Curriculum & Instruction

SUMMIT PUBLIC SCHOOLS

Content Area: Mathematics
Course: Math 7 (MA701)
Grade(s): 7

Course Overview

The Math 7 course will prepare the student for the Pre-Algebra 8 course. Students will build on their knowledge of the number system using algebraic properties and number sense to compare, order, and compute with rational numbers. Order of operations will be extended to simplify expressions with exponents. They will solve one- and two-step equations with rational numbers. Students will write, solve and graph one- and two-step inequalities. Ratios, proportions, and percents will be represented using tables, graphs and equations in real-world contexts. Students will extend their work in two-dimensional geometry by learning properties of lines, rays, segments, special angle pairs, and polygons. Students will find the area of triangles, quadrilaterals, and compound shapes. Three-dimensional geometry will include identifying various solids and their properties, classifying solids, and finding surface area and volume. The statistics and probability units will include comparative analysis of similar data sets, theoretical and experimental probability, random sampling, tree diagrams showing possible outcomes, and graphs. Throughout the course, technology, interdisciplinary activities, media literacy and global perspectives will be integrated.

Prerequisite: Math 6

New Jersey State Learning Standards

Summit Public Schools curriculum aligns with the New Jersey Student Learning Standards,

Content Area Standards:

- 7.EE.A.1. Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
- 7.EE.A.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.”
- 7.EE.B.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.

- 7.EE.B.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,* and are specific rational numbers. Solve equations of these forms with accuracy and efficiency. 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.A.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.
- 7.G.A.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.
- 7.G.B.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.
- 7.G.B.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.
- 7.G.B.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.NS.A.1. Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.
    - a. Describe situations in which opposite quantities combine to make 0. For example, in the first round of a game, Maria scored 20 points. In the second round of the same game, she lost 20 points. What is her score at the end of the second round?
    - b. Understand p + q as the number located a distance |q| from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.
    - c. Understand subtraction of rational numbers as adding the additive inverse, p – q = p + (–q). Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.
    - d. Apply properties of operations as strategies to add and subtract rational numbers.

- 7.NS.A.2. Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.
    - a. Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (–1)(–1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts
    - b. Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then –(p/q) = (–p)/q = p/(–q). Interpret quotients of rational numbers by describing real world contexts.
    - c. Apply properties of operations as strategies to multiply and divide rational numbers.
    - d. Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.
- 7.NS.A.3. Solve real-world and mathematical problems involving the four operations with rational numbers.
- 7.RP.A.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.
- 7.RP.A.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.
- 7.RP.A.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.SP.A.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.
- 7.SP.A.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.
- 7.SP.A.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.

- 7.SP.B.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.
- 7.SP.B.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.

Interdisciplinary Standards:

- MS-PSI-2. Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.
- MS-PS3-1. Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.
- MS-PS4-1. Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave.
- MS-LS2-1. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.
- MS-LS4-1. Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.
- 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.
- MS-ESSI-3. Analyze and interpret data to determine scale properties of objects in the solar system.
- MS-ESS2-3. Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.
- MS-ESS3-2. Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.
- MS-ETSI-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

Career Readiness, Life Literacies and Key Skills Standards:

- 8.1.8.DA.1: Organize and transform data collected using computational tools to make it usable for a specific purpose.
- 9.4.8.CI.3: Examine challenges that may exist in the adoption of new ideas
- 9.4.8.CT.2: Develop multiple solutions to a problem and evaluate short- and long-term effects to determine the most plausible option

- 9.4.8.DC.7: Collaborate within a digital community to create a digital artifact using strategies such as crowdsourcing or digital surveys.
- 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
- 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.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

Computer Science and Design Thinking Standards:

- 8.1.8.DA.1: Organize and transform data collected using computational tools to make it usable for a specific purpose.
- 8.2.8.ED.2: Identify the steps in the design process that could be used to solve a problem.

Career Readiness Practices

- CRP 1. Act as a responsible and contributing citizen and employee.
- CRP 2. Apply appropriate academic and technical skills.
- CRP 3. Attend to personal health and financial well-being.
- CRP 4. Communicate clearly and effectively and with reason.
- CRP 5. Consider the environmental, social and economic impacts of decisions.
- CRP 6. Demonstrate creativity and innovation.
- CRP 7. Employ valid and reliable research strategies.
- CRP 8. Utilize critical thinking to make sense of problems and persevere in solving them.
- CRP 9. Model integrity, ethical leadership and effective management.
- CRP 10. Plan education and career paths aligned to personal goals.
- CRP 11. Use technology to enhance productivity.
- CRP 12. Work productively in teams while using cultural global competence.

New Jersey Curriculum Mandates:

This curriculum integrates lessons that address the following interdisciplinary New Jersey Curriculum Mandates:

- Diversity and Inclusion (Grades K - 12)
    - C.18A:35-4.36a: Curriculum to include instruction on diversity and inclusion.
        - (3) encourage safe, welcoming, and inclusive environments for all students regardless of race or ethnicity, sexual and gender identities, mental and physical disabilities, and religious beliefs.

Learning Objectives

Date Revised: August 2025

Learning objectives are clear, specific statements that define what students should know, understand, and be able to do by the end of a lesson or course.

Students will understand that…

- Multiplying by zero, in any form, produces a product of 0.
- Multiplying by one, in any form, does not change the value of the quantity.
- They can represent addition and subtraction on a horizontal or vertical number line diagram.
- Subtraction of rational numbers as adding the
- Additive inverse, $p - q = p + (-q)$.
- They can apply and extend previous understandings of multiplication and division and of fractions to multiply and divide integers.
- A number and its opposite have a sum of 0 (are additive inverses).
- Integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number.
- Long division can be used to convert a rational number to a decimal; know that the decimal form of a rational number terminates in 0s or eventually repeats.
- Multiplication and division is extended from fractions to rational numbers by following the same ideas as multiplying integers such as two negatives multiply to a positive product.
- An expression has parts such as variables, coefficients, and constants.
- Like terms can be grouped together to add and subtract expressions.
- Expressions can be expanded using the Distributive Property before combining like terms.
- In order to solve a two-step equation, they must use the rules of PEMDAS in reverse order.
- They can check their algebraic equation solutions by substituting their solution into the equation.
- They can write word sentences as inequalities.
- “Less/greater than” and “less/greater than or equal to” solutions are represented differently on a number line.
- They can utilize properties of expressions and equations to solve inequalities.
- Inequalities can be used to model real-life situations.
- A ratio can be understood like a fraction.
- They can write equivalent ratios and proportional relationships.
- They can model ratio relationships, proportional relationships, and percents to solve real-life problems.
- They can identify the constant of proportionality (unit rate) in tables, graphs, . . . diagrams, and verbal descriptions of proportional relationships.
- Ratios can be used to create scale drawings and calculate missing dimensions in scale drawings.
- You can rewrite, compare and order fractions, decimals, and percents.
- Students can use the percent proportion or percent equation to find a percent, a part, or a whole.
- The original price is always represented as 100% and they can use proportions and the percent equation to calculate discounts and markups.
- Intersecting lines form various angle relationships.
- Angle relationships can be used to calculate angle measures utilizing algebra.
- Angles can be classified as adjacent, vertical, complementary and/or supplementary.
- Triangles can be classified by sides and angles.

- Then can solve real-world problems with angle relationship facts.
- Quadrilaterals can be classified by angle measurements and side lengths.
- The value of pi is used to estimate circumference and area of circles.
- Explain how to find the circumference and area of a circle.
- Find the areas of circles and composite figures.
- They can describe the surface area and volume of different shapes.
- They can use formulas to find surface areas and volumes of solids.
- They can solve real-life problems involving surface area and volume.
- How to describe cross sections of solids.
- Each event has a certain amount of outcomes
- Probability is the amount of times a desired outcome occurs out of the total outcomes
- They can explain the meaning of experimental and theoretical probability.
- They can make predictions using probabilities.
- How to determine the validity of a conclusion.
- How to explain variability in samples of a population.
- Can solve a problem using statistics.
- Can compare populations.

Units of Study

Units of study are organized collections of lessons and learning experiences focused on a specific topic and set of skills within a course. Each unit is guided by a set of essential questions.

Unit 1: Integers (~16 Days) - Chapter 1

- How can you use integers to represent the velocity and the speed of an object?
- Is the sum of two integers positive, negative, or zero? How can you tell?
- How are adding integers and subtracting integers related?
- Is the product of two integers positive, negative, or zero? How can you tell?
- Is the quotient of two integers positive, negative, or zero? How can you tell?

Unit 2: Rational Numbers (~16 Days) - Chapter 2

- How can you use a number line to order rational numbers?
- How can you use what you know about adding integers to add rational numbers?
- How can you use what you know about subtracting integers to subtract rational numbers?
- Why is the product of two negative rational numbers positive?

Unit 3: Expressions and Equations (~21 Days) - Chapter 3

- How can you simplify an algebraic expression using like terms?
- How can you use multiplication or division to solve equations?
- What properties do I have to follow to simplify expressions?
- How does writing expressions interpret real-life problems?
- What rules do I have to follow to solve two-step equations?
- In what scenarios can algebra be utilized to solve problems in your life?
- How do I write and solve algebraic equations that represent real-world problems ?

Unit 4: Inequalities (~12 Days) - Chapter 4

- How can you use a number line to represent solutions of an inequality?

- How can you use addition or subtraction to solve an inequality?
- How can you use multiplication or division to solve an inequality?
- In what scenarios can algebra be utilized to solve problems in your life?
- How do I write and solve algebraic equations that represent real-world problems ?

Unit 5: Ratios and Proportions (~22 Days) - Chapters 5 & 7

- Can you think of any situation where it might be important to make a comparison of amounts?
- How do rates help you describe real-life problems?
- How can you use a table of different unit rates, a graph in a coordinate plane, and an equation to solve ratio problems?
- How can you write a proportion that solves a problem in real life?
- How can you use ratio tables and cross products to solve proportions?
- How can you compare two rates graphically?

Unit 6: Percents (~18 Days) - Chapter 6

- How does the decimal point move when you rewrite a percent as a decimal and when you rewrite a decimal as a percent?
- How can you order numbers that are written as fractions, decimals, and percents?
- What is a percent of decrease? What is a percent of increase?
- How can you find discounts and selling prices?
- How can you find the amount of simple interest earned on a savings account?
- How can you find the amount of interest owed on a loan?

Unit 7: Angles and Triangles (~12 Days) - Chapter 7

- What can you conclude about the angles formed by two intersecting lines?
- How can you classify two angles as complementary or supplementary?
- How can you classify two angles as adjacent or vertical?
- How do you solve problems involving angle measures?
- How can you classify quadrilaterals?

Unit 8: Circles (~11 Days) - Chapter 8

- How can you find the circumference of a circle?
- What regular shapes is a specific composite shape composed of?
- How can you find the perimeter of a composite figure?
- How can you find the area of a circle?
- How can you find the area of a composite figure?

Unit 9: Surface Area and Volume (~14 Days) - Chapter 9

- How can you find the surface area of a prism?
- How can you find the surface area of a pyramid?
- How can you find the surface area of a cylinder?
- How can you find the volume of a prism?
- How can you find the volume of a pyramid?
- How can you find and compare the areas and volumes of similar solids?

Unit 10: Probability and Statistics (~18 Days) - Chapter 10

- In an experiment, how can you determine the number of possible results?
- How can you describe the likelihood of an event?
- How can you use relative frequencies to find probabilities?
- How can you find the number of possible outcomes of one or more events?
- What is the difference between dependent and independent events?
- How can you determine whether a sample accurately represents a population?
- How can you compare data sets that represent two populations?
- How can you make and interpret different representations of data?

Instructional Resources and Materials

Instructional resources are the information sources teachers utilize to guide their teaching and assessing. Instructional materials are the texts students read or review. The instructional resources and materials may vary in order to meet the learning needs of students.

- Guided Note Outlines
- Google Classroom
- DeltaMath
- Desmos
- Khan Academy
- NJ Standardized Test Prep Resources
- Kuta Software
- Textbook Resource: Big Ideas Math (Grade 7 Red CC) 2010

Assessment Strategies

Assessment measures a student's mastery of a course standard and learning objective. Assessment can be used for both instructional purposes and for evaluative purposes. Teachers may choose one or more of the following ideas to assess learners. They may also modify these ideas to make the assessment more responsive to students' interests and needs.

Formative: Practice Problem Sets, Homework Exercises, Exit Tickets, Graded Check-Ins

Summative: Quizzes & Unit Tests

Benchmark: Midterm and Final Exams

Alternative: Projects

Suggested Strategies for Modification & Differentiation

Modifications Chart

Date Revised: August 2025

Multilingual Learners

Please note this curriculum can be modified for Multilingual Learners for the Sheltered Math 7 course