

# BENWAY SCHOOL

Math Curriculum

Grade 6



**Benway School**

**Unit 1**

**Content Area:** Mathematics

**Unit Title:** Operations and Reasoning About Ratios

**Grade Level:** 6

**Unit Overview:** In this unit, the students will 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. Additionally, they will explore ratio concepts and use ratio reasoning to solve problems.

**Recommended Pacing:** 8-10 weeks (September-November)

<b>Student Learning Objectives</b>	<b>NJSLS</b>
<b>Major Content</b> <b>Supporting Content</b> <b>Additional Content</b> (Identified by PARCC Model Content Frameworks).	
Compute quotients of fractions. (SMP 4)	<b>6.NS.1</b>
Construct visual fraction models to represent quotients of fractions and use the relationship between multiplication and division to explain division of fractions. (SMP 4)	<b>6.NS.1</b>
Solve real-world problems involving quotients of fractions and interpret the solutions in the context given. (SMP 4)	<b>6.NS.1</b>
Fluently divide multi-digit numbers using the standard algorithms.	<b>6.NS.2</b>
Fluently add, subtract, multiply and divide multi-digit decimals.	<b>6.NS.3</b>
Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two numbers less than or equal to 12. (SMP 7)	<b>6.NS.4</b>
Explain the relationship of two quantities in given ratio using ratio language. (SMP2)	<b>6.RPA.1</b>
Use rate language, in the context of the ratio relationship, to describe a unit rate. (SMP 2)	<b>6.RPA.2</b>
Create and complete tables of equivalent ratios to solve real world and mathematical problems using ratio and rate reasoning that include making tables of equivalent ratios, solving unit rate problems, finding percent of a quantity as a rate per 100. (SMP 2, 4, 5, 6, 7, 8)	<b>6.RPA.3</b>
Use ratio and rate reasoning to convert measurement units and to transform units appropriately when multiplying or dividing quantities. (SMP 2, 4, 5, 6, 7, 8)	<b>6.RPA.3</b>
<b>New Jersey Student Learning Standards</b>	<b>Progress Indicator</b>
<b>Major Content</b> <b>Supporting Content</b> <b>Additional Content</b> (Identified by PARCC Model Content Frameworks). <i><b>Bold type indicates a benchmarked standard.</b></i>	
Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. <i>For example, create a story context for (2/3)</i>	<b>6.NS.1</b>

<p><math>\div (3/4)</math> and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that <math>(2/3) \div (3/4) = 8/9</math> because <math>3/4</math> of <math>8/9</math> is <math>2/3</math>. In general, <math>(a/b) \div (c/d) = (ad/bc)</math> How much chocolate will each person get if 3 people share <math>1\ 1/2</math> lb of chocolate equally? How many <math>3/4</math>-cup servings are in <math>2/3</math> of a cup of yogurt? How wide is a rectangular strip of land with length <math>3/4</math> mi and area <math>1/2</math> square mi.?</p>	
Fluently divide multi-digit numbers using the standard algorithm.	6.NS.2
Fluently add, subtract, multiply, and divide multi-digit decimals using the standards algorithm for each operation.	6.NS.3
Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12.	6.NS.4
Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. <i>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."</i>	6.RP.1
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. <i>For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is <math>3/4</math> cup of flour for each cup of sugar." "We paid \$75 for 15 hamburgers, which is a rate of \$5 per hamburger."</i>	6.RP.2
Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. *(benchmarked) a. 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. Solve unit rate problems including those involving unit pricing and constant speed. <i>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?</i> c. 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. d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.	6.RP.3
<b>Standards for Mathematical Practice</b>	<b>Progress Indicator</b>
Reason abstractly and quantitatively.	SMP 2
Model with mathematics.	SMP 4
Use appropriate tools strategically.	SMP 5
Attend to precision.	SMP 6
Look for and make use of structure.	SMP 7
Look for and express regularity in repeated reasoning.	SMP 8

<b>New Jersey Student Learning Standards Technology</b> <i>(Additional standards should be applied, as needed, to enrich instruction and foster student achievement.)</i>	<b>Indicator</b>
Demonstrate knowledge of a real world problem using digital tools.	<b>8.1.8.A.1</b>
Graph and calculate data within a spreadsheet and present a summary of the results.	<b>8.1.8.A.4</b>
Create a database query, sort and create a report and describe the process, and explain the report results.	<b>8.1.8.A.5</b>
Develop an algorithm to solve an assigned problem using a specified set of commands and use peer review to critique the solution.	<b>8.2.8.E.3</b>
Use appropriate terms in conversation (e.g., programming, language, data, RAM, ROM, Boolean logic terms).	<b>8.2.8.E.4</b>
<b>New Jersey Student Learning Standards 21<sup>st</sup> Century Life and Career Skills</b> <i>(Additional standards should be applied, as needed, to enrich instruction and foster student achievement.)</i>	<b>Indicator</b>
Explain the purpose of the payroll deduction process, taxable income, and employee benefits.	<b>9.1.8.A.7</b>
Distinguish among cash, check, credit card, and debit card.	<b>9.1.8.B.1</b>
Construct a simple personal savings and spending plan based on various sources of income.	<b>9.1.8.B.2</b>
Justify the concept of “paying yourself first” as a financial savings strategy.	<b>9.1.8.B.3</b>
Relate the concept of deferred gratification to [investment,] meeting financial goals, and building wealth.	<b>9.1.8.B.4</b>
Develop a system for keeping and using financial records.	<b>9.1.8.B.8</b>
Determine the most appropriate use of various financial products and services (e.g., ATM, debit cards, credit cards, check books).	<b>9.1.8.B.9</b>
Justify safeguarding personal information when using credit cards, banking electronically, or filing forms.	<b>9.1.8.B.10</b>
Determine how saving contributes to financial well-being.	<b>9.1.8.D.1</b>
Analyze interest rates and fees associated with financial services, credit cards, debit cards, and gift cards.	<b>9.1.8.E.5</b>
<b>Career Ready Practices</b>	<b>Indicator</b>
Apply appropriate academic and technical skills.	<b>CRP2</b>
Communicate clearly and effectively and with reason.	<b>CRP4</b>
Demonstrate creativity and innovation.	<b>CRP6</b>
Utilize critical thinking to make sense of problems and persevere in solving them.	<b>CRP8</b>
Use technology to enhance productivity.	<b>CRP11</b>
Work productively in teams while using cultural global competence.	<b>CRP12</b>
<b>Key Vocabulary Words</b>	
Greatest common factor, least common multiple, ratio/equivalent ratios, unit rate	
<b>Evidence of Learning</b>	

**Additional Suggested Assessments:**

- Classroom discussions
- Individual and group projects
- Multimedia presentations
- Performance-based assessments
- Tests/quizzes

**Learning Activities:**

- Whole class and small group discussions
- Independent and group work
- Mathematical modeling and reasoning through open-ended questions

**GO Math! Unit 2, Module 4 (6.NS.1)**

- In the United States we use the Fahrenheit scale to measure temperature. Other countries use the Celsius scale. The students will be provided with the equation used to convert temperatures. Start with temperatures that convert to whole numbers, such as 41F, 59F, 68F, 68F, 77F, 86F.
- Use pattern blocks to model the division  $\frac{2}{3}$  divided by  $\frac{1}{4} = 4$ . Remind students that the division is asking “How many one-sixths are in two-thirds?”
- Have students follow this procedure to divide fractions:
  - Begin by dividing the first numerator by the second numerator, and the first denominator by the second denominator.
  - Next, multiply by a fraction that is equal to 1 and results in a whole-number numerator.
  - Finally, multiply by another fraction that is equal to 1 and results in a whole-number denominator.

**Unit 3-Modules 6, 7, and 8 (6.RP.1, 2, 3)**

- Have students work in groups to find equivalent ratios. Groups toss two number cubes. The lesser number becomes the numerator of a ratio, and the greater number becomes the denominator. If the numbers are the same, the number is both the numerator and denominator. Each group member names one equivalent ratio. Then have each group write the ratios in order from least denominator to greatest denominator.
- Have students explain the strategies they used to find their answers.
- The Richmond bakery is celebrating its 10<sup>th</sup> anniversary by offering 2 cupcakes for \$3. Create a table to see the cost of 2, 4, 6, 8, 10 and 12 cupcakes.
- Provide prices for different packages of competitive products from several stores, for example, 24 oz for \$4.80 and 36 oz for \$5.40. Have students work in pairs to find the unit rate for each item and to determine which items are the best buys. Then have pairs compare their work and explain their steps.
- A carpenter installed 10 windows in 4 hours. A second carpenter installed 15 windows in 5 hours. A third carpenter installed 50 windows in 20 hours. Draw a 4-column rate table to display this information. Include a column for unit rate on the table. Which carpenter is working at the fastest rate? Who has the next fastest rate? Explain.

<ul style="list-style-type: none"> <li>● Sports statistics provide many examples of ratios and rates. Several commonly used sports ratios and rates: RBI's (Baseball), free-throws to attempted free-throws (basketball), pass/run (football). Have students find sports data online or in newspapers, and then ask them to make tables and graphs to display a player's progress.</li> </ul>	
<b>Instructional Materials:</b> <ul style="list-style-type: none"> <li>● GO Math!</li> <li>● Laptops</li> <li>● Smartboard</li> </ul>	
<b>Teacher Resources:</b> <ul style="list-style-type: none"> <li>● <u>Go Math</u> <ul style="list-style-type: none"> <li>○ <u>Correlation</u> : <ul style="list-style-type: none"> <li>▪ Unit 2 Module 4</li> <li>▪ Unit 1 Module 3</li> </ul> </li> </ul> </li> <li>● <u>6.NS.A.1 Traffic Jam</u></li> <li>● <u>6.RP.A.1 Games at Recess</u></li> <li>● <u>6.RP.A.2 Price per pound and pounds per dollar</u></li> <li>● <u>6.RP.A.3 Voting for Three, Variation 1</u></li> <li>● <u>6.RP.A.3c Shirt Sale</u></li> <li>● <u>6.NS.B.3 Reasoning about Multiplication and Division and Place Value, Part 1</u></li> <li>● <u>6.NS.B.4 Factors and Common Factors</u></li> <li>● <u>6.NS.B.4 Multiples and Common Multiples</u></li> <li>● <u>Illustrative Mathematics: Grade 6</u></li> <li>● <u>Khan Academy</u></li> <li>● <u>Math Evidence Statements: Grade 6</u></li> <li>● <u>Math Rules That Expire in the Middle Grades</u></li> </ul>	
<b>Modifications &amp; Accommodations:</b> <i>*Please note that the following modifications and accommodations vary from unit to unit, and may be implemented for any student who would benefit</i>	
<p style="text-align: center;"><b><u>Gifted and Talented</u></b></p> <p><i>(content, process, product, and learning environment)</i></p> <p><b>Extension Activities:</b></p> <ul style="list-style-type: none"> <li>● Conduct research and provide presentation of cultural topics</li> <li>● Design surveys to generate and analyze data to be used in discussion. Debate topics of interest/cultural importance.</li> <li>● Authentic listening and reading sources that provide data and support for speaking and writing prompts</li> <li>● Exploration of art and/or artists to understand society and history</li> <li>● Implement RAFT (role, audience, format, topic) activities as they pertain to the types/modes of communication</li> </ul>	<p style="text-align: center;"><b><u>English Language Learners</u></b></p> <p><b>Modifications:</b></p> <ul style="list-style-type: none"> <li>● Modified assignments</li> <li>● Native language translation (peer, online assistive technology, translation device, bilingual dictionary)</li> <li>● Extended time for assignment completion as needed</li> <li>● Highlight key vocabulary</li> <li>● Use graphic organizers</li> </ul>

<ul style="list-style-type: none"> <li>● Anchor activities</li> <li>● Use of higher-level questioning techniques</li> <li>● Provide assessments at a higher-level of thinking</li> </ul>	
<p style="text-align: center;"><b><u>Students with Disabilities</u></b> <i>(appropriate accommodations, instructional adaptation, and/or modifications as determined by the IEP or 504 team)</i></p> <p><b>Modifications for Classroom:</b></p> <ul style="list-style-type: none"> <li>● Pair visual prompts with verbal presentations</li> <li>● Ask students to restate information, directions, and assignments</li> <li>● Repetition and practice</li> <li>● Model skills/techniques to be mastered</li> <li>● Extended time to complete class work</li> <li>● Provide copy of class notes</li> <li>● Preferential seating to be mutually determined by the student and teacher</li> <li>● Student may request to use a computer to complete assignments</li> <li>● Establish expectations for correct spelling on assignments</li> <li>● Extra textbooks for home</li> <li>● Student may request books on tape/CD/digital media, as available and appropriate</li> <li>● Assign a peer helper in the class setting</li> <li>● Provide oral reminders and check student work during independent work time</li> <li>● Assist student with long and short term planning of assignments</li> <li>● Encourage student to proofread assignments and tests</li> <li>● Provide regular parent/school communication</li> <li>● Teachers will check/sign student agenda daily</li> <li>● Student requires use of other assistive technology device</li> </ul> <p><b>Homework and Assignments:</b></p> <ul style="list-style-type: none"> <li>● Extended time to complete assignments</li> <li>● Student requires more complex assignments to be broken up and explained in smaller units, with work to be submitted in phases.</li> <li>● Provide the student with clearly stated (written) expectations and grading criteria for assignments.</li> </ul>	<p style="text-align: center;"><b><u>Students at Risk of School Failure</u></b></p> <p><b>Modifications for Classroom:</b></p> <ul style="list-style-type: none"> <li>● Pair visual prompts with verbal presentations</li> <li>● Ask students to restate information, directions, and assignments</li> <li>● Repetition and practice</li> <li>● Model skills/techniques to be mastered</li> <li>● Extended time to complete class work</li> <li>● Provide a copy of class notes</li> <li>● Preferential seating to be mutually determined by the student and teacher</li> <li>● Student may request to use a computer to complete assignments</li> <li>● Establish expectations for correct spelling on assignments</li> <li>● Extra textbooks for home</li> <li>● Student may request books on tape/CD/digital media, as available and appropriate</li> <li>● Assign a peer helper in the class setting</li> <li>● Provide oral reminders and check student work during independent work time</li> <li>● Assist student with long and short term planning of assignments</li> <li>● Encourage student to proofread assignments and tests</li> <li>● Provide regular parent/school communication</li> <li>● Teachers will check/sign student agenda daily</li> <li>● Student requires use of other assistive technology device</li> </ul> <p><b>Modifications for Homework and Assignments:</b></p> <ul style="list-style-type: none"> <li>● Extended time to complete assignments</li> <li>● Student requires more complex assignments to be broken up and explained in smaller units, with work to be submitted in phases.</li> <li>● Provide the student with clearly stated (written) expectations and grading criteria for assignments.</li> <li>● Implement RAFT (role, audience, format, topic) activities as they pertain to the types/modes of communication</li> </ul>

- Implement RAFT (role, audience, format, topic) activities as they pertain to the types/modes of communication
- Continue to develop phrasing and fluency while reading aloud, as needed
- Encourage silent reading for short periods of time
- Use close reading strategies
- Continue to provide access to various genres
- Make available high interest, low readability texts for use during independent reading
- Use citing the text strategy to develop oral and written summarization skills
- Continue using marking the text strategy
- Write short essays using various supporting strategies such as marking the text, graphic organizers, citing text, and teacher-prompts
- Write routinely and engage in peer editing with teacher guidance

**Modifications for Assessments:**

- Extended time on classroom tests and quizzes
- Student may take/complete tests in an alternate setting as needed
- Restate, reread, and clarify directions/questions
- Distribute study guide for classroom tests
- Establish procedures for accommodations/modifications for assessments

**Modifications for Assessments:**

- Extended time on classroom tests and quizzes
- Student may take/complete tests in an alternate setting as needed
- Restate, reread, and clarify directions/questions
- Distribute study guide for classroom tests
- Establish procedures for accommodations/modifications for assessments



Benway School	
Unit 2	
<b>Content Area:</b> Mathematics	
<b>Unit Title:</b> Expressions and 3-D Geometry	
<b>Grade Level:</b> 6	
<b>Unit Overview:</b> In this unit, students will apply and extend previous understandings of arithmetic to algebraic expressions, reason about and solve one-variable equations and inequalities, and solve real-world and mathematical problems involving area, surface area, and volume.	
<b>Recommended Pacing:</b> 8-10 weeks (November-January)	
Student Learning Objectives	
Major Content Supporting Content Additional Content (Identified by PARCC Model Content Frameworks).	NJSLs
Use mathematical language to identify parts of an expression. (SMP 2, 7)	6.EE.2
Write and evaluate numerical expressions involving whole number exponents. (SMP 2, 7)	6.EE.1
Write and evaluate algebraic expressions involving exponents (include evaluating formulas). (SMP 2,7)	6.EE.2
Apply properties of operations (factor, distribute, and combine like terms) to generate equivalent expressions and to identify when two expressions are equivalent. (SMP 2, 7)	6.EE.3,4
Use variables to represent numbers and write expressions when solving real world or mathematical problems. (SMP 2, 6, 7)	6.EE.6
Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes and show that the volume is the same as it would be if found by multiplying the edge lengths; apply volume formulas to right rectangular prisms with fractional edge lengths. (SMP 2)	6.G.A.2
Represent three dimensional figures objects with nets made of rectangles and triangles, and use the nets to find the surface area of the figures in order to solve real world and mathematical problems. (SMP 1, 4, 5)	6.G.A.4
New Jersey Student Learning Standards	
Major Content Supporting Content Additional Content (Identified by PARCC Model Content Frameworks). <i>Bold type indicates a benchmarked standard.</i>	Progress Indicator
Write and evaluate numerical expressions involving whole number exponents.	6.EE.1
Read, write, and evaluate expressions in which letters stand for numbers. a. Write expressions that record operations with numbers and with letters standing for numbers. <i>For example, express the calculation “Subtract y from 5” as <math>5 - y</math>.</i> 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>	6.EE.2

c. Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). <i>For example, use the formulas <math>V = s^3</math> and <math>A = 6s^2</math> to find the volume and surface area of a cube with sides of length <math>s = 1/2</math>.</i>	
Apply the properties of operations to generate equivalent expressions. <i>For example, apply the distributive property to the expression <math>3(2 + x)</math> to produce the equivalent expression <math>6 + 3x</math>; apply the distributive property to the expression <math>24x + 18y</math> to produce the equivalent expression <math>6(4x + 3y)</math>; apply properties of operations to <math>y + y + y</math> to produce the equivalent expression <math>3y</math>.</i>	6.EE.3
Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). <i>For example, the expressions <math>y + y + y</math> and <math>3y</math> are equivalent because they name the same number regardless of which number <math>y</math> stands for.</i>	6.EE.4
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.	6.EE.6
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 $V = lwh$ and $V = Bh$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.	6.G.2
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.	6.G.4
<b>Standards for Mathematical Practice</b>	<b>Progress Indicator</b>
Make sense of problems and persevere in solving them.	SMP 1
Reason abstractly and quantitatively.	SMP 2
Model with mathematics.	SMP 4
Use appropriate tools strategically.	SMP 5
Attend to precision.	SMP 6
Look for and make use of structure.	SMP 7
<b>New Jersey Student Learning Standards Technology</b> <i>(Additional standards should be applied, as needed, to enrich instruction and foster student achievement.)</i>	<b>Indicator</b>
Demonstrate knowledge of a real world problem using digital tools.	8.1.8.A.1
Graph and calculate data within a spreadsheet and present a summary of the results.	8.1.8.A.4

Create a database query, sort and create a report and describe the process, and explain the report results.	<b>8.1.8.A.5</b>
Develop an algorithm to solve an assigned problem using a specified set of commands and use peer review to critique the solution.	<b>8.2.8.E.3</b>
Use appropriate terms in conversation (e.g., programming, language, data, RAM, ROM, Boolean logic terms).	<b>8.2.8.E.4</b>
<b>New Jersey Student Learning Standards 21<sup>st</sup> Century Life and Career Skills</b> <i>(Additional standards should be applied, as needed, to enrich instruction and foster student achievement.)</i>	<b>Indicator</b>
Explain the purpose of the payroll deduction process, taxable income, and employee benefits.	<b>9.1.8.A.7</b>
Distinguish among cash, check, credit card, and debit card.	<b>9.1.8.B.1</b>
Construct a simple personal savings and spending plan based on various sources of income.	<b>9.1.8.B.2</b>
Justify the concept of “paying yourself first” as a financial savings strategy.	<b>9.1.8.B.3</b>
Relate the concept of deferred gratification to [investment,] meeting financial goals, and building wealth.	<b>9.1.8.B.4</b>
Develop a system for keeping and using financial records.	<b>9.1.8.B.8</b>
Determine the most appropriate use of various financial products and services (e.g., ATM, debit cards, credit cards, check books).	<b>9.1.8.B.9</b>
Justify safeguarding personal information when using credit cards, banking electronically, or filing forms.	<b>9.1.8.B.10</b>
Determine how saving contributes to financial well-being.	<b>9.1.8.D.1</b>
Analyze interest rates and fees associated with financial services, credit cards, debit cards, and gift cards.	<b>9.1.8.E.5</b>
<b>Career Ready Practices</b>	<b>Indicator</b>
Apply appropriate academic and technical skills.	<b>CRP2</b>
Communicate clearly and effectively and with reason.	<b>CRP4</b>
Demonstrate creativity and innovation.	<b>CRP6</b>
Utilize critical thinking to make sense of problems and persevere in solving them.	<b>CRP8</b>
Use technology to enhance productivity.	<b>CRP11</b>
Work productively in teams while using cultural global competence.	<b>CRP12</b>
<b>Key Vocabulary Words</b>	
Distributive property, expression, evaluate, order of operations, surface area	
<b>Evidence of Learning</b>	
<b>Additional Suggested Assessments:</b>	
<ul style="list-style-type: none"> <li>● Classroom discussions</li> <li>● Individual and group projects</li> <li>● Multimedia presentations</li> <li>● Performance-based assessments</li> <li>● Tests/quizzes</li> </ul>	
<b>Learning Activities:</b>	

- Whole class and small group discussions
- Independent and group work
- Mathematical modeling and reasoning through open-ended questions

**GO Math! Unit 4, Modules 9 & 10 (6.EE.1, 6.EE.2, 6.EE.3)**

- Every integer can be written as a sum of square numbers. Write the integers 8, 13, and 18 as a sum of two squares. Can you write the number 36 as the sum of squares in more than one way?
- A perfect number is a number that is equal to the sum of all its factors (excluding the number itself). The number 6 is an example. Find the next largest perfect number and explain how it is?
- Have students work together in groups to decide which operation signs to use to make the number sentence true. They need to use order of operations.
- Write 10 expressions that use exactly 4 fours and that equal one of the numbers 0 through 9. Remember use the order of operations.
- Have students work in groups to solve a magic square. A magic square is an array of numbers in which each row, column, and diagonal has the same sum.
- During a basketball game Joelle scored 8 points on free throws. She also scored 2 points for each inside shot and 3 points for each outside shot she made. Joelle made  $n$  inside shots and  $s$  outside shots during the game. Write six expressions for the total number of points Joelle scored.

**Unit 6 Modules 13 and 15 (6.G1 [less emphasis on G.1], G.2, G.4)**

- Have students construct a three-column table of information about the areas of quadrilaterals. The first column lists names of the figures: parallelogram, trapezoid, and rhombus. The second column has formulas for the areas. The third column shows drawings of the figures with labels for their bases, heights, and diagonals.
- Have students work in small groups to draw a triangle whose lengths have whole number measures to fit onto a standard sheet of graph paper. Have students cut out the triangle and use the formula to show that any of the sides can serve as a base. Groups can draw a rectangle around the triangle on another sheet of graph paper to find the height of the triangle and for each base.
- Have students work in pairs to find the area of composite figures. Each student draws a figure on a sheet of paper. Students trade figures with their partner and find the area.
- Give students the nets for several three-dimensional figures on graph paper. Have them cut out the nets and assemble them to make models of the figures. Students can use the graph paper squares to estimate the surface area before computing the actual surface area. Comparing their actual answers with the estimates will help them determine whether their answers are reasonable.
- Have students bring in a box, such as a cereal box or cracker box, from home. Have them find the volume of the box. Make a table of the dimensions and volumes on the board. Then ask students if two rectangular prisms can have different heights but the same volume. Ask them to explain their reasoning.

**Instructional Materials:**

- GO Math!

- Laptops
- Smartboard

**Teacher Resources:**

- Go Math
- 6.EE.A.1 The Djinni's Offer
- 6.EE.A.2 Rectangle Perimeter 1
- 6.EE.A.4 Rectangle Perimeter 2
- 6.EE.A.4 Equivalent Expressions
- 6.G.A.2 Volumes with Fractional Edge Lengths
- 6.G.A.4 Nets for Pyramids and Prisms
- Illustrative Mathematics: Grade 6
- Khan Academy
- Math Evidence Statements: Grade 6
- Math Rules That Expire in the Middle Grades

**Modifications & Accommodations:**

*\*Please note that the following modifications and accommodations vary from unit to unit, and may be implemented for any student who would benefit*

**Gifted and Talented**

*(content, process, product, and learning environment)*

**Extension Activities:**

- Conduct research and provide presentation of cultural topics
- Design surveys to generate and analyze data to be used in discussion.  
Debate topics of interest/cultural importance.
- Authentic listening and reading sources that provide data and support for speaking and writing prompts
- Exploration of art and/or artists to understand society and history
- Implement RAFT (role, audience, format, topic) activities as they pertain to the types/modes of communication
- Anchor activities
- Use of higher-level questioning techniques
- Provide assessments at a higher-level of thinking

**English Language Learners**

**Modifications:**

- Modified assignments
- Native language translation (peer, online assistive technology, translation device, bilingual dictionary)
- Extended time for assignment completion as needed
- Highlight key vocabulary
- Use graphic organizers

**Students with Disabilities**

*(appropriate accommodations, instructional adaptation, and/or modifications as determined by the IEP or 504 team)*

**Modifications for Classroom:**

- Pair visual prompts with verbal presentations
- Ask students to restate information, directions, and assignments

**Students at Risk of School Failure**

**Modifications for Classroom:**

- Pair visual prompts with verbal presentations
- Ask students to restate information, directions, and assignments
- Repetition and practice
- Model skills/techniques to be mastered

- Repetition and practice
- Model skills/techniques to be mastered
- Extended time to complete class work
- Provide copy of class notes
- Preferential seating to be mutually determined by the student and teacher
- Student may request to use a computer to complete assignments
- Establish expectations for correct spelling on assignments
- Extra textbooks for home
- Student may request books on tape/CD/digital media, as available and appropriate
- Assign a peer helper in the class setting
- Provide oral reminders and check student work during independent work time
- Assist student with long and short term planning of assignments
- Encourage student to proofread assignments and tests
- Provide regular parent/school communication
- Teachers will check/sign student agenda daily
- Student requires use of other assistive technology device

**Homework and Assignments:**

- Extended time to complete assignments
- Student requires more complex assignments to be broken up and explained in smaller units, with work to be submitted in phases.
- Provide the student with clearly stated (written) expectations and grading criteria for assignments.
- Implement RAFT (role, audience, format, topic) activities as they pertain to the types/modes of communication
- Continue to develop phrasing and fluency while reading aloud, as needed
- Encourage silent reading for short periods of time
- Use close reading strategies
- Continue to provide access to various genres
- Make available high interest, low readability texts for use during independent reading

- Extended time to complete class work
- Provide a copy of class notes
- Preferential seating to be mutually determined by the student and teacher
- Student may request to use a computer to complete assignments
- Establish expectations for correct spelling on assignments
- Extra textbooks for home
- Student may request books on tape/CD/digital media, as available and appropriate
- Assign a peer helper in the class setting
- Provide oral reminders and check student work during independent work time
- Assist student with long and short term planning of assignments
- Encourage student to proofread assignments and tests
- Provide regular parent/school communication
- Teachers will check/sign student agenda daily
- Student requires use of other assistive technology device

**Modifications for Homework and Assignments:**

- Extended time to complete assignments
- Student requires more complex assignments to be broken up and explained in smaller units, with work to be submitted in phases.
- Provide the student with clearly stated (written) expectations and grading criteria for assignments.
- Implement RAFT (role, audience, format, topic) activities as they pertain to the types/modes of communication

**Modifications for Assessments:**

- Extended time on classroom tests and quizzes
- Student may take/complete tests in an alternate setting as needed
- Restate, reread, and clarify directions/questions
- Distribute study guide for classroom tests
- Establish procedures for accommodations/modifications for assessments

- Use citing the text strategy to develop oral and written summarization skills
- Continue using marking the text strategy
- Write short essays using various supporting strategies such as marking the text, graphic organizers, citing text, and teacher-prompts
- Write routinely and engage in peer editing with teacher guidance

**Modifications for Assessments:**

- Extended time on classroom tests and quizzes
- Student may take/complete tests in an alternate setting as needed
- Restate, reread, and clarify directions/questions
- Distribute study guide for classroom tests
- Establish procedures for accommodations/modifications for assessments

**Benway School**

**Unit 3**

**Content Area:** Mathematics

**Unit Title:** *Equations, the Rational Number System, and 2-Geometry*

**Grade Level:** 6

**Unit Overview:** In this unit, the students will reason about and solve one-variable equations and inequalities, apply and extend previous understandings of numbers to the system of rational numbers, and solve real-world and mathematical problems involving area, surface area, and volume.

**Recommended Pacing:** 8-10 weeks (February-April)

**Student Learning Objectives**

**Major Content** **Supporting Content** **Additional Content** (Identified by PARCC Model Content Frameworks).

**NJSLS**

Use substitution to determine whether a given number makes an equation or inequality true. (SMP 5, 6)

**6.EE.5**

Solve real world problems by writing and solving equations of the form  $x + p = q$  and  $px = q$  ( $p$ ,  $q$ , and  $x$  are non-negative rational numbers). (SMP 1, 2, 6, 7)

**6.EE.7**

Write an inequality of the form  $x > c$  or  $x < c$  to represent a constraint or condition in a real world or mathematical problem and represent them on a number line. (SMP 2, 6, 7)

**6.EE.8**

Analyze the relationship between the dependent and independent variables in an equation using graphs and tables. 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.

**6.EE.9**

Use positive and negative numbers to represent quantities in real-world situations, explaining the meaning of zero in the context of the real-world situation. (SMP 2, 5)

**6.NS.5**

Locate rational numbers and their opposites on horizontal and vertical number line; explain their relation of the opposites to zero. (SMP 5, 8)

**6.NS.6**

Plot pairs of positive and negative rational numbers in the coordinate plane; describe two ordered pairs that differ only by signs as reflections across one or both axes. (SMP 5, 8)

**6.NS.6**

Use statements of inequality to determine relative positions of two rational numbers on a number line; write and explain statements of order for rational numbers in real-world contexts. (SMP 2, 3, 5)

**6.NS.7**

Explain the meaning of absolute value of a rational number as distance from zero on the number line and as magnitude for a positive or negative quantity in a real-world situation. (SMP 2, 3 5)

**6.NS.7**

Solve real world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Use the absolute value of the differences of their coordinates to find distances between points with the same first coordinate or same second coordinate. (SMP 1, 2, 4, 5)

**6.NS.8, 6.G.A.3**

Find the area of right triangles, other triangles, special quadrilaterals and polygons by composing into rectangles or decomposing into triangles and other shapes to solve real world or mathematical problems. (SMP 1, 2, 5, 7)

**6.G.A.1**



<p style="text-align: center;"><b>New Jersey Student Learning Standards</b></p> <p><b>Major Content</b> <b>Supporting Content</b> <b>Additional Content</b> (Identified by PARCC Model Content Frameworks).  <b>Bold type indicates a benchmarked standard.</b></p>	<p style="text-align: center;"><b>Progress Indicator</b></p>
<p>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.</p>	<p><b>6.EE.5</b></p>
<p>Solve real-world and mathematical problems by writing and solving equations of the form <math>x + p = q</math> and <math>px = q</math> for cases in which <math>p</math>, <math>q</math> and <math>x</math> are all nonnegative rational numbers.</p>	<p><b>6.EE.7</b></p>
<p>Write an inequality of the form <math>x &gt; c</math> or <math>x &lt; c</math> to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form <math>x &gt; c</math> or <math>x &lt; c</math> have infinitely many solutions; represent solutions of such inequalities on number line diagrams.</p>	<p><b>6.EE.8</b></p>
<p>Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.</p>	<p><b>6.NS.5</b></p>
<p>Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.</p> <p>a. Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., <math>-(-3) = 3</math>, and that 0 is its own opposite.</p> <p>b. Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.</p> <p>c. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers</p>	<p><b>6.NS.6</b></p>
<p>Understand ordering and absolute value of rational numbers.</p> <p>a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. <i>For example, interpret <math>-3 &gt; -7</math> as a statement that <math>-3</math> is located to the right of <math>-7</math> on a number line oriented from left to right.</i></p> <p>b. Write, interpret, and explain statements of order for rational numbers in real-world contexts. <i>For example, write <math>-3^{\circ}\text{C} &gt; -7^{\circ}\text{C}</math> to express the fact that <math>-3^{\circ}\text{C}</math> is warmer than <math>-7^{\circ}\text{C}</math>.</i></p> <p>c. Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or</p>	<p><b>6.NS.7</b></p>

<p>negative quantity in a real-world situation. <i>For example, for an account balance of <math>-30</math> dollars, write <math> -30  = 30</math> to describe the size of the debt in dollars.</i></p> <p>d. Distinguish comparisons of absolute value from statements about order. <i>For example, recognize that an account balance less than <math>-30</math> dollars represents a debt greater than 30 dollars.</i></p>	
Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.	<b>6.NS.8</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.1</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>6.G.A.3</b>
<b>Standards for Mathematical Practice</b>	<b>Progress Indicator</b>
Make sense of problems and persevere in solving them.	<b>SMP 1</b>
Reason abstractly and quantitatively.	<b>SMP 2</b>
Construct viable arguments and critique the reasoning of others.	<b>SMP 3</b>
Model with mathematics.	<b>SMP 4</b>
Use appropriate tools strategically.	<b>SMP 5</b>
Attend to precision.	<b>SMP 6</b>
Look for and make use of structure.	<b>SMP 7</b>
Look for and express regularity in repeated reasoning.	<b>SMP 8</b>
<b>New Jersey Student Learning Standards Technology</b> <i>(Additional standards should be applied, as needed, to enrich instruction and foster student achievement.)</i>	<b>Indicator</b>
Demonstrate knowledge of a real world problem using digital tools.	<b>8.1.8.A.1</b>
Graph and calculate data within a spreadsheet and present a summary of the results.	<b>8.1.8.A.4</b>
Create a database query, sort and create a report and describe the process, and explain the report results.	<b>8.1.8.A.5</b>
Develop an algorithm to solve an assigned problem using a specified set of commands and use peer review to critique the solution.	<b>8.2.8.E.3</b>
Use appropriate terms in conversation (e.g., programming, language, data, RAM, ROM, Boolean logic terms).	<b>8.2.8.E.4</b>
<b>New Jersey Student Learning Standards 21<sup>st</sup> Century Life and Career Skills</b> <i>(Additional standards should be applied, as needed, to enrich instruction and foster student achievement.)</i>	<b>Indicator</b>

Explain the purpose of the payroll deduction process, taxable income, and employee benefits.	<b>9.1.8.A.7</b>
Distinguish among cash, check, credit card, and debit card.	<b>9.1.8.B.1</b>
Construct a simple personal savings and spending plan based on various sources of income.	<b>9.1.8.B.2</b>
Justify the concept of “paying yourself first” as a financial savings strategy.	<b>9.1.8.B.3</b>
Relate the concept of deferred gratification to [investment,] meeting financial goals, and building wealth.	<b>9.1.8.B.4</b>
Develop a system for keeping and using financial records.	<b>9.1.8.B.8</b>
Determine the most appropriate use of various financial products and services (e.g., ATM, debit cards, credit cards, check books).	<b>9.1.8.B.9</b>
Justify safeguarding personal information when using credit cards, banking electronically, or filing forms.	<b>9.1.8.B.10</b>
Determine how saving contributes to financial well-being.	<b>9.1.8.D.1</b>
Analyze interest rates and fees associated with financial services, credit cards, debit cards, and gift cards.	<b>9.1.8.E.5</b>
<b>Career Ready Practices</b>	<b>Indicator</b>
Apply appropriate academic and technical skills.	<b>CRP2</b>
Communicate clearly and effectively and with reason.	<b>CRP4</b>
Demonstrate creativity and innovation.	<b>CRP6</b>
Utilize critical thinking to make sense of problems and persevere in solving them.	<b>CRP8</b>
Use technology to enhance productivity.	<b>CRP11</b>
Work productively in teams while using cultural global competence.	<b>CRP12</b>
<b>Key Vocabulary Words</b>	
Inequality, positive/negative rational numbers, quadrant, substitution	
<b>Evidence of Learning</b>	
<b>Additional Suggested Assessments:</b>	
<ul style="list-style-type: none"> <li>● Classroom discussions</li> <li>● Individual and group projects</li> <li>● Multimedia presentations</li> <li>● Performance-based assessments</li> <li>● Tests/quizzes</li> </ul>	
<b>Learning Activities:</b>	
<ul style="list-style-type: none"> <li>● Whole class and small group discussions</li> <li>● Independent and group work</li> <li>● Mathematical modeling and reasoning through open-ended questions</li> </ul>	
<b>GO Math! Unit 5, Modules 11 &amp; 12 (6.EE.5, 6.EE.6, 6.EE.7, 6.EE.8, 6.EE.9)</b>	
<ul style="list-style-type: none"> <li>● Have students work in groups to create mind-reading puzzles that depend on inverse operations to return to the original number.</li> </ul>	

- Write short secret message on a piece of paper. Use the chart to find the number that matches each letter of your message. Write the number above each letter in your message. To send your message in code, write a series of equation on a separate piece of paper. Write the equations in the same order as your letters appear on your paper. Trade your equations and decode classmates' messages.
- Have students work together to consider absolute value inequalities. First have the students find numbers that make the inequality true. Then have them graph the solution.
- Have students work in three teams to play coordinate tic-tac-toe. Use a coordinate plane that is 5 units from the origin in all directions. One player on each team alternates calling out the coordinates of a point. Another player on each team locates the point and marks it on the coordinate plane. The first team to place three marks in an uninterrupted row horizontally, vertically or diagonally wins the round.
- Plot the points for each set of ordered pairs. Then connect the points in the order shown to reveal a figure. Name the figure and find its area.
- Have students work in pairs to write an equation with two variables. Each equation should involve addition. Collect students' equations and randomly redistribute them. Have the students make tables for the equations and write solutions of the equations as ordered pairs. Then have the students graph the equation.

**Unit 1, Module 3 (6.NS.5)**

- Have students work in pairs to order each set from least to greatest. Instruct the pairs to order one set using decimals and one set using fractions. Invite pairs to explain how they chose which set to order with decimals and which to order with fractions.
- Have students take turns writing an equivalent fraction or decimal for each number, while showing their work and explaining their reasoning. Discuss other possible equivalent fractions or decimals that students may have written.

**Unit 1, Module 3 (6.NS.6, 7, 8)**

- Have students use the given information to find the Mystery Number. After students solve the number puzzle, ask them to share the methods they used to identify the number. Then encourage students to write a similar number puzzle and challenge other students to solve it.

-the absolute value of the mystery number is less than  $\frac{1}{4}$  but greater than  $\frac{1}{10}$

-the mystery number is to the left of zero on a number line

-when written as a decimal, the mystery number requires 2 places to the right of the decimal point

-as a fraction in simplest form, the denominator is a multiple of 10 and the numerator is an odd number.

**Instructional Materials:**

- GO Math!
- Laptops
- Smartboard

**Teacher Resources:**

- [Go Math](#)
- [6.EE.B.5 Make Use of Structure](#)

- [6.EE.B.7 Morning Walk](#)
- [6.NS.C.5 Warmer in Miami](#)
- [6.NS.C.6 Mile High](#)
- [6.NS.C.7 Jumping Flea](#)
- [6.NS.C.7a Fractions on the Number Line](#)
- [6.NS.C.7b Comparing Temperatures](#)
- [6.EE.B.8 Fishing Adventures 1](#)
- [6.NS.C.8 Nome, Alaska](#)
- [6.G.A.1, 6.G.A.3 Polygons in the Coordinate Plane](#)
- [Illustrative Mathematics: Grade 6](#)
- [Khan Academy](#)
- [Math Evidence Statements: Grade 6](#)
- [Math Rules That Expire in the Middle Grades](#)

**Modifications & Accommodations:**

*\*Please note that the following modifications and accommodations vary from unit to unit, and may be implemented for any student who would benefit*

<p align="center"><b><u>Gifted and Talented</u></b> <i>(content, process, product, and learning environment)</i></p> <p><b>Extension Activities:</b></p> <ul style="list-style-type: none"> <li>● Conduct research and provide presentation of cultural topics</li> <li>● Design surveys to generate and analyze data to be used in discussion. Debate topics of interest/cultural importance.</li> <li>● Authentic listening and reading sources that provide data and support for speaking and writing prompts</li> <li>● Exploration of art and/or artists to understand society and history</li> <li>● Implement RAFT (role, audience, format, topic) activities as they pertain to the types/modes of communication</li> <li>● Anchor activities</li> <li>● Use of higher-level questioning techniques</li> <li>● Provide assessments at a higher-level of thinking</li> </ul>	<p align="center"><b><u>English Language Learners</u></b></p> <p><b>Modifications:</b></p> <ul style="list-style-type: none"> <li>● Modified assignments</li> <li>● Native language translation (peer, online assistive technology, translation device, bilingual dictionary)</li> <li>● Extended time for assignment completion as needed</li> <li>● Highlight key vocabulary</li> <li>● Use graphic organizers</li> </ul>
<p align="center"><b><u>Students with Disabilities</u></b> <i>(appropriate accommodations, instructional adaptation, and/or modifications as determined by the IEP or 504 team)</i></p> <p><b>Modifications for Classroom:</b></p> <ul style="list-style-type: none"> <li>● Pair visual prompts with verbal presentations</li> <li>● Ask students to restate information, directions, and assignments</li> <li>● Repetition and practice</li> </ul>	<p align="center"><b><u>Students at Risk of School Failure</u></b></p> <p><b>Modifications for Classroom:</b></p> <ul style="list-style-type: none"> <li>● Pair visual prompts with verbal presentations</li> <li>● Ask students to restate information, directions, and assignments</li> <li>● Repetition and practice</li> <li>● Model skills/techniques to be mastered</li> <li>● Extended time to complete class work</li> <li>● Provide a copy of class notes</li> </ul>

- Model skills/techniques to be mastered
- Extended time to complete class work
- Provide copy of class notes
- Preferential seating to be mutually determined by the student and teacher
- Student may request to use a computer to complete assignments
- Establish expectations for correct spelling on assignments
- Extra textbooks for home
- Student may request books on tape/CD/digital media, as available and appropriate
- Assign a peer helper in the class setting
- Provide oral reminders and check student work during independent work time
- Assist student with long and short term planning of assignments
- Encourage student to proofread assignments and tests
- Provide regular parent/school communication
- Teachers will check/sign student agenda daily
- Student requires use of other assistive technology device

**Homework and Assignments:**

- Extended time to complete assignments
- Student requires more complex assignments to be broken up and explained in smaller units, with work to be submitted in phases.
- Provide the student with clearly stated (written) expectations and grading criteria for assignments.
- Implement RAFT (role, audience, format, topic) activities as they pertain to the types/modes of communication
- Continue to develop phrasing and fluency while reading aloud, as needed
- Encourage silent reading for short periods of time
- Use close reading strategies
- Continue to provide access to various genres
- Make available high interest, low readability texts for use during independent reading

- Preferential seating to be mutually determined by the student and teacher
- Student may request to use a computer to complete assignments
- Establish expectations for correct spelling on assignments
- Extra textbooks for home
- Student may request books on tape/CD/digital media, as available and appropriate
- Assign a peer helper in the class setting
- Provide oral reminders and check student work during independent work time
- Assist student with long and short term planning of assignments
- Encourage student to proofread assignments and tests
- Provide regular parent/school communication
- Teachers will check/sign student agenda daily
- Student requires use of other assistive technology device

**Modifications for Homework and Assignments:**

- Extended time to complete assignments
- Student requires more complex assignments to be broken up and explained in smaller units, with work to be submitted in phases.
- Provide the student with clearly stated (written) expectations and grading criteria for assignments.
- Implement RAFT (role, audience, format, topic) activities as they pertain to the types/modes of communication

**Modifications for Assessments:**

- Extended time on classroom tests and quizzes
- Student may take/complete tests in an alternate setting as needed
- Restate, reread, and clarify directions/questions
- Distribute study guide for classroom tests
- Establish procedures for accommodations/modifications for assessments

- Use citing the text strategy to develop oral and written summarization skills
- Continue using marking the text strategy
- Write short essays using various supporting strategies such as marking the text, graphic organizers, citing text, and teacher-prompts
- Write routinely and engage in peer editing with teacher guidance

**Modifications for Assessments:**

- Extended time on classroom tests and quizzes
- Student may take/complete tests in an alternate setting as needed
- Restate, reread, and clarify directions/questions
- Distribute study guide for classroom tests
- Establish procedures for accommodations/modifications for assessments

**Benway School**

**Unit 4**

**Content Area:** Mathematics

**Unit Title:** Variability, Distributions, and Relationships between Quantities

**Grade Level:** 6

**Unit Overview:** In this unit, the students will represent and analyze quantitative relationships between dependent and independent variables, develop an understanding of statistical variability, summarize and describe distributions, understand ratio concepts, use ratio reasoning to solve problems, and apply and extend previous understandings of numbers to the system of rational numbers.

**Recommended Pacing:** 8-10 weeks (April-June)

<b>Student Learning Objectives</b>	<b>NJSLS</b>
<b>Major Content</b> <b>Supporting Content</b> <b>Additional Content</b> (Identified by PARCC Model Content Frameworks).	
Write an equation using two variables (independent and dependent) to represent two quantities that change in relationship to one another in a real world problem. (SMP 2, 4, 6)	<b>6.EE.9</b>
Analyze the relationship between the dependent and independent variables and relate the equation to a given graph and to its table of values. (SMP 2, 4, 6)	<b>6.EE.9</b>
Create and complete tables of equivalent ratios to solve real world and mathematical problems using ratio and rate reasoning that include making tables of equivalent ratios, solving unit rate problems, finding percent of a quantity as a rate per 100. (2, 4, 5, 6, 7, 8)	<b>6.RP.3</b>
Use ratio and rate reasoning to convert measurement units and to transform units appropriately when multiplying or dividing quantities. (2, 4, 5, 6, 7, 8)	<b>6.RP.3</b>
Solve real world and mathematical problems by graphing points in all four quadrants of the coordinate plane; use the absolute value of the differences of their coordinates to find distances between points with the same first coordinate or same second coordinate. (SMP 1, 2, 5)	<b>6.NS.8</b>
Distinguish questions that are statistical (anticipate variability in data) from those that are not. (SMP 2, 6)	<b>6.SP.1</b>
Display numerical data in plots on the number line (including dot plots, histograms, and box plots) and summarize in relation to their context. (SMP 4)	<b>6.SP.2, 6.SP.3; 6.SP.4</b>
Summarize numerical data in relation to their context by identifying the number of observations and describing how the data was measured. (SMP 2, 4, 5)	<b>6.SP.5</b>
Calculate, and interpret measures of center (mean and median) and variability (interquartile range and mean absolute deviation); report measures of center and variability appropriate to the shape of the distribution and context. (SMP 2, 4, 5)	<b>6.SP.5</b>
<b>New Jersey Student Learning Standards</b>	<b>Progress Indicator</b>
<b>Major Content</b> <b>Supporting Content</b> <b>Additional Content</b> (Identified by PARCC Model Content Frameworks). <i>Bold type indicates a benchmarked standard.</i>	
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	<b>6.E.E.9</b>



<p>independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. <i>For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation <math>d = 65t</math> to represent the relationship between distance and time.</i></p>	
<p>Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.</p> <ol style="list-style-type: none"> <li>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.</li> <li>Solve unit rate problems including those involving unit pricing and constant speed. <i>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?</i></li> <li>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.</li> <li>Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.</li> </ol>	<p><b>6.RP.3</b></p>
<p>Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.</p>	<p><b>6.NS.8</b></p>
<p>Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. <i>For example, “How old am I?” is not a statistical question, but “How old are the students in my school?” is a statistical question because one anticipates variability in students’ ages.</i></p>	<p><b>6.SP.1</b></p>
<p>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.</p>	<p><b>6.SP.2</b></p>
<p>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.</p>	<p><b>6.SP.3</b></p>
<p>Display numerical data in plots on a number line, including dot plots, histograms, and box plots.</p>	<p><b>6.SP.4</b></p>
<p>Summarize numerical data sets in relation to their context, such as by:</p> <ol style="list-style-type: none"> <li>Reporting the number of observations.</li> <li>Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.</li> <li>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.</li> </ol>	<p><b>6.SP.5</b></p>

d. 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>Standards for Mathematical Practice</b>	<b>Progress Indicator</b>
Make sense of problems and persevere in solving them.	<b>SMP 1</b>
Reason abstractly and quantitatively.	<b>SMP 2</b>
Model with mathematics.	<b>SMP 4</b>
Use appropriate tools strategically.	<b>SMP 5</b>
Attend to precision.	<b>SMP 6</b>
Look for and make use of structure.	<b>SMP 7</b>
Look for and express regularity in repeated reasoning.	<b>SMP 8</b>
<b>New Jersey Student Learning Standards Technology</b> <i>(Additional standards should be applied, as needed, to enrich instruction and foster student achievement.)</i>	<b>Indicator</b>
Demonstrate knowledge of a real world problem using digital tools.	<b>8.1.8.A.1</b>
Graph and calculate data within a spreadsheet and present a summary of the results.	<b>8.1.8.A.4</b>
Create a database query, sort and create a report and describe the process, and explain the report results.	<b>8.1.8.A.5</b>
Develop an algorithm to solve an assigned problem using a specified set of commands and use peer review to critique the solution.	<b>8.2.8.E.3</b>
Use appropriate terms in conversation (e.g., programming, language, data, RAM, ROM, Boolean logic terms).	<b>8.2.8.E.4</b>
<b>New Jersey Student Learning Standards 21<sup>st</sup> Century Life and Career Skills</b> <i>(Additional standards should be applied, as needed, to enrich instruction and foster student achievement.)</i>	<b>Indicator</b>
Explain the purpose of the payroll deduction process, taxable income, and employee benefits.	<b>9.1.8.A.7</b>
Distinguish among cash, check, credit card, and debit card.	<b>9.1.8.B.1</b>
Construct a simple personal savings and spending plan based on various sources of income.	<b>9.1.8.B.2</b>
Justify the concept of “paying yourself first” as a financial savings strategy.	<b>9.1.8.B.3</b>
Relate the concept of deferred gratification to [investment,] meeting financial goals, and building wealth.	<b>9.1.8.B.4</b>
Develop a system for keeping and using financial records.	<b>9.1.8.B.8</b>
Determine the most appropriate use of various financial products and services (e.g., ATM, debit cards, credit cards, check books).	<b>9.1.8.B.9</b>
Justify safeguarding personal information when using credit cards, banking electronically, or filing forms.	<b>9.1.8.B.10</b>
Determine how saving contributes to financial well-being.	<b>9.1.8.D.1</b>
Analyze interest rates and fees associated with financial services, credit cards, debit cards, and gift cards.	<b>9.1.8.E.5</b>
<b>Career Ready Practices</b>	<b>Indicator</b>

Apply appropriate academic and technical skills.	<b>CRP2</b>
Communicate clearly and effectively and with reason.	<b>CRP4</b>
Demonstrate creativity and innovation.	<b>CRP6</b>
Utilize critical thinking to make sense of problems and persevere in solving them.	<b>CRP8</b>
Use technology to enhance productivity.	<b>CRP11</b>
Work productively in teams while using cultural global competence.	<b>CRP12</b>
<b>Key Vocabulary Words</b>	
Box plot, dependent/independent variables, dot plot, equivalent ratios, histogram, statistical, variability	
<b>Evidence of Learning</b>	
<p><b>Additional Suggested Assessments:</b></p> <ul style="list-style-type: none"> <li>● Classroom discussions</li> <li>● Individual and group projects</li> <li>● Multimedia presentations</li> <li>● Performance-based assessments</li> <li>● Tests/quizzes</li> </ul>	
<p><b>Learning Activities:</b></p> <ul style="list-style-type: none"> <li>● Whole class and small group discussions</li> <li>● Independent and group work</li> <li>● Mathematical modeling and reasoning through open-ended questions</li> </ul>	
<p><b>Go Math Correlation: Unit 7, Module 16 (6.SP.4)</b></p> <ul style="list-style-type: none"> <li>● Have students search through a newspaper or magazine at home with a family member to find a set of data, such as prices of houses, high temperatures, or points scored by the players on a sports team. Students can then find the mean and median for the set of data.</li> <li>● Challenge students to use the given clues to identify the data values for the following sets of data. <ul style="list-style-type: none"> <li>-There are four whole numbers in a data set. The mean of the data set is 67. Three of the data values are 56, 63, and 70. What is the fourth data value?</li> <li>-There are 7 whole numbers in a data set. The least number is 9, and the greatest number is 20. The mean and median are both 14. What numbers could be the values of the data set?</li> <li>-Develop a Challenge question similar to one of the questions above and challenge a classmate to find the answer.</li> </ul> </li> <li>● Have students predict which set of songs will have less variability in length; songs from their own personal collection, or songs played on the radio. Students can research the length of a sample of songs that are played on the radio and calculate the mean absolute deviation. Then have students calculate the MAD for a sample of songs from their personal collection.</li> <li>● Write the data values from a data set on index cards. Have students place the cards in numerical order on a flat surface. Arrange the cards to determine the least value, lower quartile, median, upper quartile and greatest value. Then use the cards to illustrate that although each quartile contains 25% of the data values, the range of data values in each quartile almost always varies.</li> </ul>	

- Have students work in groups. Each group is responsible for making a list of at least 5 questions that include both statistical and nonstatistical questions. Have a student from each group read their questions aloud. Students from other groups must decide if the question is statistical or nonstatistical.
- Have students work in groups to find data that they are interested in and can display using a frequency table. Ideas can include topics such as the number of Super Bowls won by teams in the NFL or the number of Olympic medals won by different countries. Have students make a frequency table with intervals and a histogram to represent the data. Have groups present their data to the class.

**Instructional Materials:**

- GO Math!
- Laptops
- Smartboard

**Teacher Resources:**

- Go Math
- 6.EE.C.9 Families of Triangles
- 6.SP.A.1 Identifying Statistical Questions
- 6.SP.A.2, 6.SP.B.4 Puppy Weights
- 6.SP.A.3 Is It Center or Is It Variability?
- 6.SP.B.5c Number of Siblings
- 6.SP.B.5d Mean or Median?
- Illustrative Mathematics: Grade 6
- Khan Academy
- Math Evidence Statements: Grade 6
- Math Rules That Expire in the Middle Grades

**Modifications & Accommodations:**

*\*Please note that the following modifications and accommodations vary from unit to unit, and may be implemented for any student who would benefit*

<u>Gifted and Talented</u>	<u>English Language Learners</u>
<p><i>(content, process, product, and learning environment)</i></p> <p><b>Extension Activities:</b></p> <ul style="list-style-type: none"> <li>● Conduct research and provide presentation of cultural topics</li> <li>● Design surveys to generate and analyze data to be used in discussion. Debate topics of interest/cultural importance.</li> <li>● Authentic listening and reading sources that provide data and support for speaking and writing prompts</li> <li>● Exploration of art and/or artists to understand society and history</li> </ul>	<p><b>Modifications:</b></p> <ul style="list-style-type: none"> <li>● Modified assignments</li> <li>● Native language translation (peer, online assistive technology, translation device, bilingual dictionary)</li> <li>● Extended time for assignment completion as needed</li> <li>● Highlight key vocabulary</li> <li>● Use graphic organizers</li> </ul>

<ul style="list-style-type: none"> <li>● Implement RAFT (role, audience, format, topic) activities as they pertain to the types/modes of communication</li> <li>● Anchor activities</li> <li>● Use of higher-level questioning techniques</li> <li>● Provide assessments at a higher-level of thinking</li> </ul>	
<p style="text-align: center;"><b><u>Students with Disabilities</u></b> <i>(appropriate accommodations, instructional adaptation, and/or modifications as determined by the IEP or 504 team)</i></p> <p><b>Modifications for Classroom:</b></p> <ul style="list-style-type: none"> <li>● Pair visual prompts with verbal presentations</li> <li>● Ask students to restate information, directions, and assignments</li> <li>● Repetition and practice</li> <li>● Model skills/techniques to be mastered</li> <li>● Extended time to complete class work</li> <li>● Provide copy of class notes</li> <li>● Preferential seating to be mutually determined by the student and teacher</li> <li>● Student may request to use a computer to complete assignments</li> <li>● Establish expectations for correct spelling on assignments</li> <li>● Extra textbooks for home</li> <li>● Student may request books on tape/CD/digital media, as available and appropriate</li> <li>● Assign a peer helper in the class setting</li> <li>● Provide oral reminders and check student work during independent work time</li> <li>● Assist student with long and short term planning of assignments</li> <li>● Encourage student to proofread assignments and tests</li> <li>● Provide regular parent/school communication</li> <li>● Teachers will check/sign student agenda daily</li> <li>● Student requires use of other assistive technology device</li> </ul> <p><b>Homework and Assignments:</b></p> <ul style="list-style-type: none"> <li>● Extended time to complete assignments</li> <li>● Student requires more complex assignments to be broken up and explained in smaller units, with work to be submitted in phases.</li> </ul>	<p style="text-align: center;"><b><u>Students at Risk of School Failure</u></b></p> <p><b>Modifications for Classroom:</b></p> <ul style="list-style-type: none"> <li>● Pair visual prompts with verbal presentations</li> <li>● Ask students to restate information, directions, and assignments</li> <li>● Repetition and practice</li> <li>● Model skills/techniques to be mastered</li> <li>● Extended time to complete class work</li> <li>● Provide a copy of class notes</li> <li>● Preferential seating to be mutually determined by the student and teacher</li> <li>● Student may request to use a computer to complete assignments</li> <li>● Establish expectations for correct spelling on assignments</li> <li>● Extra textbooks for home</li> <li>● Student may request books on tape/CD/digital media, as available and appropriate</li> <li>● Assign a peer helper in the class setting</li> <li>● Provide oral reminders and check student work during independent work time</li> <li>● Assist student with long and short term planning of assignments</li> <li>● Encourage student to proofread assignments and tests</li> <li>● Provide regular parent/school communication</li> <li>● Teachers will check/sign student agenda daily</li> <li>● Student requires use of other assistive technology device</li> </ul> <p><b>Modifications for Homework and Assignments:</b></p> <ul style="list-style-type: none"> <li>● Extended time to complete assignments</li> <li>● Student requires more complex assignments to be broken up and explained in smaller units, with work to be submitted in phases.</li> <li>● Provide the student with clearly stated (written) expectations and grading criteria for assignments.</li> </ul>

- Provide the student with clearly stated (written) expectations and grading criteria for assignments.
- Implement RAFT (role, audience, format, topic) activities as they pertain to the types/modes of communication
- Continue to develop phrasing and fluency while reading aloud, as needed
- Encourage silent reading for short periods of time
- Use close reading strategies
- Continue to provide access to various genres
- Make available high interest, low readability texts for use during independent reading
- Use citing the text strategy to develop oral and written summarization skills
- Continue using marking the text strategy
- Write short essays using various supporting strategies such as marking the text, graphic organizers, citing text, and teacher-prompts
- Write routinely and engage in peer editing with teacher guidance

**Modifications for Assessments:**

- Extended time on classroom tests and quizzes
- Student may take/complete tests in an alternate setting as needed
- Restate, reread, and clarify directions/questions
- Distribute study guide for classroom tests
- Establish procedures for accommodations/modifications for assessments

- Implement RAFT (role, audience, format, topic) activities as they pertain to the types/modes of communication

**Modifications for Assessments:**

- Extended time on classroom tests and quizzes
- Student may take/complete tests in an alternate setting as needed
- Restate, reread, and clarify directions/questions
- Distribute study guide for classroom tests
- Establish procedures for accommodations/modifications for assessments