only how to solve each kind of problem but also which procedure was appropriate for each kind of problem.
    - Ensure that a majority of a practice set consists of securely held or developing knowledge. Practice problems that address learning in progress should never represent a majority of a practice set.
    - Students should achieve better understanding of the topic as subsequent lessons are taught; a mixed-spaced format provides opportunities to practice and assess these developing skills over the course of the chapter and unit.
- When planning lessons, prioritize core concepts, problems, and activities that best support learning in progress as students move through the instructional unit (lesson-section-chapter-unit).
    - Select standards-based activities and learning tasks that provide an introduction to concepts (launch), multiple representations (exploration), and practice and closure (summary).
    - Embedded within tasks and activities should be teacher led opportunities for demonstrations, guided practice, and individual/small-group instruction as needed.
- Use processes to develop and hone critical thinking skills in students. Critical thinking can de defined as the mental processes, strategies, and representations people use to solve problems, make decisions, and learn new concepts. Engage students in modeling and reasoning tasks that develop critical reasoning by:
    - Provide opportunity and support for meaningful student discussion during activities and tasks.
    - Plan for students to demonstrate understanding through both verbal and written forms.
    - Engage students in constructing viable arguments, critiquing the reasoning of others, and presenting explanatory presentations.
    - Engage students in modeling tasks that allow them to make assumptions and approximations, simplify complicated situations, identify and compare relationships, and use models as an approach to solve problems.
    - Continually assess student capacity to demonstrate understanding through higher-order modeling and reasoning tasks. Provide time for peer and teacher feedback that support ongoing learning.
- Use technology to enhance student learning in ways that support curricular objectives and help students reach intended learning outcomes. Instructional technology can be used as a *teaching* tool to improve communication and presentation of ideas. Technology can also be used as a student *learning* tool where students engage in active learning and use the technology in ways that enrich the learning experience. Technology integration can be achieved by:
    - Incorporating the routine and transparent use of technology in daily lessons.
    - Using technology applications that engage students in modeling and reasoning tasks (examples include, Desmos.com, Kahoot.it, Padlet.com, graphing calculators, etc…)
    - Using technology as a tool to present and communicate ideas, research information, and formatively/summatively assess student learning.

Unit 7 Ratios and Operations	
Career Readiness, Life Literacies, and Key Skills	**Interdisciplinary Connections**

Reference: http://www.p21.org/our-work/p21-framework
• Career Awareness and Planning
  ◦ An individual's strengths, lifestyle goals, choices, and interests affect employment and income.
  ◦ Communication skills and responsible behavior in addition to education, experience, certifications, and skills are all factors that affect employment and income.
• Creativity and Innovation
  ◦ Gathering and evaluating knowledge and information from a variety of sources, including global perspectives, fosters creativity and innovative thinking.
• Critical Thinking and Problem-solving
  ◦ Multiple solutions exist to solve a problem.
  ◦ An essential aspect of problem solving is being able to self-reflect on why possible solutions for solving problems were or were not successful.
• Digital Citizenship
  ◦ Digital communities are used by Individuals to share information, organize, and engage around issues and topics of interest.
  ◦ Digital technology and data can be leveraged by communities to address effects of climate change.
• Global and Cultural Awareness
  ◦ Awareness of and appreciation for cultural differences is critical to avoid barriers to productive and positive interaction.
• Information and Media Literacy
  ◦ Digital tools make it possible to analyze and interpret data, including text, images, and sound. These tools allow for broad concepts and data to be more effectively communicated.
  ◦ Sources of information are evaluated for accuracy and relevance when considering the use of information.
  ◦ There are ethical and unethical uses of information and media.
• Technology Literacy
  ○ Some digital tools are appropriate for gathering, organizing, analyzing, and presenting information, while other types of digital tools are appropriate for creating text, visualizations, models, and communicating with others.
	Connection to English Language Arts:
	Students are expected to develop viable arguments and to critique the reasoning of others. This performance expectation is present in ELA and math practice standards as well as NGSS science and engineering practices. Also, inherent in all three sets of standards is an expectation to research and communicate information and enduring understandings.
	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.
	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.W2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
	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.
	
	Connection to Technology:
	Students will use digital tools to explore, model, synthesize and evaluate mathematical concepts. Technology should enhance and enrich the learning experience and provide students with new and alternative ways to access mathematical content. (NJSLS Technology 8.1)

Instructional Technology Resources	
This is a place to capture examples of instructional technology strategies and resources. • Desmos • Kahoot • CPM Lesson Videos • 3-Act Lessons	

Unit 8 Statistics and Multiplication Equations		
Content Standards	**Suggested Standards for Mathematical Practice**	**Critical Knowledge & Skills**
NJSLS.6.EE.7. Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q and x are all nonnegative rational numbers. 6.EE.9. Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. *For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d = 65t to represent the relationship between distance and time.* NJSLS.6.SP.1. Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. *For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages.* NJSLS.6.SP.2. Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape. NJSLS.6.SP.3. Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number. NJSLS.6.SP.4. Display numerical data in plots on a number line, including dot plots, histograms, and box plots. NJSLS.6.SP.5. Summarize numerical data sets in relation to their context, such as by: • NJSLS.6.SP.5a. Reporting the number of observations. • NJSLS.6.SP.5b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. • NJSLS.6.SP.5c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. • NJSLS.6.SP.5d. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments & 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.	Concepts – Students will understand: • Measures of central Tendency: • Mean • Median • Mode • Mean Absolute deviation • Box Plots • That statistical questions can anticipate variability in the answers. • The relationship between distance, rate, and time. • Develop an understanding of the importance of units when comparing rates and when using rates to compute Skills - Students are able to: • Introduced to measures of central tendency and will develop methods to find the mean, median, and range of a set of data. • Develop the formula for the average distance from the mean in a set of data – the mean absolute deviation. • Construct and interpret box plots and compare sets of data. • Construct three different representations of a single set of data. They will then determine what kinds of information the representation communicates and decide which representation is most useful for answering a specific question. • Identify statistical questions. • Use variables to write and solve equations of the form $ax = b$. • Identify the relationship between distance, rate, and time and will use $d = rt$ to solve word problems.

Unit 8 Statistics and Multiplication Equations	
District/School Formative Assessment Plan	**District/School Summative Assessment Plan**
Formative assessment informs instruction and is ongoing throughout a unit to determine how students are progressing against the standards. The district identifies three areas of knowledge attainment that should be continually assessed: Assessing securely held knowledge: (previously held knowledge where mastery or near mastery is expected) • Targeted skill based anticipatory set • Short Diagnostic prior to new concepts Assessing developing knowledge: (recently learned knowledge where student has not achieved mastery and current instruction is building upon) • What Have I Learned Activity • Participation Quiz • Partner Quiz • Peer Check • Learning Log Assessing learning in progress: (knowledge that currently being learned and assessing where students are in that learning process) • Carousel-Station Rotation • Exit Slip Gallery Walk • Participation Quiz • Think-Pair-Share Alternative Assessments: • Tools I can Use Activity • Math Chat • Red Light, Green Light	*Summative assessment is an opportunity for students to demonstrate mastery of the skills taught during a particular unit.* • Chapter Quiz • Chapter Test • Common quarterly and/or unit exams *Benchmark assessments:* • Summarize Understanding Activity • Common Mid-Term assessments • Common Final assessments Alternative Assessments: • Portfolio Performance Based Tasks

Unit 8 Statistics and Multiplication Equations

District Resources

District/school resources and supplementary resources that are texts as well as digital resources used to support the instruction.

- College Preparatory Mathematics program (primary)
- District developed lessons or mini-lessons
- District developed pre-assessments
- Technology integrated lesson activities

Enrichments and Supplements

Enrichments:

Ambassador	Dyad	Gallery Walk
Hot Seat	Math Chat	Peer Edit
Reciprocal Teaching	Silent Debate	Swap Meet
Traveling Salesman	Whiparound	

Supplements:

Ambassador	Around the World	Index Card Huddle
Dyad	Fishbowl	Fortune Cookie
Gallery Walk	Hot Potato	Hot Seat
Huddle	I Spy	Jigsaw
Listening Post	Math Chat	Numbered Heads
Pairs Check	Peer Edit	Reciprocal Teaching
Silent Debate	Swap Meet	Teammates Consult
Traveling Salesman	Tuning Protocol	Walk and Talk
Whip Around: I Have…Who Has…		

Instructional Activities

Measures of Central Tendency
Choosing Mean or Median
Shape and Spread
Box Plots and Interquartile Range
Comparing and Choosing Representations
Statistical
Writing Multiplication Equations
Distance, Rate, and Time
Unit Conversion
Career Exploration Project on Statisticians

Recommended Instructional Strategies

This is a place to capture areas of standards integration and instructional best practices.

- Continually assess student progress through formative assessment and provide timely and relevant feedback. Formative Assessment strategies include:
  - Develop questions for each lesson that will provide information about ongoing student understanding and that allow you to provide valuable and useful feedback to students during the learning task.
  - Provide students with opportunities to revise their work products based on feedback received from their peers or teacher.
  - Ask questions that prompt student-to-student discussion. When working in groups direct questions to students who are less engaged.
  - Monitor collaborative work and discussions to collect evidence of student understandings and misconceptions.
  - Encourage students to provide constructive feedback on their peer's work products.
  - Identify when to provide immediate clarification to redirect discussions and when to allow for productive struggle. Decide when to provide clarification and address misconceptions during the lesson/activity.
- Provide a safe place to struggle. Students are more likely to engage and grapple with daily activities if they believe it will lead to their personal growth and progress. Productive struggle strategies include:

    - Students need to have a connection with their instructors, and students also need targeted feedback letting them know whether they are right or wrong. The classroom environment is a place where students can take risks and know that in order to attain mastery we must first work through our mistakes. Through this process students will develop perseverance and a deeper understanding of the material.
    - Create a classroom environment where students can take academic risks. Solicit multiple student responses to promote a positive exchange of ideas that result in a shared understanding. Refrain from immediate validation of student responses that hinder active student discussion.
    - Use mistakes and misconceptions that students express as a positive starting point for developing deeper understanding of a concept.
    - Plan for multiple opportunities for students to engage in productive struggle within a unit in order foster the development of perseverance and grit over time.
- Incorporate mixed-spaced practice into daily lessons and activities. A mixed practice schedule requires that students learn not only how to perform each procedure but also learn to strategically choose an approach for a variety of problem types. Spacing intrinsically ensures that the problems within each practice set include a mixture of different types and there are no more than a few practice problems of each kind within each practice set.
    - Systematically arrange practice problems throughout the lessons, chapters, and units so they are both distributed and mixed.
    - Prepare students to know not only how to solve each kind of problem but also which procedure was appropriate for each kind of problem.
    - Ensure that a majority of a practice set consists of securely held or developing knowledge. Practice problems that address learning in progress should never represent a majority of a practice set.
    - Students should achieve better understanding of the topic as subsequent lessons are taught; a mixed-spaced format provides opportunities to practice and assess these developing skills over the course of the chapter and unit.
- When planning lessons, prioritize core concepts, problems, and activities that best support learning in progress as students move through the instructional unit (lesson-section-chapter-unit).
    - Select standards-based activities and learning tasks that provide an introduction to concepts (launch), multiple representations (exploration), and practice and closure (summary).
    - Embedded within tasks and activities should be teacher led opportunities for demonstrations, guided practice, and individual/small-group instruction as needed.
- Use processes to develop and hone critical thinking skills in students. Critical thinking can de defined as the mental processes, strategies, and representations people use to solve problems, make decisions, and learn new concepts. Engage students in modeling and reasoning tasks that develop critical reasoning by:
    - Provide opportunity and support for meaningful student discussion during activities and tasks.
    - Plan for students to demonstrate understanding through both verbal and written forms.
    - Engage students in constructing viable arguments, critiquing the reasoning of others, and presenting explanatory presentations.
    - Engage students in modeling tasks that allow them to make assumptions and approximations, simplify complicated situations, identify and compare relationships, and use models as an approach to solve problems.
    - Continually assess student capacity to demonstrate understanding through higher-order modeling and reasoning tasks. Provide time for peer and teacher feedback that support ongoing learning.
- Use technology to enhance student learning in ways that support curricular objectives and help students reach intended learning outcomes. Instructional technology can be used as a *teaching* tool to improve communication and presentation of ideas. Technology can also be used as a student *learning* tool where students engage in active learning and use the technology in ways that enrich the learning experience. Technology integration can be achieved by:
    - Incorporating the routine and transparent use of technology in daily lessons.
    - Using technology applications that engage students in modeling and reasoning tasks (examples include, Desmos.com, Kahoot.it, Padlet.com, graphing calculators, etc…)
    - Using technology as a tool to present and communicate ideas, research information, and formatively/summatively assess student learning.

Unit 8 Statistics and Multiplication Equations	
Career Readiness, Life Literacies, and Key Skills	**Interdisciplinary Connections**

Reference: http://www.p21.org/our-work/p21-framework
• Career Awareness and Planning
  ◦ An individual's strengths, lifestyle goals, choices, and interests affect employment and income.
  ◦ Communication skills and responsible behavior in addition to education, experience, certifications, and skills are all factors that affect employment and income.
• Creativity and Innovation
  ◦ Gathering and evaluating knowledge and information from a variety of sources, including global perspectives, fosters creativity and innovative thinking.
• Critical Thinking and Problem-solving
  ◦ Multiple solutions exist to solve a problem.
  ◦ An essential aspect of problem solving is being able to self-reflect on why possible solutions for solving problems were or were not successful.
• Digital Citizenship
  ◦ Digital communities are used by Individuals to share information, organize, and engage around issues and topics of interest.
  ◦ Digital technology and data can be leveraged by communities to address effects of climate change.
• Global and Cultural Awareness
  ◦ Awareness of and appreciation for cultural differences is critical to avoid barriers to productive and positive interaction.
• Information and Media Literacy
  ◦ Digital tools make it possible to analyze and interpret data, including text, images, and sound. These tools allow for broad concepts and data to be more effectively communicated.
  ◦ Sources of information are evaluated for accuracy and relevance when considering the use of information.
  ◦ There are ethical and unethical uses of information and media.
• Technology Literacy
  ○ Some digital tools are appropriate for gathering, organizing, analyzing, and presenting information, while other types of digital tools are appropriate for creating text, visualizations, models, and communicating with others.
	Connection to English Language Arts:
	Students are expected to develop viable arguments and to critique the reasoning of others. This performance expectation is present in ELA and math practice standards as well as NGSS science and engineering practices. Also, inherent in all three sets of standards is an expectation to research and communicate information and enduring understandings.
	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.
	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.W2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
	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.
	
	Connection to Technology:
	Students will use digital tools to explore, model, synthesize and evaluate mathematical concepts. Technology should enhance and enrich the learning experience and provide students with new and alternative ways to access mathematical content. (NJSLS Technology 8.1)

Instructional Technology Resources	
This is a place to capture examples of instructional technology strategies and resources. • Desmos • Kahoot • CPM Lesson Videos • 3-Act Lessons	

Unit 9 Volumes and Percents		
Content Standards	**Suggested Standards for Mathematical Practice**	**Critical Knowledge & Skills**
NJSLS.6.G.2. Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = l\ w\ h$ and $V = b\ h$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems. NJSLS.6.G.4. Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems. NJSLS.6.RP.3. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. • NJSLS.6.RP.3c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments & 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.	Concepts – Students will understand: • 3 dimensions of objects and their volume • Nets • Surface area • Percents • Relationship between ratios and percents • Multiplicative growth • Discounts • Skills - Students are able to: • Calculate the volume of right rectangular prisms as area of the base multiplied by the height. • Create nets for three-dimensional shapes and will predict the appearance of three-dimensional shapes starting from nets. • Calculate surface area of shapes made with rectangles and triangles. • Represent ratios as percents and apply them in multiplicative growth situations. • Determine parts, wholes, and percentages given different information. • Calculate percent discounts and sale prices. • Continue to develop strategies for calculating percents without a calculator.

Unit 9 Volumes and Percents	
District/School Formative Assessment Plan	**District/School Summative Assessment Plan**
Formative assessment informs instruction and is ongoing throughout a unit to determine how students are progressing against the standards. The district identifies three areas of knowledge attainment that should be continually assessed: Assessing securely held knowledge: (previously held knowledge where mastery or near mastery is expected) • Targeted skill based anticipatory set • Short Diagnostic prior to new concepts Assessing developing knowledge: (recently learned knowledge where student has not achieved mastery and current instruction is building upon) • What Have I Learned Activity • Participation Quiz • Partner Quiz • Peer Check • Learning Log Assessing learning in progress: (knowledge that currently being learned and assessing where students are in that learning process) • Carousel-Station Rotation • Exit Slip Gallery Walk • Participation Quiz • Think-Pair-Share Alternative Assessments: • Tools I can Use Activity • Math Chat • Red Light, Green Light	*Summative assessment is an opportunity for students to demonstrate mastery of the skills taught during a particular unit.* • Chapter Quiz • Chapter Test • Common quarterly and/or unit exams *Benchmark assessments:* • Summarize Understanding Activity • Common Mid-Term assessments • Common Final assessments Alternative Assessments: • Portfolio Performance Based Tasks

Unit 9 Volumes and Percents

District Resources

District/school resources and supplementary resources that are texts as well as digital resources used to support the instruction.

- College Preparatory Mathematics program (primary)
- District developed lessons or mini-lessons
- District developed pre-assessments
- Technology integrated lesson activities

Enrichments and Supplements

Enrichments:

Ambassador	Dyad	Gallery Walk
Hot Seat	Math Chat	Peer Edit
Reciprocal Teaching	Silent Debate	Swap Meet
Traveling Salesman	Whiparound	

Supplements:

Ambassador	Around the World	Index Card Huddle
Dyad	Fishbowl	Fortune Cookie
Gallery Walk	Hot Potato	Hot Seat
Huddle	I Spy	Jigsaw
Listening Post	Math Chat	Numbered Heads
Pairs Check	Peer Edit	Reciprocal Teaching
Silent Debate	Swap Meet	Teammates Consult
Traveling Salesman	Tuning Protocol	Walk and Talk
Whip Around: I Have…Who Has…		

Instructional Activities

Volume of a Rectangular Prism
Nets and Surface Area
Multiplicative Growth and Percents
Composition and Decomposition of Percents
Percent Discounts
Simple Interest and Tips
A Culminating Portions Challenge
Representing and Predicting Patterns
Analyzing Data to Identify a Trend

Recommended Instructional Strategies

This is a place to capture areas of standards integration and instructional best practices.

- Continually assess student progress through formative assessment and provide timely and relevant feedback. Formative Assessment strategies include:
  - Develop questions for each lesson that will provide information about ongoing student understanding and that allow you to provide valuable and useful feedback to students during the learning task.
  - Provide students with opportunities to revise their work products based on feedback received from their peers or teacher.
  - Ask questions that prompt student-to-student discussion. When working in groups direct questions to students who are less engaged.
  - Monitor collaborative work and discussions to collect evidence of student understandings and misconceptions.
  - Encourage students to provide constructive feedback on their peer's work products.
  - Identify when to provide immediate clarification to redirect discussions and when to allow for productive struggle. Decide when to provide clarification and address misconceptions during the lesson/activity.
- Provide a safe place to struggle. Students are more likely to engage and grapple with daily activities if they believe it will lead to their personal growth and progress. Productive struggle strategies include:

    - Students need to have a connection with their instructors, and students also need targeted feedback letting them know whether they are right or wrong. The classroom environment is a place where students can take risks and know that in order to attain mastery we must first work through our mistakes. Through this process students will develop perseverance and a deeper understanding of the material.
    - Create a classroom environment where students can take academic risks. Solicit multiple student responses to promote a positive exchange of ideas that result in a shared understanding. Refrain from immediate validation of student responses that hinder active student discussion.
    - Use mistakes and misconceptions that students express as a positive starting point for developing deeper understanding of a concept.
    - Plan for multiple opportunities for students to engage in productive struggle within a unit in order foster the development of perseverance and grit over time.
- Incorporate mixed-spaced practice into daily lessons and activities. A mixed practice schedule requires that students learn not only how to perform each procedure but also learn to strategically choose an approach for a variety of problem types. Spacing intrinsically ensures that the problems within each practice set include a mixture of different types and there are no more than a few practice problems of each kind within each practice set.
    - Systematically arrange practice problems throughout the lessons, chapters, and units so they are both distributed and mixed.
    - Prepare students to know not only how to solve each kind of problem but also which procedure was appropriate for each kind of problem.
    - Ensure that a majority of a practice set consists of securely held or developing knowledge. Practice problems that address learning in progress should never represent a majority of a practice set.
    - Students should achieve better understanding of the topic as subsequent lessons are taught; a mixed-spaced format provides opportunities to practice and assess these developing skills over the course of the chapter and unit.
- When planning lessons, prioritize core concepts, problems, and activities that best support learning in progress as students move through the instructional unit (lesson-section-chapter-unit).
    - Select standards-based activities and learning tasks that provide an introduction to concepts (launch), multiple representations (exploration), and practice and closure (summary).
    - Embedded within tasks and activities should be teacher led opportunities for demonstrations, guided practice, and individual/small-group instruction as needed.
- Use processes to develop and hone critical thinking skills in students. Critical thinking can de defined as the mental processes, strategies, and representations people use to solve problems, make decisions, and learn new concepts. Engage students in modeling and reasoning tasks that develop critical reasoning by:
    - Provide opportunity and support for meaningful student discussion during activities and tasks.
    - Plan for students to demonstrate understanding through both verbal and written forms.
    - Engage students in constructing viable arguments, critiquing the reasoning of others, and presenting explanatory presentations.
    - Engage students in modeling tasks that allow them to make assumptions and approximations, simplify complicated situations, identify and compare relationships, and use models as an approach to solve problems.
    - Continually assess student capacity to demonstrate understanding through higher-order modeling and reasoning tasks. Provide time for peer and teacher feedback that support ongoing learning.
- Use technology to enhance student learning in ways that support curricular objectives and help students reach intended learning outcomes. Instructional technology can be used as a *teaching* tool to improve communication and presentation of ideas. Technology can also be used as a student *learning* tool where students engage in active learning and use the technology in ways that enrich the learning experience. Technology integration can be achieved by:
    - Incorporating the routine and transparent use of technology in daily lessons.
    - Using technology applications that engage students in modeling and reasoning tasks (examples include, Desmos.com, Kahoot.it, Padlet.com, graphing calculators, etc…)
    - Using technology as a tool to present and communicate ideas, research information, and formatively/summatively assess student learning.

Unit 9 Volumes and Percents	
Career Readiness, Life Literacies, and Key Skills	**Interdisciplinary Connections**

Reference: http://www.p21.org/our-work/p21-framework
• Career Awareness and Planning
  ◦ An individual's strengths, lifestyle goals, choices, and interests affect employment and income.
  ◦ Communication skills and responsible behavior in addition to education, experience, certifications, and skills are all factors that affect employment and income.
• Creativity and Innovation
  ◦ Gathering and evaluating knowledge and information from a variety of sources, including global perspectives, fosters creativity and innovative thinking.
• Critical Thinking and Problem-solving
  ◦ Multiple solutions exist to solve a problem.
  ◦ An essential aspect of problem solving is being able to self-reflect on why possible solutions for solving problems were or were not successful.
• Digital Citizenship
  ◦ Digital communities are used by Individuals to share information, organize, and engage around issues and topics of interest.
  ◦ Digital technology and data can be leveraged by communities to address effects of climate change.
• Global and Cultural Awareness
  ◦ Awareness of and appreciation for cultural differences is critical to avoid barriers to productive and positive interaction.
• Information and Media Literacy
  ◦ Digital tools make it possible to analyze and interpret data, including text, images, and sound. These tools allow for broad concepts and data to be more effectively communicated.
  ◦ Sources of information are evaluated for accuracy and relevance when considering the use of information.
  ◦ There are ethical and unethical uses of information and media.
• Technology Literacy
  ○ Some digital tools are appropriate for gathering, organizing, analyzing, and presenting information, while other types of digital tools are appropriate for creating text, visualizations, models, and communicating with others.
	Connection to English Language Arts:
	Students are expected to develop viable arguments and to critique the reasoning of others. This performance expectation is present in ELA and math practice standards as well as NGSS science and engineering practices. Also, inherent in all three sets of standards is an expectation to research and communicate information and enduring understandings.
	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.
	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.W2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
	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.
	
	Connection to Technology:
	Students will use digital tools to explore, model, synthesize and evaluate mathematical concepts. Technology should enhance and enrich the learning experience and provide students with new and alternative ways to access mathematical content. (NJSLS Technology 8.1)

Instructional Technology Resources	
This is a place to capture examples of instructional technology strategies and resources. • Desmos • Kahoot • CPM Lesson Videos • 3-Act Lessons	

Interdisciplinary Standards Implementation Matrix

Career Readiness, Life Literacies, and Key Skills

- Career Awareness and Planning
  - An individual's strengths, lifestyle goals, choices, and interests affect employment and income.
  - Communication skills and responsible behavior in addition to education, experience, certifications, and skills are all factors that affect employment and income.
- Creativity and Innovation
  - Gathering and evaluating knowledge and information from a variety of sources, including global perspectives, fosters creativity and innovative thinking.
- Critical Thinking and Problem-solving
  - Multiple solutions exist to solve a problem.
  - An essential aspect of problem solving is being able to self-reflect on why possible solutions for solving problems were or were not successful.
- Digital Citizenship
  - Digital communities are used by Individuals to share information, organize, and engage around issues and topics of interest.
  - Digital technology and data can be leveraged by communities to address effects of climate change.
- Global and Cultural Awareness
  - Awareness of and appreciation for cultural differences is critical to avoid barriers to productive and positive interaction.
- Information and Media Literacy
  - Digital tools make it possible to analyze and interpret data, including text, images, and sound. These tools allow for broad concepts and data to be more effectively communicated.
  - Sources of information are evaluated for accuracy and relevance when considering the use of information.
  - There are ethical and unethical uses of information and media.
- Technology Literacy
  - Some digital tools are appropriate for gathering, organizing, analyzing, and presenting information, while other types of digital tools are appropriate for creating text, visualizations, models, and communicating with others.

These skills are applied throughout the course. For example in:

- 9.1.8.FI.4 is utilized in Unit 7 during the Comparing Rates with Tables and Graphs activity.
- 9.2.8.CAP.1, 12, and 19 is utilized in Unit 8 during the Career Exploration Project on Statisticians.
- 9.4.8.TL.2 is utilized in Unit 5, students use ratios and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.
- 9.4.8.IML.8 is utilized in Unit 8, students recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. *For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages.*

Connection to Technology:

8.1 Computer Science and Design Thinking

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

This standard is applied throughout the course. For example in:

- Unit 4, students use technology to explore rescaling
- Unit 8, students use technology to collect, represent and statistically evaluate data.

Connection to English Language Arts:

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.

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.W2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

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.

Students are expected to develop viable arguments and to critique the reasoning of others. This performance expectation is present in ELA and math practice standards as well as NGSS science and engineering practices. Also, inherent in all three sets of standards is an expectation to research and communicate information and enduring understandings. For example in:

These skills are applied throughout the course. For example in:

- Unit 3, students use the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. *For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."*
- Unit 7, students interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b) ÷ (c/d) = ad/bc.) How much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 3/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi?*

Connection to Science:

Science & Engineering Practices:

SEP 2. Developing and using models
SEP 5. Using mathematics and computational thinking
SEP 7. Engaging in argument from evidence
SEP 8. Obtaining, evaluating, and communicating information

Many of the mathematical practices and the science and engineering practices of Next Generation Science Standards (NGSS) are interrelated. Specifically, the practices of developing and using mathematical models, computational thinking, and strategic use of mathematical tools. For example in:

These skills are applied throughout the course. For example in:

- Unit 1, Display numerical data in plots on a number line, including dot plots, histograms, and box plots.
- Unit 8, students summarize numerical data sets in relation to their context, such as by:
  - Reporting the number of observations.
  - Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
  - Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.
  - Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered. Summarize numerical data sets in relation to their context, such as by:
  - Reporting the number of observations.
  - Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.

- Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.
- Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.

LGBT and Disabilities Law: In Unit 1 the Mathematicians Report Project has students explore the contributions of Mathematicians from varying minorities including those who are LGBTQ and have disabilities