

Eagleswood Township Elementary School District

Grade: 6	Content Area: Mathematics
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Standard Alignment September 2017	NJDOE Adoption Date September 2017
Revise December 2021	ETESD BOE Approved 1/2021

***Suggested Pacing Guide***

Unit	Unit Length
<b>Unit 1: Ratio</b>	<b>25 Days</b>
<b>Unit 2 Number and Operations in Base Ten</b>	<b>50 Days</b>
<b>Unit 3 Expressions and Equations</b>	<b>50 Days</b>
<b>Unit 4 Geometry</b>	<b>25 Days</b>
<b>Unit 5 Unit 5: Statistics and Probability</b>	<b>25 Days</b>

## Grade 6 Overview

### **Ratios and Proportional Relationships**

- Understand ratio concepts and use ratio reasoning to solve problems.

### **The Number System**

- Apply and extend previous understandings of multiplication and division to divide fractions by fractions.
- Compute fluently with multi-digit numbers and find common factors and multiples.
- Apply and extend previous understandings of numbers to the system of rational numbers.

### **Expressions and Equations**

- Apply and extend previous understandings of arithmetic to algebraic expressions.
- Reason about and solve one-variable equations and inequalities.
- Represent and analyze quantitative relationships between dependent and independent variables.

### **Geometry**

- Solve real-world and mathematical problems involving area, surface area, and volume.

### **Statistics and Probability**

- Develop understanding of statistical variability.
- Summarize and describe distributions.

## **Mathematical Practices**

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

<b>Unit 1: Ratio</b>	<b>Duration: 25 Days</b>
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<b><u>Career Readiness, Life Literacies, and Key Skills Practices</u></b>	
Act as a responsible and contributing community members and employee.	Students understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others. They are conscientious of the impacts of their decisions on others and the environment around them. They think about the near-term and long-term consequences of their actions and seek to act in ways that contribute to the betterment of their teams, families, community and workplace. They are reliable and consistent in going beyond the minimum expectation and in participating in activities that serve the greater good.

<p>Consider the environmental, social and economic impacts of decisions.</p>	<p>Students understand the interrelated nature of their actions and regularly make decisions that positively impact and/or mitigate negative impact on other people, organization, and the environment. They are aware of and utilize new technologies, understandings, procedures, materials, and regulations affecting the nature of their work as it relates to the impact on the social condition, the environment and the profitability of the organization.</p>
<p>Demonstrate creativity and innovation.</p>	<p>Students regularly think of ideas that solve problems in new and different ways, and they contribute those ideas in a useful and productive manner to improve their organization. They can consider unconventional ideas and suggestions as solutions to issues, tasks or problems, and they discern which ideas and suggestions will add greatest value. They seek new methods, practices, and ideas from a variety of sources and seek to apply those ideas to their own workplace. They take action on their ideas and understand how to bring innovation to an organization.</p>
<p>Utilize critical thinking to make sense of problems and persevere in solving them.</p>	<p>Students readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of problems when they occur and take action quickly to address the problem; they thoughtfully investigate the root cause of the problem prior to introducing solutions. They carefully consider the options to solve the problem. Once a solution is agreed upon, they follow through to ensure the problem is solved, whether through their own actions or the actions of others.</p>
<p>Model integrity, ethical leadership and effective management.</p>	<p>Students consistently act in ways that align personal and community-held ideals and principles while employing strategies to positively influence others in the workplace. They have a clear understanding of integrity and act on this understanding in every decision. They use a variety of means to positively impact the directions and actions of a team or organization, and they apply insights into human behavior to change others' action, attitudes and/or beliefs. They recognize the</p>

	near-term and long-term effects that management's actions and attitudes can have on productivity, morals and organizational culture.
Plan education and career paths aligned to personal goals.	Students take personal ownership of their own education and career goals, and they regularly act on a plan to attain these goals. They understand their own career interests, preferences, goals, and requirements. They have perspective regarding the pathways available to them and the time, effort, experience and other requirements to pursue each, including a path of entrepreneurship. They recognize the value of each step in the education and experiential process, and they recognize that nearly all career paths require ongoing education and experience. They seek counselors, mentors, and other experts to assist in the planning and execution of career and personal goals.
Use technology to enhance productivity, increase collaboration and communicate effectively.	Students find and maximize the productive value of existing and new technology to accomplish workplace tasks and solve workplace problems. They are flexible and adaptive in acquiring new technology. They are proficient with ubiquitous technology applications. They understand the inherent risks-personal and organizational-of technology applications, and they take actions to prevent or mitigate these risks.
Work productively in teams while using cultural/global competence.	Students positively contribute to every team, whether formal or informal. They apply an awareness of cultural difference to avoid barriers to productive and positive interaction. They find ways to increase the engagement and contribution of all team members. They plan and facilitate effective team meetings.

**Career Readiness, Life Literacies, and Key Skills**  
**Addressed In This Unit**

9.1.8.CR.2: Compare various ways to give back through strengths, passions, goals, and other personal factors.

9.1.8.CR.3: Relate the importance of consumer, business, and government responsibility to the economy and personal finance

9.1.8.FP.1: Describe the impact of personal values on various financial scenarios.

9.1.8.FP.6: Compare and contrast advertising messages to understand what they are trying to accomplish.

9.1.8.PB.3: Explain how to create budget that aligns with financial goals.

9.2.8.CAP.2: Develop a plan that includes information about career areas of interest.

9.2.8.CAP.12: Assess personal strengths, talents, values, and interests to appropriate jobs and careers to maximize career potential.

9.2.8.CAP.14: Evaluate sources of income and alternative resources to accurately compare employment options.

9.4.8.CI.4: Explore the role of creativity and innovation in career pathways and industries

9.4.8.CT.2: Develop multiple solutions to a problem and evaluate short- and long-term effects to determine the most plausible option (e.g., MS-ETS1-4, 6.1.8.CivicsDP.1).

9.4.8.DC.4: Explain how information shared digitally is public and can be searched, copied, and potentially seen by public audiences.

9.4.8.DC.5: Manage digital identity and practice positive online behavior to avoid inappropriate forms of self-disclosure.

9.4.8.GCA.2: Demonstrate openness to diverse ideas and perspectives through active discussions to achieve a group goal.

9.4.8.IML.4: Ask insightful questions to organize different types of data and create meaningful visualizations.

9.4.8.IML.5: Analyze and interpret local or public data sets to summarize and effectively communicate the data.

9.4.8.IML.12: Use relevant tools to produce, publish, and deliver information supported with evidence for an authentic audience.

9.4.8.TL.3: Select appropriate tools to organize and present information digitally.

9.4.8.TL.6: Collaborate to develop and publish work that provides perspectives on a real-world problem

## **Computer Science and Design Thinking**

### ***Computing Systems***

#### ***By the end of grade 8***

The study of human computer interaction can improve the design of devices and extend the abilities of humans.

Software and hardware determine a computing system's capability to store and process information. The design or selection of a computing system involves multiple considerations and potential trade-offs.

Troubleshooting a problem is more effective when knowledge of the specific device along with a systematic process is used to identify the source of a problem.

### ***Networks and the Internet***

Protocols, packets and addressing are the key components for reliable delivery of information across networks.

The information sent and received across networks can be protected from unauthorized access and modification in a variety of ways.

The evolution of malware leads to understanding the key security measures and best practices needed to proactively address the threat to digital data.

### ***Impacts of Computing***

Advancements in computing technology can change individuals' behaviors.

Society is faced with tradeoffs due to the increasing globalization and automation that computing brings

### ***Data & Analysis***

People use digital devices and tools to automate the collection, use, and transformation of data..

The manner in which data is collected and transformed is influenced by the type of digital device(s) available and the intended use of the data.

Data is represented in many formats. Software tools translate the low-level representation of bits into a form understandable by individuals. Data is organized and accessible based on the application used to store it.

The purpose of cleaning data is to remove errors and make it easier for computers to process.

Computer models can be used to simulate events, examine theories and inferences, or make predictions.

### ***Algorithms & Programming***

Individuals design algorithms that are reusable in many situations.

Algorithms that are readable are easier to follow, test, and debug.

Programmers create variables to store data values of different types and perform appropriate operations on their values.

Control structures are selected and combined in programs to solve more complex problems.

Programs use procedures to organize code and hide implementation details. Procedures can be repurposed in new programs. Defining parameters for procedures can generalize behavior and increase reusability.

Individuals design and test solutions to identify problems taking into consideration the diverse needs of the users and the community.

### ***Engineering Design***

Engineering design is a systematic, creative and iterative process used to address local and global problems.

The process includes generating ideas, choosing the best solution, and making, testing, and redesigning models or prototypes.

Engineering design requirements and specifications involve making trade-offs between competing requirements and desired design features.

### ***Interaction of Technology and Humans***

Economic, political, social, and cultural aspects of society drive development of new technological products, processes, and systems.

Technology interacts with society, sometimes bringing about changes in a society's economy, politics, and culture, and often leading to the creation of new needs and wants.

New needs and wants may create strains on local economies and workforces.

Improvements in technology are intended to make the completion of tasks easier, safer, and/or more efficient.

### ***Nature of Technology***

Technology advances through the processes of innovation and invention which relies upon the imaginative and inventive nature of people.

Sometimes a technology developed for one purpose is adapted to serve other purposes.

Engineers use a systematic process of creating or modifying technologies that is fueled and constrained by physical laws,

cultural norms, and economic resources. Scientists use systematic investigation to understand the natural world.

***Effects of Technology on the Natural World***

Resources need to be utilized wisely to have positive effects on the environment and society.

Some technological decisions involve trade-offs between environmental and economic needs, while others have positive effects for both the economy and environment.

**Ethics & Culture**

Technological disparities have consequences for public health and prosperity

**Correlation Key**

Holocaust

Amistad

Financial Literacy

**Unit 1: Ratio**

**Duration: 25 Days**

**NJ Student Learning Standard: 6.RP**

**Unit Summary**

- Understand ratio concepts and use ratio reasoning to solve problems

**Unit Summary:** Students use reasoning about multiplication and division to solve ratio and rate problems about quantities. By viewing equivalent ratios and rates as deriving from, and extending, pairs of rows (or columns) in the multiplication table, and by analyzing simple drawings that indicate the relative size of quantities, students connect their understanding of multiplication and division with ratios and rates. Thus, students expand the scope of problems for which they can use multiplication and division to solve problems, and they connect ratios and fractions. Students solve a wide variety of problems involving ratios and rates.

<b>NJ Student Learning Standards</b>	
<b>6.RP.A.1</b>	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."
<b>6.RP.A.2</b>	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." <sup>1</sup>
<b>6.R.P.A.3</b>	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.
<b>6.R.P.A.3a</b>	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.
<b>6.R.P.3b</b>	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?
<b>6.RP.A.3c</b>	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.
<b>6.RP.A.3d</b>	Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.
<b>NJ Student Learning Standards for Introduction</b>	
<b>7.RP.A.1</b>	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. For example, if a person walks $1/2$ mile in each $1/4$ hour, compute the unit rate as the complex fraction $1/2/1/4$ miles per hour, equivalently 2 miles per hour.
<b>7.Rp.A.2.B</b>	Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
<b>Interdisciplinary Skills</b>	

<b>SL.6.1.B</b>	Follow rules for collegial discussions, set specific goals and deadlines, and define individual roles as needed.	
	<b>Computer Science and Design Thinking</b>	
<b>8.1.8.CS.1</b>	Recommend improvements to computing devices in order to improve the ways users interact with the devices	
<b>8.1.8.CS4</b>	Systematically apply troubleshooting strategies to identify and resolve hardware and software problems in computing systems.	
<b>8.1.8.DA.1</b>	Organize and transform data collected using computational tools to make it usable for a specific purpose.	
<b>8.1.8.DA.3</b>	Identify the appropriate tool to access data based on its file format.	
<b>8.2.8.ITH.2</b>	Compare how technologies have influenced society over time	
<b>Essential Understandings</b>		<b>Essential Questions</b>
<p><b><i>Students will understand that...</i></b></p> <ul style="list-style-type: none"> <li>• A ratio is a special relationship between two quantities where for every x units of one quantity there are y units of another <ul style="list-style-type: none"> <li>• In a proportional relationship there are an infinite number of ratios equal to the lowest terms or constant ratio. Equal ratios can be found by multiplying both terms by the same non-zero number.</li> <li>• A unit rate is a rate that compares a quantity to one unit of another quantity.</li> <li>• A formula is a common relationship between quantities expressed as an equation. <ul style="list-style-type: none"> <li>• A special proportional relationship involves distance (d), rate (r), and time (t). The formula showing this relationship is <math>d = r \times t</math>.</li> <li>• Rates are easily compared when each is expressed as a unit rate.</li> </ul> </li> </ul> </li> </ul>		<ul style="list-style-type: none"> <li>• What are ratios and rates, and how are they used in solving problems? <ul style="list-style-type: none"> <li>• What is a proportion, and what role does a ratio play in a proportion? <ul style="list-style-type: none"> <li>• How can you use ratios to express relationships and solve problems?</li> <li>• How can you use ratio reasoning to solve percent problems?</li> <li>• How can you use measurements to help you describe and compare objects?</li> </ul> </li> </ul> </li> </ul>

<b>Evidence of Student Learning</b>	
<b>Performance Tasks:</b> Activities to provide evidence for student learning of content and cognitive skills.	<b>Other Assessments</b>
	<p><b>Formative Assessments</b></p> <ul style="list-style-type: none"> <li>● Oral Questioning</li> <li>● Choral Response</li> <li>● Partners</li> <li>● Student Conference</li> <li>● Self-Assessment</li> <li>● Think-Pair-Share</li> <li>● Hand Signals</li> <li>● Peer Reflection</li> <li>● Graphic Organizers</li> <li>● Constructive Response</li> <li>● Teacher Observation Exit Card Tickets</li> <li>● Class work</li> </ul> <p><b>Summative Assessments</b></p> <ul style="list-style-type: none"> <li>● Chapter Tests</li> <li>● Quizzes</li> <li>● Projects Alternative</li> <li>● Assessments</li> <li>● Standardized Tests</li> <li>● Modifications</li> </ul>

	<p><b>Benchmark Assessment</b></p> <ul style="list-style-type: none"> <li>● GoMath Benchmark Assessment</li> </ul> <p><b>Alternative Assessments</b></p> <ul style="list-style-type: none"> <li>● Untimed Fact Practice Assessment</li> <li>● Manipulative Driven Assessment</li> <li>● Modified/Teacher Created Chapter Tests</li> <li>● Modified/Teacher Created Mid-Chapter Quiz</li> <li>● Visual Representation of Skills Assess</li> <li>● Modified Classwork Assignments</li> <li>● Modified Benchmarks</li> <li>● GoMath Reteach Activities and Worksheets</li> <li>● Project Based Assessments with Scoring Rubric</li> <li>●</li> </ul>
<b>Vocabulary</b>	
Ratio, Pattern, Rate, Unit Rate, Equivalent Ratio, Equivalent Fractions, Numerator, Denominator, Cooperative Grouping, Rephrase, Rate, Unit Rate, Coordinate Plane, Ordered Pair, X Coordinate, Y Coordinate, Percent, Simplify, Conversion, Factor, Length, Meter, Capacity, Gallon, Liter, Pint, Quart, Gram, Mass, Ounce, Pound, Ton, Weight	
<b>Knowledge and Skills</b>	
<b>Content</b>	<b>Skills</b>
<ul style="list-style-type: none"> <li>● Understand ratio concepts and use ratio reasoning to solve problems</li> </ul> <p>Students will know....</p>	<p>Students will be able to ...</p> <ul style="list-style-type: none"> <li>● Model ratios</li> <li>● Write ratios and rates</li> <li>● Use a multiplication table to find equivalent ratios</li> </ul>

<ul style="list-style-type: none"> <li>● Use ratio language to describe a relationship between two quantities</li> </ul>	<ul style="list-style-type: none"> <li>● Solve problems involving ratios by using the strategy “Find a Pattern”</li> <li>● Use tables to solve problems involving equivalent ratios.</li> <li>● Use unit rates to make comparisons.</li> <li>● Solve problems using unit rates</li> <li>● Use a graph to represent equivalent ratio.</li> <li>● Use a model to show a percent as a rate per 100.</li> <li>● Write parents as fractions and decimals.</li> <li>● Write fractions as decimals and percent.</li> <li>● Find a percent of a quantity.</li> <li>● Solve percent problems by applying the strategy, “Use a model”.</li> <li>● Find the whole given a part and a percent.</li> <li>● Use ratio reasoning to convert from one unit of length to another.</li> <li>● Use ratio reasoning to convert from one unit of capacity to another.</li> <li>● Use ratio reasoning to convert from one unit of weight or mass to another.</li> <li>● Transform units to solve problems.</li> <li>● Solve problems involving distance, rate and time by applying the strategy, “Use a formula”.</li> </ul>
<b>Instructional Plan</b>	
<b>Suggested Activities</b>	<b>Resources</b>

<ol style="list-style-type: none"> <li>1. Observe relationships between number patterns.</li> <li>2. Use fraction strips to model equivalent fractions.</li> <li>3. Use ratios and rates to solve real world problems</li> </ol>	HMH Go Math Chapter 4, Chapter 5, Chapter 6
<b>K-12 Amistad Curriculum Resources Township of Union Public Schools</b>	Interdisciplinary teaching Ideas <a href="http://www.twpunionschools.org/documents/Curricula/K-12%20Amistad%20Curriculum%20Resources.pdf">http://www.twpunionschools.org/documents/Curricula/K-12%20Amistad%20Curriculum%20Resources.pdf</a>
<b>Important African American Figures</b> <b>A Hidden Figure of the SpaceRace: Katherine G. Johnson</b>	<a href="http://www.readworks.org">ReadWorks.org</a>
<b>Holocaust "Six Million" Math Activity &amp; Project</b>	<a href="https://www.teacherspayteachers.com/Browse/Search:holocaust%20math#">https://www.teacherspayteachers.com/Browse/Search:holocaust%20math#</a>
<b>The Price to Earning ratio</b>	<a href="https://www.khanacademy.org/economics-finance-domain/core-finance/stock-and-bonds/valuation-and-investing/v/introduction-to-the-price-to-earnings-ratio">https://www.khanacademy.org/economics-finance-domain/core-finance/stock-and-bonds/valuation-and-investing/v/introduction-to-the-price-to-earnings-ratio</a>
<b>Websites</b>	
Interactive arithmetic lessons Online Resources Online Videos Interactive Games Games, Powerpoint, Instructional Aides	<a href="http://www.khanacademy.org">www.khanacademy.org</a> <a href="http://www.funbrain.com">www.funbrain.com</a> <a href="http://www.coolmath.com">www.coolmath.com</a> <a href="http://doyourhomeworkarizona.org/6th-grade/math/ratios-and-proportional-relationships">http://doyourhomeworkarizona.org/6th-grade/math/ratios-and-proportional-relationships</a> <a href="http://www.insidemathematics.org/common-core-resources/mathematical-content-standards/standards-by-grade/6th-grade">http://www.insidemathematics.org/common-core-resources/mathematical-content-standards/standards-by-grade/6th-grade</a> <a href="https://www.spellingcity.com/sixth-grade-math-vocabulary.html">https://www.spellingcity.com/sixth-grade-math-vocabulary.html</a>

<b>Suggested Options for Differentiation</b>	
<p>Basic Skills/Economically Disadvantaged/Students at Risk</p> <ul style="list-style-type: none"><li>● 1:1 instruction</li><li>● Repeating Directions</li><li>● Small Group</li><li>● Manipulatives</li><li>● Reteach/Enrichment Pages for each lesson (RTI)</li></ul> <p>Gifted and Talented</p> <ul style="list-style-type: none"><li>● Multi-step problems</li><li>● Enrichment Lesson</li><li>● Presentation</li><li>● Student-driven activities/choices</li></ul> <p>ELL</p> <ul style="list-style-type: none"><li>● Elicit Prior Knowledge</li><li>● Rephrase</li><li>● Understand Context</li><li>● Scaffold Language</li><li>● Restate</li><li>● Cooperative Grouping</li></ul> <p>Special Education</p> <ul style="list-style-type: none"><li>● Follow all IEP modifications</li><li>● One on one instruction</li><li>● Adaptive devices</li><li>● Take more time to complete a task or a test</li><li>● Have extra time to process spoken information and directions</li><li>● Take frequent break</li></ul>	

- Sit where they learn best (for example, near the teacher)
- Use special lighting or acoustics
- Take a test in a small group setting
- Use sensory tools such as an exercise band that can be looped around a chair's legs.
- Use a calculator or table of "math facts"
- Provide manipulatives or the opportunity to draw solution strategies

504

- Follow all 504 plan modifications
- Simplify written directions.
- Use or create worksheets with large print.
- Provide colored strips.
- Give the student a partner who is responsible for writing.
- Offer extra time for tasks that require reading and writing.
- Allow the student to give answers orally.
- Provide number lines and place value charts
- Use graph paper to organize and line up numbers for all operations and create model

**Unit 2: The Number System**

**Duration: 50 Days**

**[Career Readiness, Life Literacies, and Key Skills](#)**

**[Addressed In This Unit](#)**

9.1.8.CR.2: Compare various ways to give back through strengths, passions, goals, and other personal factors.

9.1.8.CR.3: Relate the importance of consumer, business, and government responsibility to the economy and personal finance

9.1.8.CP.1: Compare prices for the same goods or services.

9.1.8.FP.2: Evaluate the role of emotions, attitudes, and behavior (rational and irrational) in making financial decisions.

9.1.8.PB.3: Explain how to create budget that aligns with financial goals.

9.1.8.PB.4: Construct a simple personal savings and spending plan based on various sources of in

9.2.8.CAP.1: Identify offerings such as high school and county career and technical school courses, apprenticeships, military programs, and dual enrollment courses that support career or occupational areas of interest. 9.2.8.CAP.2: Develop a plan that includes information about career areas of interest.

9.2.8.CAP.3: Explain how career choices, educational choices, skills, economic conditions, and personal behavior affect income.

9.2.8.CAP.10: Evaluate how careers have evolved regionally, nationally, and globally.

9.2.8.CAP.12: Assess personal strengths, talents, values, and interests to appropriate jobs and careers to maximize career potential.

9.4.8.CI.4: Explore the role of creativity and innovation in career pathways and industries

9.4.8.CT.2: Develop multiple solutions to a problem and evaluate short- and long-term effects to determine the most plausible option (e.g., MS-ETS1-4, 6.1.8.CivicsDP.1).

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9.4.8.GCA.2: Demonstrate openness to diverse ideas and perspectives through active discussions to achieve a group goal.

9.4.8.IML.1: Critically curate multiple resources to assess the credibility of sources when searching for information.

9.4.8.IML.3: Create a digital visualization that effectively communicates a data set using formatting techniques such as form, position, size, color, movement, and spatial grouping (e.g., 6.SP.B.4, 7.SP.B.8b).

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The process includes generating ideas, choosing the best solution, and making, testing, and redesigning models or prototypes.
Engineering design requirements and specifications involve making trade-offs between competing requirements and desired design features.
<b><i>Interaction of Technology and Humans</i></b>
Economic, political, social, and cultural aspects of society drive development of new technological products, processes, and systems.
Technology interacts with society, sometimes bringing about changes in a society's economy, politics, and culture, and often leading to the creation of new needs and wants.
New needs and wants may create strains on local economies and workforces.

Improvements in technology are intended to make the completion of tasks easier, safer, and/or more efficient.
<b><i>Nature of Technology</i></b>
Technology advances through the processes of innovation and invention which relies upon the imaginative and inventive nature of people.
Sometimes a technology developed for one purpose is adapted to serve other purposes.
Engineers use a systematic process of creating or modifying technologies that is fueled and constrained by physical laws, cultural norms, and economic resources. Scientists use systematic investigation to understand the natural world.
<b><i>Effects of Technology on the Natural World</i></b>
Resources need to be utilized wisely to have positive effects on the environment and society.
Some technological decisions involve trade-offs between environmental and economic needs, while others have positive effects for both the economy and environment.
<b>Ethics &amp; Culture</b>
Technological disparities have consequences for public health and prosperity

Correlation Key		
Holocaust	Amistad	Financial Literacy

<b>Unit 2: The Number System</b>	<b>Duration: 50 days</b>
<b>NJ Student Learning Standard: 6.NS</b>	

### Unit Summary

- Apply and extend previous understandings of multiplication and division to divide fractions by fractions.
- Compute fluently with multi-digit numbers and find common factors and multiples.
- Apply and extend previous understandings of numbers to the system of rational numbers.

**Unit Summary:** Students use the meaning of fractions, the meanings of multiplication and division, and the relationship between multiplication and division to understand and explain why the procedures for dividing fractions make sense. Students use these operations to solve problems. Students extend their previous understandings of number and the ordering of numbers to the full system of rational numbers, which includes negative rational numbers, and in particular negative integers. They reason about the order and absolute value of rational numbers and about the location of points in all four quadrants of the coordinate plane.

### Unit 3: Expressions and Equations

Duration:

### *Career Readiness, Life Literacies, and Key Skills*

#### *Addressed In This Unit*

9.1.8.CR.2: Compare various ways to give back through strengths, passions, goals, and other personal factors.

9.1.8.FP.2: Evaluate the role of emotions, attitudes, and behavior (rational and irrational) in making financial decisions.

9.1.8.FP.6: Compare and contrast advertising messages to understand what they are trying to accomplish.

9.2.8.CAP.2: Develop a plan that includes information about career areas of interest.

9.2.8.CAP.3: Explain how career choices, educational choices, skills, economic conditions, and personal behavior affect income.

9.2.8.CAP.12: Assess personal strengths, talents, values, and interests to appropriate jobs and careers to maximize career potential.

9.4.8.CI.4: Explore the role of creativity and innovation in career pathways and industries

9.4.8.DC.5: Manage digital identity and practice positive online behavior to avoid inappropriate forms of self-disclosure.

9.4.8.IML.3: Create a digital visualization that effectively communicates a data set using formatting techniques such as form, position, size, color, movement, and spatial grouping (e.g., 6.SP.B.4, 7.SP.B.8b).

9.4.8.IML.4: Ask insightful questions to organize different types of data and create meaningful visualizations.

9.4.8.TL.3: Select appropriate tools to organize and present information digitally.

9.4.8.TL.6: Collaborate to develop and publish work that provides perspectives on a real-world problem

## Computer Science and Design Thinking

### *Computing Systems*

#### *By the end of grade 8*

The study of human computer interaction can improve the design of devices and extend the abilities of humans.

Software and hardware determine a computing system's capability to store and process information. The design or selection of a computing system involves multiple considerations and potential trade-offs.

Troubleshooting a problem is more effective when knowledge of the specific device along with a systematic process is used to identify the source of a problem.

## ***Networks and the Internet***

Protocols, packets and addressing are the key components for reliable delivery of information across networks.

The information sent and received across networks can be protected from unauthorized access and modification in a variety of ways.

The evolution of malware leads to understanding the key security measures and best practices needed to proactively address the threat to digital data.

## ***Impacts of Computing***

Advancements in computing technology can change individuals' behaviors.

Society is faced with tradeoffs due to the increasing globalization and automation that computing brings

## ***Data & Analysis***

People use digital devices and tools to automate the collection, use, and transformation of data..

The manner in which data is collected and transformed is influenced by the type of digital device(s) available and the intended use of the data.

Data is represented in many formats. Software tools translate the low-level representation of bits into a form understandable by individuals. Data is organized and accessible based on the application used to store it.

The purpose of cleaning data is to remove errors and make it easier for computers to process.

Computer models can be used to simulate events, examine theories and inferences, or make predictions.

## ***Algorithms & Programming***

Individuals design algorithms that are reusable in many situations.

Algorithms that are readable are easier to follow, test, and debug.

Programmers create variables to store data values of different types and perform appropriate operations on their values.

Control structures are selected and combined in programs to solve more complex problems.

Programs use procedures to organize code and hide implementation details. Procedures can be repurposed in new programs. Defining parameters for procedures can generalize behavior and increase reusability.

Individuals design and test solutions to identify problems taking into consideration the diverse needs of the users and the community.

### ***Engineering Design***

Engineering design is a systematic, creative and iterative process used to address local and global problems.

The process includes generating ideas, choosing the best solution, and making, testing, and redesigning models or prototypes.

Engineering design requirements and specifications involve making trade-offs between competing requirements and desired design features.

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### **Ethics & Culture**

Technological disparities have consequences for public health and prosperity

### **Correlation Key**

Holocaust

Amistad

Financial Literacy

**Unit 3: Expressions and Equations**

**Duration: 50 Days**

**NJ Student Learning Standard: 6.EE**

### **Unit Summary**

- Apply and extend previous understandings of arithmetic to algebraic expressions.

- Reason about and solve one-variable equations and inequalities.
- Represent and analyze quantitative relationships between dependent and independent variables.

**Unit Summary:** Students understand the use of variables in mathematical expressions. They write expressions and equations that correspond to given situations, evaluate expressions, and use expressions and formulas to solve problems. Students understand that expressions in different forms can be equivalent, and they use the properties of operations to rewrite expressions in equivalent forms. Students know that the solutions of an equation are the values of the variables that make the equation true. Students use properties of operations and the idea of maintaining the equality of both sides of an equation to solve simple one-step equations. Students construct and analyze tables, such as tables of quantities that are in equivalent ratios, and they use equations (such as  $3x = y$ ) to describe relationships between quantities

	<b>NJ Student Learning Standards</b>
<b>6.EE.A.1</b>	Write and evaluate numerical expressions involving whole-number exponents.
<b>6.EE.A.2A</b>	Write expressions that record operations with numbers and with letters standing for numbers. For example, express the calculation "Subtract $y$ from 5" as $5 - y$ .
<b>6.EE.A.2B</b>	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. <i>For example, describe the expression <math>2(8 + 7)</math> as a product of two factors; view <math>(8 + 7)</math> as both a single entity and a sum of two terms.</i>
<b>6.EE.A.3</b>	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 $3y$ .
<b>6.EE.A.4</b>	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..
<b>6.EE.B.5</b>	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.
<b>6.EE.B.6</b>	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.
<b>6.EE.B7</b>	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.
<b>6.EE.B8</b>	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.
<b>6.EE.C9</b>	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.
<b>NJ Student Learning Standard for Introduction</b>	
<b>7.EE.A.1</b>	Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
<b>SL.6.1.B</b>	Follow rules for collegial discussions, set specific goals and deadlines, and define individual roles as needed.
<b>Computer Science and Design Thinking</b>	
<b>8.1.8.CS4</b>	Systematically apply troubleshooting strategies to identify and resolve hardware and software problems in computing systems.
<b>8.2.8.ED.3</b>	Develop a proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, technical sketch).
<b>8.1.8.DA.1</b>	Organize and transform data collected using computational tools to make it usable for a specific purpose.
<b>8.1.8.DA.4</b>	Transform data to remove errors and improve the accuracy of the data for analysis.
<b>Essential Understandings</b>	
<b>Essential Questions</b>	

<p><i>Students will understand that.....</i></p> <ul style="list-style-type: none"> <li>• Some mathematical situations can be translated and represented using a variable in an algebraic expression.</li> <li>• The value of an algebraic expression can be found by replacing the variable(s) with given number(s) and doing the calculation that results.</li> <li>• There is an agreed upon order in which operations are carried out in a numerical expressions.</li> <li>• The Distributive Property of Multiplication over Addition lets you multiply a sum by multiplying each addend separately and then finding the sum of the products.</li> <li>• Some quantities have a mathematical relationship; the value of one quantity can be found if you know the value of the other quantity.</li> <li>• Patterns can sometimes be used to identify a relationship between two quantities.</li> <li>• Some problems can be solved by recording and organizing data in a table and by finding and using numerical patterns in the table.</li> <li>• Equations can be transformed into equivalent equations and solved using properties of equality and inverse operations. A solution to an inequality is a value that makes the inequality true.</li> </ul>	<ul style="list-style-type: none"> <li>• How do you write, interpret and use algebraic expressions?</li> <li>• How can you use equations and inequalities to represent situations and solve problems?</li> <li>• How can you show relationships between variables?</li> </ul>
<b>Evidence of Student Learning</b>	
<b>Performance Tasks:</b> <i>Activities to provide evidence for student learning of content and cognitive skills.</i>	<b>Other Assessments</b>
	<b>Formative Assessments</b> <ul style="list-style-type: none"> <li>• Oral Questioning</li> <li>• Choral Response</li> <li>• Partners</li> </ul>

- Student Conference
- Self-Assessment
- Think-Pair-Share
- Hand Signals
- Peer Reflection
- Graphic Organizers
- Constructive Response
- Teacher Observation Exit Tickets
- Class work

#### **Summative Assessments**

- Chapter Tests
- Quizzes
- Benchmark
- Assessments
- Projects
- Alternative Assessments
- Benchmark Tests
- Standardized Tests
- Modifications

#### **Benchmark Assessment**

- GoMath Benchmark Assessment

#### **Alternative Assessments**

- Untimed Fact Practice Assessment
- Manipulative Driven Assessment
- Modified/Teacher Created Chapter Tests

	<ul style="list-style-type: none"> <li>● Modified/Teacher Created Mid-Chapter Quiz</li> <li>● Visual Representation of Skills Assess</li> <li>● Modified Classwork Assignments</li> <li>● Modified Benchmarks</li> <li>● GoMath Reteach Activities and Worksheets</li> <li>● Project Based Assessments with Scoring Rubric</li> </ul>
<b>Vocabulary</b>	
<p>Exponent, Base, Factor, Numerical Expression, Order of Operations, Evaluate, Algebraic Expression, Variable, Terms, Coefficient, Like Term, Equivalent Expression, Commutative Property, Associative Property, Identity Property, Distributive Property, Equation, Solution to an Equation, Variable, Algebraic Expression, Inverse Operations, Subtraction/Addition Property of Equality, Identity Property of Addition, Division/Multiplication Property of Equality, Identity Property of Multiplication, Inequality, Solution to an Inequality, Independent/Dependent Variable, Linear Equations</p>	
<b>Knowledge and Skills</b>	
<b>Content</b>	<b>Skills</b>
<ul style="list-style-type: none"> <li>● Apply and extend previous understandings of arithmetic to algebraic expressions.</li> <li>● Reason about and solve one-variable equations and inequalities.</li> </ul>	<p>Students will be able to ...</p> <ul style="list-style-type: none"> <li>● Write and evaluate expressions using exponents.</li> <li>● Use the order of operations to evaluate expressions using exponents.</li> <li>● Write algebraic expressions.</li> <li>● Identify and describe parts of expressions.</li> <li>● Evaluate algebraic expressions and formulas</li> <li>● Use algebraic expressions to solve problems.</li> </ul>

<ul style="list-style-type: none"> <li>● Represent and analyze quantitative relationships between dependent and independent variables.</li> </ul>	<ul style="list-style-type: none"> <li>● Determine whether a number is a solution to an equation.</li> <li>● Translate between words and equations.</li> <li>● Use models to solve additional equations, and multiplication equations.</li> <li>● Use algebra to solve addition, subtraction, multiplication and division equations.</li> <li>● Determine whether a number is a solution of an inequality.</li> <li>● Write algebraic inequalities.</li> <li>● Represent solutions of algebraic inequalities on number line diagrams.</li> <li>● Write an equation to represent the relationship between an independent and dependent variable.</li> <li>● Translate between equations and tables.</li> <li>● Graph the relationship between two quantities.</li> <li>● Translate between equations and graphs</li> </ul>
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**Instructional Plan**

<b>Suggested Activities</b>	<b>Resources</b>
<ol style="list-style-type: none"> <li>1. Evaluate expressions with grouping symbols using the order of operations.</li> <li>2. Model multiplication using arrays.</li> <li>3. Identify parts of an algebraic expression before evaluating.</li> <li>4. Use models to solve simple one-step equations.</li> <li>5. Observe the relationship between two number patterns.</li> <li>6. Use a model to show a rule and observe alternative patterns.</li> </ol>	HMH Go Math Chapter 7, Chapter 8, Chapter 9

<p>Financial Algebra: this is a PDF with several math and finance activities</p>	<p><a href="https://mpsnj.org/UserFiles/Servers/Server_99480/File/Academics/Curriculum/K12%20Curriculum%20for%20District%20Staff/K%2012%20Math/Financial%20Algebra.pdf">mpsnj.org/UserFiles/Servers/Server_99480/File/Academics/Curriculum/K12%20Curriculum%20for%20District%20Staff/K%2012%20Math/Financial%20Algebra.pdf</a></p>
<p><b>Math Literature</b></p>	
<p><b>Multiplication:</b>  Hershey’s Kisses by Jerry Pollatta  365 Penguins by Jean Luc Fromental  The Doorbell Rang by Pat Hutchings</p> <p><b>Division:</b>  Safari Park by Stuart Murphy  The Doorbell Rang by Pat Hutchings</p> <p><b>Counting the Stars: The Story of Katherine Johnson, NASA Mathematician</b> by Lesa Cline-Ransome (Also)</p>	
<p><b>Websites</b></p>	
<p>Interactive arithmetic lessons  Online Resources  Online Videos  Interactive Games  Games, PowerPoint, Instructional Aides</p>	<p><a href="http://www.kutasoftware.com">www.kutasoftware.com</a>  <a href="http://www.funbrain.com">www.funbrain.com</a>  <a href="http://www.coolmath.com">www.coolmath.com</a>  <a href="http://www.mathchimp.com/6th-grade-math-resources">http://www.mathchimp.com/6th-grade-math-resources</a>  <a href="http://www.insidemathematics.org/common-core-resources/mathematical-content-standards/standards-by-strand/expressions-and-equations">http://www.insidemathematics.org/common-core-resources/mathematical-content-standards/standards-by-strand/expressions-and-equations</a>  <a href="http://www.insidemathematics.org/common-core-resources/mathematical-content-standards/standards-by-strand/expressions-and-equations">http://www.insidemathematics.org/common-core-resources/mathematical-content-standards/standards-by-strand/expressions-and-equations</a></p>
<p><b>Suggested Options for Differentiation</b></p>	

#### Basic Skills/Economically Disadvantaged/Students at Risk

- 1:1 Instruction
- Grab and Go centers
- Repeating Directions
- Small Group
- Manipulatives
- Interactive Notes
- Reteach/Enrichment Pages for each lesson (RTI)

#### Gifted and Talented

- Multi-step problems
- Enrichment Lesson
- Presentation
- Student-driven activities/choices

#### ELL

- Elicit Prior Knowledge
- Rephrase
- Understand Context
- Scaffold Language
- Restate
- Cooperative Grouping

#### Special Education

- Follow all IEP modifications
- One on one instruction
- Adaptive devices
- Take more time to complete a task or a test
- Have extra time to process spoken information and directions
- Take frequent break
- Sit where they learn best (for example, near the teacher)

- Use special lighting or acoustics
- Take a test in a small group setting
- Use sensory tools such as an exercise band that can be looped around a chair's legs.
- Use a calculator or table of "math facts"
- Provide manipulatives or the opportunity to draw solution strategies

504

- Follow all 504 plan modifications
- Simplify written directions.
- Use or create worksheets with large print.
- Provide colored strips.
- Give the student a partner who is responsible for writing.
- Offer extra time for tasks that require reading and writing.
- Allow the student to give answers orally.
- Provide number lines and place value charts
- Use graph paper to organize and line up numbers for all operations and create models

**Unit 4: Geometry**

**Duration:**

***Career Readiness, Life Literacies, and Key Skills  
Addressed In This Unit***

9.1.8.CR.2: Compare various ways to give back through strengths, passions, goals, and other personal factors.

9.1.8.CR.3: Relate the importance of consumer, business, and government responsibility to the economy and personal finance

9.1.8.CP.1: Compare prices for the same goods or services.

9.1.8.PB.4: Construct a simple personal savings and spending plan based on various sources of income.

9.2.8.CAP.1: Identify offerings such as high school and county career and technical school courses, apprenticeships, military programs, and dual enrollment courses that support career or occupational areas of interest. 9.2.8.CAP.2: Develop a plan that includes information about career areas of interest.

9.2.8.CAP.3: Explain how career choices, educational choices, skills, economic conditions, and personal behavior affect income.

9.2.8.CAP.10: Evaluate how careers have evolved regionally, nationally, and globally.

9.2.8.CAP.12: Assess personal strengths, talents, values, and interests to appropriate jobs and careers to maximize career potential.

9.4.8.CI.4: Explore the role of creativity and innovation in career pathways and industries

9.4.8.CT.2: Develop multiple solutions to a problem and evaluate short- and long-term effects to determine the most plausible option (e.g., MS-ETS1-4, 6.1.8.CivicsDP.1).

9.4.8.DC.4: Explain how information shared digitally is public and can be searched, copied, and potentially seen by public audiences.

9.4.8.DC.5: Manage digital identity and practice positive online behavior to avoid inappropriate forms of self-disclosure.

9.4.8.IML.12: Use relevant tools to produce, publish, and deliver information supported with evidence for an authentic audience.

9.4.8.TL.3: Select appropriate tools to organize and present information digitally.

9.4.8.TL.6: Collaborate to develop and publish work that provides perspectives on a real-world problem.

<b>Computer Science and Design Thinking</b>
<b><i>Computing Systems</i></b>
<b><i>By the end of grade 8</i></b>
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### **Ethics & Culture**

Technological disparities have consequences for public health and prosperity

### **Correlation Key**

Holocaust

Amistad

Financial Literacy

### **Unit 4: Geometry**

**Duration: 25 days**

### **NJ Student Learning Standard: 6.G**

#### **Unit Summary**

- Solve real-world and mathematical problems involving area, volume, and surface area.

**Unit Summary:** Students build on their work with area in elementary school by reasoning about relationships among shapes to determine area, surface area, and volume. Try to find the areas of right triangles, other triangles, and special quadrilaterals by decomposing these shapes, rearranging or removing pieces, and relating the shapes to rectangles. Using these methods, students discuss, develop, and justify formulas for areas of triangles and parallelograms. Students find the areas of polygons and surface areas of prisms and pyramids by decomposing them into pieces whose area they can determine. They reason about right rectangular prisms with fractional side lengths to extend formulas for the volume of a right rectangular prism to fractional side lengths. They prepare for work on scale drawings and constructions in Grade 7 by drawing polygons in the coordinate plane.

<b>NJ Student Learning Standards</b>	
<b>6.G.A.1</b>	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.
<b>6.G.A.4</b>	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.
<b>6.G.A.2</b>	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 problem.
<b>6.G.A.3</b>	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.
<b>NJ Student Learning Standards for Introduction</b>	
<b>7.G.A.2</b>	Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.
<b>7.G.B.4</b>	Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.
<b>7.G.B.5</b>	Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.
<b>SL.6.1.B</b>	Follow rules for collegial discussions, set specific goals and deadlines, and define individual roles as needed.
<b>Computer Science and Design Thinking</b>	
<b>8.1.8.CS4</b>	Systematically apply troubleshooting strategies to identify and resolve hardware and software problems in computing systems.

<b>8.2.8.ED.3</b>	proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, technical sketch).
<b>8.1.8.DA.1</b>	Organize and transform data collected using computational tools to make it usable for a specific purpose.
<b>8.1.8.DA.4</b>	Transform data to remove errors and improve the accuracy of the data for analysis.
<b>8.1.8.CS4</b>	Systematically apply troubleshooting strategies to identify and resolve hardware and software problems in computing systems.
<b>Essential Understandings</b>	
<b>Essential Questions</b>	
<i>Students will understand that.....</i>	
<ul style="list-style-type: none"> <li>● Measurements can be used to describe, compare, and make sense of real-world situations, including area, volume, and surface area.</li> <li>● Geometric properties can be used to construct geometric figures.</li> <li>● Coordinate geometry facilitates the visualization of algebraic relationships</li> </ul>	<ul style="list-style-type: none"> <li>● How can you use measurements to describe two dimensional figures?</li> <li>● How can you use measurements to describe three dimensional figures?</li> <li>● How can measurements and geometric relationships be used to solve problems?</li> <li>● How does coordinate geometry illustrate a connection between geometry and algebra?</li> </ul>
<b>Evidence of Student Learning</b>	
<b>Performance Tasks:</b> <i>Activities to provide evidence for student learning of content and cognitive skills.</i>	<b>Formative Assessments</b>
	<ul style="list-style-type: none"> <li>● Oral Questioning</li> <li>● Choral Response</li> <li>● Partners</li> <li>● Student Conference</li> <li>● Self-Assessment</li> <li>● Think-Pair-Share</li> <li>● Hand Signals</li> <li>● Peer Reflection</li> <li>● Graphic Organizers</li> <li>● Constructive Response</li> </ul>

- Teacher Observation Exit Card Tickets
- Class work

**Summative Assessments**

- Chapter Tests
- Quizzes
- Benchmark Assessments
- Projects Alternative
- Assessments
- Benchmark Tests
- Standardized Tests
- Modifications

**Benchmark Assessment**

- GoMath Benchmark Assessment
- Linkit! Benchmark Assessments

**Alternative Assessments**

- Untimed Fact Practice Assessment
- Manipulative Driven Assessment
- Modified/Teacher Created Chapter Tests
- Modified/Teacher Created Mid-Chapter Quiz
- Visual Representation of Skills Assess
- Modified Classwork Assignments
- Modified Benchmarks
- GoMath Reteach Activities and Worksheets
- Project Based Assessments with Scoring Rubric

**Vocabulary**

Area, Parallelogram, Congruent, Diagonals, Right/Acute/Obtuse Triangle, Trapezoid, Regular Polygon, Composite Figure, Volume, Solid Figure, Net Face, Edge, Vertex, Base, Lateral Face, Prism, Pyramid, Polygon	
<b>Knowledge and Skills</b>	
<b>Content:</b>	<b>Skills:</b>
Solve real-world and mathematical problems involving area, volume, and surface area.	<p><i>Students will be able to ...</i></p> <ul style="list-style-type: none"> <li>● Find the area of parallelograms.</li> <li>● Investigate the relationship among the areas of triangles, rectangles and parallelograms.</li> <li>● Find the area of triangles.</li> <li>● Investigate the relationship between the areas of trapezoids and parallelograms.</li> <li>● Find the area of trapezoids.</li> <li>● Find the area of regular polygons</li> <li>● Make and identify a 3-D figure from a net</li> <li>● Use nets to find surface area</li> <li>● Show volume as <math>V=Bh</math> and <math>V=lwh</math></li> </ul>
<b>Instructional Plan</b>	
<b>Suggested Activities</b>	<b>Resources</b>
<ol style="list-style-type: none"> <li>1. Find the area of a rectangle with fractional side lengths.</li> <li>2. Find the perimeter and area of rectangles and squares.</li> <li>3. Use small unit cubes to find the volume of rectangular prisms.</li> <li>4. Explore nets by use of different shaped prisms and pyramids.</li> </ol>	<p>HMH Go Math</p> <p>Chapter 10 &amp; 11</p>

<p>Research Careers that use Geometry Have students create a digital presentation of these careers to share.</p>	<p><a href="https://www.indeed.com/career-advice/finding-a-job/jobs-that-use-geometry">https://www.indeed.com/career-advice/finding-a-job/jobs-that-use-geometry</a></p> <p><a href="https://study.com/articles/jobs_that_involve_geometry.html">https://study.com/articles/jobs_that_involve_geometry.html</a></p> <p><a href="https://careertrend.com/about-5414862-types-jobs-use-geometry.html">https://careertrend.com/about-5414862-types-jobs-use-geometry.html</a></p>
<p><b>A Holocaust Monument</b></p>	<p><a href="https://fcit.usf.edu/holocaust/activity/35plan/monument.htm">https://fcit.usf.edu/holocaust/activity/35plan/monument.htm</a></p>
<p><b>National Museum of African American History and Culture</b></p>	<p><a href="https://archive.curbed.com/2016/9/19/12947604/national-museum-african-american-history-culture">https://archive.curbed.com/2016/9/19/12947604/national-museum-african-american-history-culture</a></p>
<p><b>Math Literature</b></p>	
<p>Sir Cumference and the Great Knight of Angleland (A Math Adventure) By Cindy Neuschwander-This series explores geometric concepts in an adventurous way.</p> <p>Sir Cumference and the Sword in the Cone: A Math Adventure By Cindy Neuschwander</p> <p>Sir Cumference and the Dragon of Pi (Math Adventures)- Simple tangram story that can be used to review basic geometry terms.</p> <p>Grandfather Tang's Story Ann Tompert- Geometry/tessellation story</p> <p>A Cloak For The Dreamer Aileen Friedman- Shape story</p> <p>The Greedy Triangle Marilyn Burns - Geometry story</p> <p>Flatland Edwin Edwin Abbot</p> <p>Mr. Archimedes' Bath Pamela Allen</p> <p>Who Sank the Boat? Pamela Allen</p>	

### Websites

<p>Interactive arithmetic lessons            Online Resources            Online Videos            Interactive Games            Games, PowerPoint, Instructional Aides</p> <p style="background-color: #00FFFF;">African American Mathematicians</p>	<p><a href="http://www.kutasoftware.com">www.kutasoftware.com</a> <a href="http://www.khanacademy.org">www.khanacademy.org</a>  <a href="http://www.funbrain.com">www.funbrain.com</a>  <a href="http://www.math4childrenplus.com/games/geometry/">http://www.math4childrenplus.com/games/geometry/</a>  <a href="http://www.adaptedmind.com/categorylist.php?categoryId=6">http://www.adaptedmind.com/categorylist.php?categoryId=6</a> <a href="http://www.kidsmathTV.com/6th-grade-videos/">http://www.kidsmathTV.com/6th-grade-videos/</a></p> <p><a href="https://www.mashupmath.com/blog/famous-african-american-mathematicians">https://www.mashupmath.com/blog/famous-african-american-mathematicians</a></p>
<p style="background-color: #FFFF00;">Holocaust Hexagonal Thinking Activity</p>	<p><a href="https://www.teacherspayteachers.com/Product/Holocaust-Hexagonal-Thinking-Activity-4463586">https://www.teacherspayteachers.com/Product/Holocaust-Hexagonal-Thinking-Activity-4463586</a></p>

### Suggested Options for Differentiation

**Basic Skills/Economically Disadvantaged/Students at Risk**

- 1:1 instruction
- Grab and Go centers
- Repeating Directions
- Small Group
- Manipulatives
- Interactive Notes
- Reteach/Enrichment Pages for each lesson (RTI)

**Gifted and Talented**

- Multi-step problems
- Enrichment Lesson
- Presentation
- Student-driven activities/choices

**ELL**

- Elicit Prior Knowledge
- Rephrase

- Understand Context
- Scaffold Language
- Restate
- Cooperative Grouping

#### Special Education

- Follow all IEP modifications
- One on one instruction
- Adaptive devices
- Take more time to complete a task or a test
- Have extra time to process spoken information and directions
- Take frequent break
- Sit where they learn best (for example, near the teacher)
- Use special lighting or acoustics
- Take a test in a small group setting
- Use sensory tools such as an exercise band that can be looped around a chair's legs.
- Use a calculator or table of "math facts"
- Provide manipulatives or the opportunity to draw solution strategies

#### 504

- Follow all 504 plan modifications
- Simplify written directions.
- Use or create worksheets with large print.
- Provide colored strips.
- Give the student a partner who is responsible for writing.
- Offer extra time for tasks that require reading and writing.
- Allow the student to give answers orally.
- Provide number lines and place value charts
- Use graph paper to organize and line up numbers for all operations and create models

**Unit 5: Statistics and Probability**

**Duration:25 days**

***Career Readiness, Life Literacies, and Key Skills***

***Addressed In This Unit***

9.1.8.CR.2: Compare various ways to give back through strengths, passions, goals, and other personal factors.

9.1.8.CR.3: Relate the importance of consumer, business, and government responsibility to the economy and personal finance

9.1.8.CP.1: Compare prices for the same goods or services.

9.2.8.CAP.2: Develop a plan that includes information about career areas of interest. • 9.2.8.CAP.3: Explain how career choices, educational choices, skills, economic conditions, and personal behavior affect income.

9.2.8.CAP.10: Evaluate how careers have evolved regionally, nationally, and globally.

9.2.8.CAP.12: Assess personal strengths, talents, values, and interests to appropriate jobs and careers to maximize career potential.

9.2.8.CAP.14: Evaluate sources of income and alternative resources to accurately compare employment options.

9.4.8.CI.4: Explore the role of creativity and innovation in career pathways and industries

9.4.8.IML.3: Create a digital visualization that effectively communicates a data set using formatting techniques such as form, position, size, color, movement, and spatial grouping (e.g., 6.SP.B.4, 7.SP.B.8b).

9.4.8.IML.5: Analyze and interpret local or public data sets to summarize and effectively communicate the data.

9.4.8.IML.12: Use relevant tools to produce, publish, and deliver information supported with evidence for an authentic audience.

9.4.8.TL.3: Select appropriate tools to organize and present information digitally.

9.4.8.TL.6: Collaborate to develop and publish work that provides perspectives on a real-world problem

## Computer Science and Design Thinking

### ***Computing Systems***

#### ***By the end of grade 8***

The study of human computer interaction can improve the design of devices and extend the abilities of humans.

Software and hardware determine a computing system's capability to store and process information. The design or selection of a computing system involves multiple considerations and potential trade-offs.

Troubleshooting a problem is more effective when knowledge of the specific device along with a systematic process is used to identify the source of a problem.

### ***Networks and the Internet***

Protocols, packets and addressing are the key components for reliable delivery of information across networks.

The information sent and received across networks can be protected from unauthorized access and modification in a variety of ways.

The evolution of malware leads to understanding the key security measures and best practices needed to proactively address the threat to digital data.

### ***Impacts of Computing***

Advancements in computing technology can change individuals' behaviors.

Society is faced with tradeoffs due to the increasing globalization and automation that computing brings

### ***Data & Analysis***

People use digital devices and tools to automate the collection, use, and transformation of data..

The manner in which data is collected and transformed is influenced by the type of digital device(s) available and the intended use of the data.

Data is represented in many formats. Software tools translate the low-level representation of bits into a form understandable by individuals. Data is organized and accessible based on the application used to store it.

The purpose of cleaning data is to remove errors and make it easier for computers to process.

Computer models can be used to simulate events, examine theories and inferences, or make predictions.

### ***Algorithms & Programming***

Individuals design algorithms that are reusable in many situations.

Algorithms that are readable are easier to follow, test, and debug.

Programmers create variables to store data values of different types and perform appropriate operations on their values.

Control structures are selected and combined in programs to solve more complex problems.

Programs use procedures to organize code and hide implementation details. Procedures can be repurposed in new programs. Defining parameters for procedures can generalize behavior and increase reusability.

Individuals design and test solutions to identify problems taking into consideration the diverse needs of the users and the community.

### ***Engineering Design***

Engineering design is a systematic, creative and iterative process used to address local and global problems.

The process includes generating ideas, choosing the best solution, and making, testing, and redesigning models or prototypes.

Engineering design requirements and specifications involve making trade-offs between competing requirements and desired design features.

### ***Interaction of Technology and Humans***

Economic, political, social, and cultural aspects of society drive development of new technological products, processes, and systems.

Technology interacts with society, sometimes bringing about changes in a society's economy, politics, and culture, and often leading to the creation of new needs and wants.

New needs and wants may create strains on local economies and workforces.

Improvements in technology are intended to make the completion of tasks easier, safer, and/or more efficient.

### ***Nature of Technology***

Technology advances through the processes of innovation and invention which relies upon the imaginative and inventive nature of people.

Sometimes a technology developed for one purpose is adapted to serve other purposes.

Engineers use a systematic process of creating or modifying technologies that is fueled and constrained by physical laws, cultural norms, and economic resources. Scientists use systematic investigation to understand the natural world.

***Effects of Technology on the Natural World***

Resources need to be utilized wisely to have positive effects on the environment and society.

Some technological decisions involve trade-offs between environmental and economic needs, while others have positive effects for both the economy and environment.

**Ethics & Culture**

Technological disparities have consequences for public health and prosperity

**Correlation Key**

Holocaust

Amistad

Financial Literacy

**Unit 5: Statistics and Probability**

**Duration:**

**NJ Student Learning Standard: 6.SP**

**Unit Summary**

- Develop understanding of statistical variability
- Summarize and describe distributions

**Unit Summary:** Students learn to describe and summarize numerical data sets, identifying clusters, peaks, gaps, and symmetry, considering the context in which the data were collected.

	Learning Standards
<b>6.SP.A.1</b>	Measurements can be used to describe, compare, and make sense of real-world situations, including area, volume, and surface area. Geometric properties can be used to construct geometric figures. Coordinate geometry facilitates the visualization of algebraic relationships.
<b>6.SP.A.2</b>	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.
<b>6.SP.A.3</b>	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.
<b>6.SP.B.4</b>	Display numerical data in plots on a number line, including dot plots, histograms, and boxplots.
<b>6.SP.B.5a</b>	Reporting the number of observations.
<b>6.SP.B.5b</b>	Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
<b>6.SP.B.5c</b>	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.
<b>6.SP.B.5d</b>	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.
	<b>NJ Student Learning Standard for Introduction</b>
<b>7.SP.A.1</b>	Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.
<b>SL.6.1.B</b>	Follow rules for collegial discussions, set specific goals and deadlines, and define individual roles as needed.
	<b>Computer Science and Design Thinking</b>
<b>8.1.8.CS4</b>	Systematically apply troubleshooting strategies to identify and resolve hardware and software problems in computing systems.

<b>8.2.8.ED.3</b>	proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, technical sketch).
<b>8.1.8.DA.1</b>	Organize and transform data collected using computational tools to make it usable for a specific purpose.
<b>8.1.8.DA.4</b>	Transform data to remove errors and improve the accuracy of the data for analysis.
<b>8.1.8.CS4</b>	Systematically apply troubleshooting strategies to identify and resolve hardware and software problems in computing systems.
<b>Essential Understandings</b>	<b>Essential Questions</b>
<p><i>Students will understand that.....</i></p> <ul style="list-style-type: none"> <li>• Statistical questions anticipate variability in the data. These questions can be answered by collecting and analyzing data. The question to be answered determines the data that needs to be collected.</li> <li>• Each type of graph is most appropriate for certain kinds of data. A histogram uses bars to compare continuous numerical data grouped into intervals.</li> <li>• Box plots are useful for plotting data above a number line. Box plots show the spread for each quarter of the data.</li> <li>• A set of data collected to answer a statistical question has a</li> <li>• distribution, which can be described by its center, spread, and overall shape</li> </ul>	<ul style="list-style-type: none"> <li>• How can you describe the shape of a data set using graphs, measures of center and measures of variability?</li> <li>• How can you display data and analyze measures of center?</li> <li>• What are ways data can be represented?</li> </ul>
<b>Evidence of Student Learning</b>	

**Performance Tasks:** *Activities to provide evidence for student learning of content and cognitive skills.*

**Formative Assessments**

- Oral Questioning
- Choral Response
- Partners
- Student Conference
- Self-Assessment
- Think-Pair-Share
- Hand Signals
- Peer Reflection
- Graphic Organizers
- Constructive Response
- Teacher Observation
- Exit Card Tickets
- Class work

**Summative Assessments**

- Chapter Tests
- Quizzes
- Benchmark Assessments
- Projects
- Alternative Assessments
- Benchmark Tests
- Standardized Tests
- Modifications

**Benchmark Assessment**

- GoMath Benchmark Assessment

**Alternative Assessments**

- Untimed Fact Practice Assessment
- Manipulative Driven Assessment

	<ul style="list-style-type: none"> <li>● Modified/Teacher Created Chapter Tests</li> <li>● Modified/Teacher Created Mid-Chapter Quiz</li> <li>● Visual Representation of Skills Assess</li> <li>● Modified Classwork Assignments</li> <li>● Modified Benchmarks</li> <li>● GoMath Reteach Activities and Worksheets</li> <li>● Project Based Assessments with Scoring Rubric</li> </ul>
<b>Vocabulary</b>	
Data, Statistical Question, Dot Plot, Frequency, Frequency Table, Relationship Frequency Table, Histogram, Bar Graph Measure of Center, Mean, Median, Mode, Outlier, Lower/Upper Quartile, Box Plot, Absolute, Deviation, Measure of Variability, Range, Interquartile Range, Distribution, Statistical Question	
<b>Knowledge and Skills</b>	
<b>Content:</b>	<b>Skills:</b>
<ul style="list-style-type: none"> <li>● Develop understanding of statistical variability</li> <li>● Summarize and describe distributions of data through graphing</li> </ul>	<p><i>Students will be able to ...</i></p> <ul style="list-style-type: none"> <li>● Recognize statistical questions.</li> <li>● Describe a data set by stating what quantity was measured and how it was measured.</li> <li>● Use frequency tables and dot plots to organize data.</li> <li>● Display data and histograms.</li> <li>● Understand the mean as a fair share and as a balance point.</li> <li>● Summarize data by using mean, median and mode.</li> <li>● Determine the effect of outliers on measures of center.</li> </ul>

	<ul style="list-style-type: none"> <li>● Solve problems involving data by using the strategy, “Draw a diagram.”</li> <li>● Describe overall pattern in data including, clusters, peak, gaps and symmetry.</li> <li>● Display data and box plots.</li> <li>● Understand mean, absolute deviation as a measure of variability from the mean.</li> <li>● Summarize a data set by using range, interquartile range, and mean absolute deviation.</li> <li>● Choose appropriate measures of center and variability to describe data and justify the choice.</li> <li>● Recognize what measures of center and variability indicate about a data set.</li> </ul>
<b>Instructional Plan</b>	
<b>Suggested Activities</b>	<b>Resources</b>
<ol style="list-style-type: none"> <li>5. Calculate percent based on data.</li> <li>6. Create and interpret bar graphs.</li> <li>7. Use a dot plot to represent and interpret data.</li> <li>8. Create a dot plot from measurements and perform simple operations on the data.</li> </ol>	HMH Go Math Chapter 12, Chapter 13
Have students explore different career options that may interest them. Have them create a digital prestations of these that must include salary range, average salary, and median salary.	Career Information websites

<p>Students use data to analyze the participation of white, black, Asian and Hispanic men and women in STEM careers as compared with their participation in the general workforce. They then discuss the possible reasons identity groups are unequally represented in STEM careers</p>	<p>STEM by the numbers  <a href="https://washingtonstem.org/focus_area/stembythenumbers/">https://washingtonstem.org/focus_area/stembythenumbers/</a></p>
<p>Explore Holocaust related Statistics and types of graphs such as those found here</p>	<p><a href="https://www.bbc.com/news/world-middle-east-39062221">https://www.bbc.com/news/world-middle-east-39062221</a></p>
<p>Money word problems using mean, median, and range</p>	<p><a href="https://www.dadsworksheets.com/worksheets/mean-median-range.html">https://www.dadsworksheets.com/worksheets/mean-median-range.html</a></p>
<p><b>Math Literature</b></p>	
<p>Anno's Hat Tricks, Akihiro Nozaki- Probability  Jumanji, Chris Van Allsburg- Probability  Martha Blah Blah, Susan Meddaugh- Probability  The Phantom Tollbooth, Norton Juster- Data Analysis, Probability</p>	
<p><b>Websites</b></p>	
<p>Interactive arithmetic lessons  Online Resources  Online Videos  Interactive Games  Games, PowerPoint, Instructional Aides</p>	<p><a href="http://www.kutasoftware.com">www.kutasoftware.com</a>  <a href="http://www.khanacademy.org">www.khanacademy.org</a>  <a href="http://www.funbrain.com">www.funbrain.com</a>  <a href="http://www.internet4classrooms.com/skill_builders/probability_math_sixth_6th_grade.htm">http://www.internet4classrooms.com/skill_builders/probability_math_sixth_6th_grade.htm</a>  <a href="http://www.spellingcity.com/statistics-and-probability-middle-school.html">http://www.spellingcity.com/statistics-and-probability-middle-school.html</a>  <a href="https://www.ixl.com/math/grade-6">https://www.ixl.com/math/grade-6</a></p>
<p><b>Suggested Options for Differentiation</b></p>	

#### Basic Skills/Economically Disadvantaged/Students at Risk

- 1:1 instruction
- Grab and Go centers
- Repeating Directions
- Small Group
- Manipulatives
- Interactive Notes
- Reteach/Enrichment Pages for each lesson (RTI)

#### Gifted and Talented

- Multi-step problems
- Enrichment Lesson
- Presentation
- Student-driven activities/choices

#### ELL

- Elicit Prior Knowledge
- Rephrase
- Understand Context
- Scaffold Language
- Restate
- Cooperative Grouping

#### Special Education

- Follow all IEP modifications
- One on one instruction
- Adaptive devices
- Take more time to complete a task or a test
- Have extra time to process spoken information and directions
- Take frequent break
- Sit where they learn best (for example, near the teacher)

- Use special lighting or acoustics
- Take a test in a small group setting
- Use sensory tools such as an exercise band that can be looped around a chair's legs.
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#### 504

- Follow all 504 plan modifications
- Simplify written directions.
- Use or create worksheets with large print.
- Provide colored strips.
- Give the student a partner who is responsible for writing.
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- Use graph paper to organize and line up numbers for all operations and create models