MOORESTOWN TOWNSHIP PUBLIC SCHOOLS
MOORESTOWN, NEW JERSEY

William Allen Middle School
Mathematics

Mathematics Accelerated
Grade 7

Date: July 2022
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Course Description and Fundamental Concepts

This course, which is aligned to the NJ Student Learning Standards, is focused on the following major concepts or Big Ideas: Ratio and Proportional Relationships, the Number System, Expressions and Equations, Geometry, Statistics and Probability. This course contains several Eighth Grade Standards and prepares students for Algebra I in Eighth Grade. Students will enhance their analytical, reasoning and problem-solving skills throughout the curriculum. This course moves at an accelerated pace and requires students to use independent and abstract thinking.

Math 7 Accelerated Overview

1. **Ratios and Proportional Relationships**
   - Analyze proportional relationships and use them to solve real-world and mathematical problems.

2. **Expressions and Equations**
   - Use properties of operations to generate equivalent expressions.
   - Solve real-life and mathematical problems using numerical and algebraic expressions and equations.
   - Work with radicals and integer exponents.
   - Understand the connections between proportional relationships, lines, and linear equations.

3. **Geometry**
   - Draw, construct and describe geometrical figures and describe the relationships between them.
   - Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.
   - Understand congruence and similarity using physical models, transparencies, or geometry software.
   - Understand and apply the Pythagorean Theorem.
   - Solve real-world and mathematical problems involving volume of cylinders, cones and spheres.

4. **Statistics and Probability**
   - Use random sampling to draw inferences about a population.
   - Draw informal comparative inferences about two populations.
   - Investigate chance processes and develop, use, and evaluate probability models.

5. **The Number System**
   - Know that there are numbers that are not rational, and approximate them by rational numbers.

6. **Functions**
   - Define, evaluate, and compare functions.
   - Use functions to model relationships between quantities.

Mathematical Practice Standards
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.

New Jersey Student Learning Standards (NJSLS)

7.RP Ratios and Proportional Relationships
  A. Analyze proportional relationships and use them to solve real-world and mathematical problems.
      1. 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.
      2. Recognize and represent proportional relationships between quantities.
          a. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.
          b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
          c. Represent proportional relationships by equations. For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as $t = pn$.
          d. Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points $(0, 0)$ and $(1, r)$ where r is the unit rate.
      3. Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.

7.NS The Number System
  A. Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.
      3. Solve real-world and mathematical problems involving the four operations with rational numbers.

7.EE Expressions and Equations
  A. Use properties of operations to generate equivalent expressions.
      1. Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
      2. Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. For example, $a + 0.05a = 1.05a$ means that "increase by 5%" is the same as "multiply by 1.05."
  B. Solve real-life and mathematical problems using numerical and algebraic expressions and equations.
      3. Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. For example: If a woman making $25 an hour gets a 10% raise, she will

make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.

4. Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.

   a. Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?

   b. Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions.

7.G Geometry

A. Draw, construct, and describe geometrical figures and describe the relationships between them.

1. Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.
2. Draw (with technology, with ruler and protractor, as well as freehand) 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.
3. Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.

B. Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

4. 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.
5. 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.
6. Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

7.SP Statistics and Probability

A. Use random sampling to draw inferences about a population.

1. 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.
2. Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.

B. Draw informal comparative inferences about two populations.
   3. Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.
   4. Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.
C. Investigate chance processes and develop, use, and evaluate probability models.
   5. Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.
   6. Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.
   7. Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.
       a. Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.
       b. Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?
   8. Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.
       a. Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.
       b. Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event.
       c. Design and use a simulation to generate frequencies for compound events. For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood?

8.NS The Number System
A. Know that there are numbers that are not rational, and approximate them by rational numbers.
   1. Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion

repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.

2. Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., sqrt2). For example, by truncating the decimal expansion of sqrt2, show that sqrt2 is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.

8.EE Expressions and Equations

A. Work with radicals and integer exponents.

1. Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $32 \times 3{-}5 = 3{-}3 = 1/33 = 1/27$.

2. Use square root and cube root symbols to represent solutions to equations of the form $x2 = p$ and $x3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that sqrt2 is irrational.

3. Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. For example, estimate the population of the United States as 3×108 and the population of the world as 7×109, and determine that the world population is more than 20 times larger.

4. Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.

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

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

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

7. Solve linear equations in one variable.

   a. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers).

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

8.F Functions

A. Define, evaluate, and compare functions.

1. Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.

2. Compare properties (e.g. rate of change, intercepts, domain and range) of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.

3. Interpret the equation y = mx + b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. For example, the function A = s2 giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line.

B. Use functions to model relationships between quantities.
   4. Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.
   5. Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.

8.G Geometry

A. Understand congruence and similarity using physical models, transparencies, or geometry software.
   1. Verify experimentally the properties of rotations, reflections, and translations:
      a. Lines are transformed to lines, and line segments to line segments of the same length.
      b. Angles are transformed to angles of the same measure.
      c. Parallel lines are transformed to parallel lines.
   2. Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.
   3. Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
   4. Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.
   5. Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.

B. Understand and apply the Pythagorean Theorem.
   6. Explain a proof of the Pythagorean Theorem and its converse.
   7. Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.
   8. Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.

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

8.SP Statistics and Probability

A. Investigate patterns of association in bivariate data.
   3. Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.

4. Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?

Mathematical Practice Standards
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.

Career Awareness, Exploration, Preparation, and Training (Standard 9.2)
List appropriate units below for which standards will be addressed

By Grade 8		
Unit Addressed	**Core Idea**	**Standard / Description**
4, 5, 10	An individual's strengths, lifestyle goals, choices, and interests affect employment and income	*9.2.8.CAP.1: Identify offerings such as high school and county career and technical school courses, apprenticeships, military programs, and dual enrollment courses that support career or occupational areas of interest.* *9.2.8.CAP.2: Develop a plan that includes information about career areas of interest.* *9.2.8.CAP.3: Explain how career choices, educational choices, skills, economic conditions, and personal behavior affect income.* *9.2.8.CAP.4: Explain how an individual's online behavior (e.g., social networking, photo exchanges, video postings) may impact opportunities for employment or advancement.*

1, 2	Developing and implementing an action plan is an essential step for achieving one's personal and professional goals.	*9.2.8.CAP.5: Develop a personal plan with the assistance of an adult mentor that includes information about career areas of interest, goals and an educational plan.*
5	Early planning can provide more options to pay for postsecondary training and employment.	*9.2.8.CAP.6: Compare the costs of postsecondary education with the potential increase in income from a career of choice.* *9.2.8.CAP.7: Devise a strategy to minimize costs of postsecondary education.* *9.2.8.CAP.8: Compare education and training requirements, income potential, and primary duties of at least two jobs of interest.* *9.2.8.CAP.9: Analyze how a variety of activities related to career preparation (e.g., volunteering, apprenticeships, structured learning experiences, dual enrollment, job search, scholarships) impacts postsecondary options.*
5	There are a variety of resources available to help navigate the career planning process.	*9.2.8.CAP.10: Evaluate how careers have evolved regionally, nationally, and globally.* *9.2.8.CAP.11: Analyze potential career opportunities by considering different types of resources, including occupation databases, and state and national labor market statistics.* *9.2.8.CAP.12: Assess personal strengths, talents, values, and interests to appropriate jobs and careers to maximize career potential.*
5	Employee benefits can influence your employment choices.	*9.2.8.CAP.13: Compare employee benefits when evaluating employment interests and explain the possible impact on personal finances.* *9.2.8.CAP.14: Evaluate sources of income and alternative resources to accurately compare employment options.*
5, 10	Communication skills and responsible behavior in addition to education, experience, certifications, and skills are all factors that affect employment and income	*9.2.8.CAP.15: Present how the demand for certain skills, the job market, and credentials can determine an individual's earning power.* *9.2.8.CAP.16: Research different ways workers/ employees improve their earning power through education and the acquisition of new knowledge and skills.* *9.2.8.CAP.17: Prepare a sample resume and cover letter as part of an application process.*

		9.2.8.CAP.18: Explain how personal behavior, appearance, attitudes, and other choices may impact the job application process.
		9.2.8.CAP.19: Relate academic achievement, as represented by high school diplomas, college degrees, and industry credentials, to employability and to potential level
5	There are resources to help an individual create a business plan to start or expand a business.	*9.2.8.CAP.20*: Identify the items to consider when estimating the cost of funding a business.

Life Literacies and Key Skills ([Standard 9.4](#))
List appropriate units below for which standards will be addressed

By Grade 8		
Unit Addressed	**Core Idea**	**Standard / Description**
1, 2, 3, 6, 8, 9, 10	**Creativity and Innovation**: Gathering and evaluating knowledge and information from a variety of sources, including global perspectives, fosters creativity and innovative thinking.	*9.4.8.CI.1*: Assess data gathered on varying perspectives on causes of climate change (e.g., cross cultural, gender-specific, generational), and determine how the data can best be used to design multiple potential solutions (e.g., RI.7.9, 6.SP.B.5, 7.1.NH.IPERS.6, 8.2.8.ETW.4). *9.4.8.CI.2*: Repurpose an existing resource in an innovative way (e.g., 8.2.8.NT.3). *9.4.8.CI.3*: Examine challenges that may exist in the adoption of new ideas (e.g., 2.1.8.SSH, 6.1.8.CivicsPD.2). *9.4.8.CI.4*: Explore the role of creativity and innovation in career pathways and industries
1, 2, 3, 6, 8, 9, 10	**Critical Thinking and Problem-solving:** Multiple solutions often exist to solve a problem.	*9.4.8.CT.1*: Evaluate diverse solutions proposed by a variety of individuals, organizations, and/or agencies to a local or global problem, such as climate change, and use critical thinking skills to predict which one(s) are likely to be effective (e.g., MS-ETS1-2). *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).

10	**Critical Thinking and Problem-solving:** An essential aspect of problem solving is being able to self-reflect on why possible solutions for solving problems were or were not successful.	*9.4.8.CT.3: Compare past problem-solving solutions to local, national, or global issues and analyze the factors that led to a positive or negative outcome.*
6, 7, 10	**Digital Citizenship:** Detailed examples exist to illustrate crediting others when incorporating their digital artifacts in one's own work.	*9.4.8.DC.1: Analyze the resource citations in online materials for proper use.* *9.4.8.DC.2: Provide appropriate citation and attribution elements when creating media products (e.g., W.6.8).*
10	**Digital Citizenship:** There are tradeoffs between allowing information to be public and keeping information private and secure.	*9.4.8.DC.3: Describe tradeoffs between allowing information to be public (e.g., within online games) versus keeping information private and secure.*
1-10	**Digital Citizenship:** Digital footprints are publicly accessible, even if only shared with a select group. Appropriate measures such as proper interactions can protect online reputations.	*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.DC.6: Analyze online information to distinguish whether it is helpful or harmful to reputation.*
1-10	**Digital Citizenship:** Digital communities are used by individuals to share information, organize, and engage around issues and topics of interest.	*9.4.8.DC.7: Collaborate within a digital community to create a digital artifact using strategies such as crowdsourcing or digital surveys.*
10	**Digital Citizenship:** Digital technology and data can be leveraged by communities to address effects of climate change.	*9.4.8.DC.8: Explain how communities use data and technology to develop measures to respond to effects of climate change (e.g., smart cities).*
10	**Global and Cultural Awareness:** Awareness of and appreciation for cultural differences is critical to avoid barriers to productive and positive interaction.	*9.4.8.GCA.1: Model how to navigate cultural differences with sensitivity and respect (e.g., 1.5.8.C1a).* *9.4.8.GCA.2: Demonstrate openness to diverse ideas and perspectives through active discussions to achieve a group goal.*

10	**Information and Media Literacy:** Increases in the quantity of information available through electronic means have heightened the need to check sources for possible distortion, exaggeration, or misrepresentation.	*9.4.8.IML.1: Critically curate multiple resources to assess the credibility of sources when searching for information.* *9.4.8.IML.2: Identify specific examples of distortion, exaggeration, or misrepresentation of information.*
10	**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.	*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.IML.5: Analyze and interpret local or public data sets to summarize and effectively communicate the data.*
1-10	**Information and Media Literacy:** The mode of information can convey a message to consumers or an audience.	*9.4.8.IML.6: Identify subtle and overt messages based on the method of communication.*
4, 5, 6, 10	**Information and Media Literacy:** Sources of information are evaluated for accuracy and relevance when considering the use of information.	*9.4.8.IML.7: Use information from a variety of sources, contexts, disciplines, and cultures for a specific purpose (e.g., 1.2.8.C2a, 1.4.8.CR2a, 2.1.8.CHSS/IV.8.AI.1, W.5.8, 6.1.8.GeoSV.3.a, 6.1.8.CivicsDP.4.b, 7.1.NH. IPRET.8).* *9.4.8.IML.8: Apply deliberate and thoughtful search strategies to access high-quality information on climate change (e.g., 1.1.8.C1b).*
1-10	**Information and Media Literacy:** There are ethical and unethical uses of information and media.	*9.4.8.IML.9: Distinguish between ethical and unethical uses of information and media (e.g., 1.5.8.CR3b, 8.2.8.EC.2).* *9.4.8.IML.10: Examine the consequences of the uses of media (e.g., RI.8.7).* *9.4.8.IML.11: Predict the personal and community impact of online and social media activities*

1, 4, 6, 8, 10	**Information and Media Literacy:** There is a need to produce and publish media that has information supported with quality evidence and is intended for authentic audiences.	*9.4.8.IML.12: Use relevant tools to produce, publish, and deliver information supported with evidence for an authentic audience.* *9.4.8.IML.13: Identify the impact of the creator on the content, production, and delivery of information (e.g., 8.2.8.ED.1).* *9.4.8.IML.14: Analyze the role of media in delivering cultural, political, and other societal messages.* *9.4.8.IML.15: Explain ways that individuals may experience the same media message differently.*
5, 10	**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.	*9.4.8.TL.1: Construct a spreadsheet in order to analyze multiple data sets, identify relationships, and facilitate data-based decision-making.* *9.4.8.TL.2: Gather data and digitally represent information to communicate a real-world problem (e.g., MS-ESS3-4, 6.1.8.EconET.1, 6.1.8.CivicsPR.4).* *9.4.8.TL.3: Select appropriate tools to organize and present information digitally.* *9.4.8.TL.4: Synthesize and publish information about a local or global issue or event (e.g., MSLS4-5, 6.1.8.CivicsPI.3).*
1-10	**Technology Literacy:** Digital tools allow for remote collaboration and rapid sharing of ideas unrestricted by geographic location or time.	*9.4.8.TL.5: Compare the process and effectiveness of synchronous collaboration and asynchronous collaboration.* *9.4.8.TL.6: Collaborate to develop and publish work that provides perspectives on a real-world problem.*

Interdisciplinary Connections ([2020 NJSLS](#))
List any other content standards addressed as well as appropriate units. All arts integration connections may be listed within this chart.

Visual & Performing Arts Integration ([Standard 1](#))
List appropriate units below for which standards (1.1 through 1.5) <u>may be addressed</u>

Unit Addressed	Artistic Process	Anchor Standard
1, 6, 7, 10	**Creating**	*Anchor Standard 1: Generating and conceptualizing ideas.* *Anchor Standard 2: Organizing and developing ideas.* *Anchor Standard 3: Refining and completing products.*

1, 5	**Connecting**	*Anchor Standard 10: Synthesizing and relating knowledge and personal experiences to create products.* *Anchor Standard 11: Relating artistic ideas and works within societal, cultural, and historical contexts to deepen understanding.*
1, 6, 7, 10	**Performing/ Presenting/ Producing**	*Anchor Standard 4: Selecting, analyzing, and interpreting work.* *Anchor Standard 5: Developing and refining techniques and models or steps needed to create products.* *Anchor Standard 6: Conveying meaning through art.*
1	**Responding**	*Anchor Standard 7: Perceiving and analyzing products.* *Anchor Standard 8: Applying criteria to evaluate products.* *Anchor Standard 9: Interpreting intent and meaning.*

Other Interdisciplinary Content Standards
List appropriate units below for any other content/standards that <u>may be addressed</u>

Unit Addressed	Content / Standard #	Standard Description
1, 10	L/A: NJSLSA.W6	Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.
1, 10	L/A: NJSLSA.W7	Conduct short as well as more sustained research projects, utilizing an inquiry-based research process, based on focused questions, demonstrating understanding of the subject under investigation.
1, 10	L/A: NJSLSA.W8	Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.
1-10	L/A: NJSLSA.W10	Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.
1, 6, 10	L/A: W.7.6	Use technology, including the Internet, to produce and publish writing and link to and cite sources as well as to interact and collaborate with others, including linking to and citing sources.
1, 2, 5, 10	L/A: W.7.7	Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions for further research and investigation.
1, 10	L/A: W.7.8	Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and

		accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.
1-10	L/A: 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.
1, 5, 7, 9, 10	L/A: NJSLSA.SL2	Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.
1-10	L/A: NJSLSA.SL4	Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.
1, 5, 10	L/A: NJSLSA.SL5	Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.
7, 10	Social Studies: 6.1	U.S. History: America in the World: All students will acquire the knowledge and skills to think analytically about how past and present interactions of people, cultures, and the environment shape the American heritage. Such knowledge and skills enable students to make informed decisions that reflect fundamental rights and core democratic values as productive citizens in local, national, and global communities.
1, 7, 10	Social Studies: 6.2	World History/Global Studies: All students will acquire the knowledge and skills to think analytically and systematically about how past interactions of people, cultures, and the environment affect issues across time and cultures. Such knowledge and skills enable students to make informed decisions as socially and ethically responsible world citizens in the 21st century.
3, 4, 5, 9, 10	Social Studies: 6.3	Active Citizenship in the 21st Century: All students will acquire the skills needed to be active, informed citizens who value diversity and promote cultural understanding by working collaboratively to address the challenges that are inherent in living in an interconnected world.
1, 4	Science: MS-LS4-6	Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.

1, 2, 3, 4	Science: MS-ESS3-4	Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.
2	Science: MS-ESS1-3	Analyze and interpret data to determine scale properties of objects in the solar system.
5	Science: 9.1.8.A.1	Explain the meaning and purposes of taxes and tax deductions and why fees for various benefits (e.g., medical benefits) are taken out of pay.
3, 4, 5, 9	21st Century Skills: Personal Financial Literacy: 9.1.A	Income and Careers
3, 4, 5	21st Century Skills: Personal Financial Literacy: 9.1.B	Money Management
3, 4, 5	21st Century Skills: Personal Financial Literacy: 9.1.D	Planning, Saving and Investing
3, 4, 5, 9	21st Century Skills: Personal Financial Literacy: 9.1.E	Becoming a critical consumer

Pacing Guide (All Dates are approximate based on the school calendar)

Unit/ Topic	Month (w/Approx number of Teaching Days)
Unit 1: Real Numbers & Roots	**September** (~19 days)
Unit 2: Properties of Powers & Scientific Notation Unit 3: Equations & Inequalities	**October** (~19 days)
Unit 3 Equations & Inequalities Unit 4: Proportional Reasoning	**November** (~16 days)
Unit 4: Proportional Reasoning Unit 10: Data Analysis and Statistics Project	**December** (~15 days)
Unit 5: Percent Problems Unit 6: Geometry – Relationships	**January** (~18 days)
Unit 6: Geometry - Relationships Unit 7: Probability	**February** (~18 days)
Unit 7: Probability	**March** (~15-20 days)
Unit 8: Geometry – Formulas	**April** (~15-20 days)
Unit 8: Geometry – Formulas Unit 9: Functions	**May** (~18 days)
Unit 9: Functions	**June** (~15 days)

Unit 1: Real Numbers & Roots
Chapter 4

Step 1 – Desired Results: What do I want my students to learn?

Standards

- 8.NS.A, 8.NS.A.1; 8.NS.A.2, 7.EE.A, 7.EE.A.1; 7.EE.A.2, MP1, MP2, MP3, MP4, MP5, MP6, MP7, MP8
NJSLS Career Awareness, Exploration, Preparation, and Training
NJSLS Life Literacies and Key Skills
NJSLS Interdisciplinary Connections

Unit Big Ideas:
(What Fundamental Concepts Should be Learned during this Unit?)

- Know that there are real numbers that are not rational, and approximate them by rational numbers.
- Write irrational numbers in an exact form.
- Solve equations with powers (square and cube).
- Apply the Pythagorean Theorem.

Objectives

Students will be able to…
- Approximate and simplify square roots.
- Identify subsets of the real number system.
- Solve equations with powers.
- Apply the Pythagorean Theorem

Unit 2: Properties of Powers & Scientific Notation
Chapter 4

Step 1 – Desired Results: What do I want my students to learn?

Standards

NJSLS - 8.EE.A, 8.EE.A.1; 8.EE.A.2; 8.EE.A.3; 8.EE.A.4
MP1, MP2, MP3, MP4, MP5, MP6, MP7, MP8

NJSLS Career Awareness, Exploration, Preparation, and Training
NJSLS Life Literacies and Key Skills
NJSLS Interdisciplinary Connections

Unit Big Ideas:
(What Fundamental Concepts Should be Learned during this Unit?)

- Operations with exponential expressions including integer exponents.
- Operations with scientific notation.

Objectives

Students will be able to…
- Simplify and evaluate algebra expressions.
- Express simplified expressions with both positive and negative exponents.
- Multiply, Divide, and simplify exponential numbers.
- Perform operations with expressions in scientific notation and express the answer in scientific notation.

Unit 3: Equations and Inequalities
Chapter 8

Standards

[NJSLS](#) - 7.EE.B, 7.EE.B.3; 7.EE.B.4, 7.EE.B.4a, 7.EE.B.4b, 8.EE.C, 8.EE.C.7, 8.EE.C.7a, 8.EE.C.7b, MP1, MP2, MP3, MP4, MP5, MP6, MP7, MP8

[NJSLS Career Awareness, Exploration, Preparation, and Training](#)
[NJSLS Life Literacies and Key Skills](#)
[NJSLS Interdisciplinary Connections](#)

Unit Big Ideas:
(What Fundamental Concepts Should be Learned during this Unit?)

- Solve real life and mathematical problems using algebraic equations.
- Solve real life and mathematical problems using algebraic inequalities.

Objectives

Students will be able to…
- Solve multi-step equations and inequalities using the properties of equality and inequality.
- Use reciprocals to solve for an unknown.
- Graph inequalities on a number line.
- Translate words into algebra symbols, equations and inequalities and vice versa.
- Rewrite formulas for a different variable.

Unit 4: Proportional Reasoning
Chapter 5

Standards

[NJSLS](#) - 7.RP.A, 7.RP.A.1, 7.RP.A.2, 7.RP.A.2a, 7.RP.A.2b, 7.RP.A.2c, 7.RP.A.2d, 7.RP.A.3, 7.NS.A, 7.NS.A.3, 7.EE.A, 7.EE.A.2; 7.EE.B, 7.EE.B.3; 7.EE.B.4, 7.EE.B.4a, 7.EE.B.4b, 7.G.A, 7.G.A.1, 8.EE.B, 8.EE.B.5, MP1, MP2, MP3, MP4, MP5, MP6, MP7, MP8

[NJSLS Career Awareness, Exploration, Preparation, and Training](#)
[NJSLS Life Literacies and Key Skills](#)
[NJSLS Interdisciplinary Connections](#)

Unit Big Ideas:
(What Fundamental Concepts Should be Learned during this Unit?)

- Analyze proportional relationships and use them to solve real world and mathematical problems.

Objectives

Students will be able to…
- Use the relationship between fractions, decimals and percents, including ratio rates and unit rates.
- Identify the constant of proportionality in tables, graphs, equations, diagrams and verbal descriptions.
- Use proportion to predict.
- Change units using dimensional analysis.

Unit 5: Proportional Reasoning and Percents
Chapter 6

Step 1 – Desired Results: What do I want my students to learn?

Standards

NJSLS Career Awareness, Exploration, Preparation, and Training
NJSLS Life Literacies and Key Skills
NJSLS Interdisciplinary Connections

Unit Big Ideas:
(What Fundamental Concepts Should be Learned during this Unit?)

- Apply the percent proportion and/or equation to solve real world percent problems.

Objectives

Students will be able to…
- Use the relationship between fractions, decimals and percents, including ratio rates and unit rates.
- Identify the constant of proportionality in tables, graphs, equations, diagrams and verbal descriptions.
- Use proportion to predict and extend to include percent.

Unit 6: Congruence, Similarity, and Transformations
Chapter 11

Step 1 – Desired Results: What do I want my students to learn?

Standards

NJSLS - 7.G.A, 7.G.A.1, 7.G.A.2, 7.G.B, 7.G.B.5, 7.NS.A.3, 7.EE.B.3, 7.RP.A.2, 7.RP.A.2a, 7.RP.A.2b, 7.RP.A.2c, 7.RP.A.2d, 8.G.A, 8.G.A.1, 8.G.A.1a, ,8.G.A.1b, 8.G.A.1c, 8.G.A.2, 8.G.A.3, 8.G.A.4, 8.G.A.5, MP1, MP2, MP3, MP4, MP5, MP6, MP7, MP8

NJSLS Career Awareness, Exploration, Preparation, and Training
NJSLS Life Literacies and Key Skills
NJSLS Interdisciplinary Connections

Unit Big Ideas:
(What Fundamental Concepts Should be Learned during this Unit?)

- Solve real-life and mathematical problems using numerical and algebraic equations
- Draw, construct and describe geometrical figures and describe the relationships between them.
- Understand congruence and similarity using physical models, transparencies or geometry software.

Objectives

Students will be able to…
- Write and solve equations to find unknown angle measures.
- Identify different types of angle relationships.
- Identify angle measurement using different types of angle relationships
- Compute actual and scale lengths and areas.
- Reproduce a scale drawing.
- Draw geometric shapes with given conditions.
- Verify the properties of rotations, reflections, and translations
- Determine a sequence of transformations that exhibits congruence between two figures.
- Describe the effect of dilations, translations, rotations, and reflections on 2D figures

Unit 7: Probability
Chapter 10

Step 1 – Desired Results: What do I want my students to learn?

Standards

NJSLS - 7.SP.C, 7.SP.C.5, 7.SP.C.6, 7.SP.C.7, 7.SP.C.7a, 7.SP.C.7b, 7.SP.C.8, 7.SP.C.8a, 7.SP.C.8b, 7.SP.C.8c, MP1, MP2, MP3, MP4, MP5, MP6, MP7, MP8

NJSLS Career Awareness, Exploration, Preparation, and Training
NJSLS Life Literacies and Key Skills
NJSLS Interdisciplinary Connections

Unit Big Ideas:
(What Fundamental Concepts Should be Learned during this Unit?)

- Investigate chance processes and develop, use and evaluate probability models.
- Find and compare theoretical and experimental probability.
- Predict actions of a larger group.

Objectives

Students will be able to…
- Count using a tree diagram or organized list and extend to the fundamental counting principle.
- Identify and find permutations and combinations.
- Find theoretical probability and experimental probability including geometrical probability.
- Find compound probability.

Unit 8: Three-Dimensional Geometry
Chapter 12

Step 1 – Desired Results: What do I want my students to learn?

Standards

NJSLS - 7.G.A.3 7.G.B, 7.G.B.4, 7.G.B.6, 7.NS.A.3, 7.EE.B.3, 8.G.B, 8.G.B.6, 8.G.B.7, 8.G.C, 8.G.C.9, MP1, MP2, MP3, MP4, MP5, MP6, MP7, MP8

NJSLS Career Awareness, Exploration, Preparation, and Training
NJSLS Life Literacies and Key Skills
NJSLS Interdisciplinary Connections

Unit Big Ideas:
(What Fundamental Concepts Should be Learned during this Unit?)

- Solve real-life and mathematical problems using numerical and algebraic equations.
- Solve real-life and mathematical problems involving angle measure, area, surface area and volume.
- Apply the Pythagorean theorem.
- Solve real-world and mathematical problems involving volume of cylinders, cones and spheres.

Objectives

Students will be able to…
- Apply the Pythagorean theorem in real-world and mathematical problems.
- Find the area of irregular and shaded regions
- Identify solid figures and name key parts, i.e. what happens why a three dimensional shape is sliced.
- Calculate surface area of prisms, pyramids, cylinders and spheres.
- Determine the volume of prisms, pyramids, cylinders, cones and spheres
- Describe the relationship between the volume of prisms/pyramids and cylinders/cones with the same base and height.
- Apply surface area and volume in real life situations.

Unit 9: Functions
Chapter 9

Step 1 – Desired Results: What do I want my students to learn?

Standards

Unit Big Ideas:
(What Fundamental Concepts Should be Learned during this Unit?)

- Define, evaluate and compare functions.
- Investigate patterns of associations in bivariate data.

Objectives

Students will be able to…
- Determine if a relation is a function.
- Compare functions, linear and nonlinear.
- Use a table of values and graph linear functions.
- Use a table of values and graph nonlinear functions
- Find the constant of proportionality of a linear function.
- Construct a function to model a linear relationship between two quantities.

Unit 10: Statistics (Project Based Learning)
Chapter 10

Step 1 – Desired Results: What do I want my students to learn?

Standards

NJSLS - 7.SP.A, 7.SP.A.1, 7.SP.A.2, 7.SP.B, 7.SP.B.3, 7.SP.B.4, MP1, MP2, MP3, MP4, MP5, MP6, MP7, MP8

NJSLS Career Awareness, Exploration, Preparation, and Training
NJSLS Life Literacies and Key Skills
NJSLS Interdisciplinary Connections

Unit Big Ideas:
(What Fundamental Concepts Should be Learned during this Unit?)

- Use random sampling to draw inferences about a population.
- Draw informal comparative inferences about two populations.
- Investigate patterns of associations of bivariate data.

Objectives

Students will be able to…
- Use data from a random sample to draw inferences about a population and use the measures of central tendency to draw informal comparisons.
- Use sampling and margin of error to find an interval in which their prediction most likely exists
- Construct and interpret scatter plots for bivariate measurement data to investigate patterns.

Please contact content supervisor for any questions.