Middle School Accelerated Grade Syllabus

Certificated Teacher: Date: 2017-2018

Desired Results

Course Title: Middle School Accelerated (7th & 8th) Syllabus

Credit: ____one semester (.5) __x__ two semesters (1)

Estimate of hours per week engaged in learning activities
5 hours of class work per week.

Prerequisites and/or recommended preparation:
Completion of a 6th grade Common Core State Standards math curriculum.

Instructional Materials:
All learning activity resources and folders are contained within the student online course. Online course is accessed via login and password assigned by student's school (web account) or emailed directly to student upon enrollment, with the login website address. This course requires a MathXL account which you will receive from your virtual learning teacher.

Course Overview/ Enduring Understandings for Course:
The mathematical learning goals below signify what students should be able to do by the end of seventh grade. Each module is organized around an important mathematical idea or cluster of related ideas correlated by Common Core State Standards.

We will use a variety of mathematical tools to describe our world and help solve daily problems.

First Semester (MSAccelerated 1A)

- **Unit 1 Ratios and Proportional Relationships:**
- **Unit 2: Rational Numbers, Integers, Exponents & Scientific Notation**
- **Unit 3: Expressions and Equations**

Second Semester (MS Accelerated1B)

- **Unit 4: Statistics and Probability**
- **Unit 5: Geometry**
- **Unit 6: Pythagorean Theorem**

Middle School Accelerated (7 & 8th[th] grade) Syllabus

Unit 1 Ratios and Unit Rates:

Analyze proportional relationships and use them to solve real-world and mathematical problems.
7.RP.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 ½ / ¼ miles per hour, equivalently 2 miles per hour.*
7.RP.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.

- 7.RP.2b Identify the constant of proportionality (unit rate0 in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
- 7.RP.2c 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 at t=pn.
- 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.EE.4a Solve word problems leading to equations of the form px + q =r and p(x +q) = r, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?
- 7.RP.2d 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.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.*

Solve real-life and mathematical problems using numerical and algebraic expressions and equations.
7.EE.4₂ Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.
a. Solve word problems leading to equations of the form *px + q = r* and *p(x + q) = r*, where *p*, *q*, and *r* are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. *For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?*

- **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.

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

Unit 2: Rational Numbers

Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

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, a hydrogen atom has 0 charge because its two constituents are oppositely charged*.

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.[2]

Use properties of operations to generate equivalent expressions.

7.EE.A.2[3] 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."*

Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

7.EE.B.4[4] Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.
a. Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r, are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. *For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?*

8.EE.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, 〖3〗^2×3^(-5)=3^(-3)= 1/3^3 =1/27

8.EE.3 Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. For example, estimate the population of the United States as 3 x

10 and the population of the world as 7 x 10 , and determine that the world population is more than 20 times larger.

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

Unit 3: Expressions and Equations

Use properties of operations to generate equivalent expressions.

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."*

- 8.EE.C.7 Solve linear equations in one variable.
    a. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers).
    b. b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.

7.G.B.5 Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and use them to solve simple equations for an unknown angle in a figure.

Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

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 ½ 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 are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. *For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?*

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

7.G.B.5 Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and use them to solve simple equations for an unknown angle in a figure

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

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

8.EE.B.6 Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation y = mx for a line through the origin and the equation y = mx + b for a line intercepting the vertical axis at b.

Second Semester (MS Accelerated 1B)

Unit 4: Statistics and Probability

INSERT NEW DESCRIPTIONS

Common Core State Standard:

6.SP.A.1	Recognize a statistical question as one that anticipates variability in the date related to the question and accounts for it in the answers. For example, "How old am I?" is not a statistical question, but "How are the students in my school?" is a statistical question because one anticipates variability in students ages.
6.SP.A.2	Understand that a set of data collected to answer a statistical question has a distribution, which can be described by its center, spread, and overall shape.
6.SP.A.3	Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.
6.SP.B.4	Display numerical data in plots on a number line, including dot plots, histograms, and box plots.
6.SP.B.5	Summarize numerical data sets in relation to their context, such as by: a. Reporting the number of observations. b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. c. 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. 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.

Using random sampling to draw inferences about a population.

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.*
Draw informal comparative inferences about two populations.
7.SP.B.3 Informally assess the degree of visual overlap of two numerical data distributions with similar variability, 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.*
Investigate chance processes and develop, use, and evaluate probability models.
7.SP.C.5 Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.
7.SP.C.6 Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. *For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.*
7.SP.C.7 Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.
a. Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. *For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.*
b. Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. *For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?*

7.SP.C.8a & 7.SP.C.8b Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.

a. Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.
b. Represent sample spaces for compound events using methods such is organized lists, tables and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes") identify the outcomes in the sample space with compose the event.

Unit 5: Geometry

Draw, construct, and describe geometrical figures and describe the relationships between them.
7.G.A.2 Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given

conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.
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.
Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.
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 twoand three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.
8.G.A.1 Verify experimentally the properties of rotations, reflections, and translations:

a. Lines are taken to lines, and line segments to line segments of the same length.
b. Angles are taken to angles of the same measure.
c. Parallel lines are taken to parallel lines.

8.G.A.2 Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.
8.G.A.3 Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.

8.G.A.4 Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.

8.G.A.5 Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. *For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.*

Unit 6: Pythagorean Theorem

8.G.B.6 Explain a proof of the Pythagorean Theorem and its converse.

8.G.B.7 Apply the Pythagorean theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.

8.G.B.8 Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.

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

8.NS.A.1 Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.

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

8.EE.A.2 Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that √2 is irrational.

Understandings:

Unit 1: Ratios and Proportional Relationships

Students are able to:

- I can compute unit rates.
- I can use ratios, equivalent ratios and finding unit rate in context.
- I can determine if two quantities are proportional.
- I can use corresponding measures to find unknown lengths.
- I can determine if two quantities are proportional in a given table by checking for the constant rate of change.
- I can determine if two quantities are not proportional.
- I can determine if two quantities are proportional on a given graph by observing whether the graph is a straight line through the origin.
- I can determine if two quantities are not proportional.
- I can identify the constant rate of change and how it relates to unit rate in the context of a given situation.
- I can interpret the constant of proportionality (constant rate of change) within the contexts of problems.
- I can use the constant of proportionality to represent proportional relationships by equations in real world contexts as they relate the equations to a corresponding ratio table and/or graphical representation.
- I can solve word problems involving percent using expressions, equations, and numeric and visual models
- I can determine which of two quantities represents the whole in a word problem
- I can use a formula to find a quantity (quantity = percent X whole)
- I can compute percent using algebraic, numeric, and visual models.
- I can identify and interpret unit rate as a coordinate on a graph.
- I can interpret what the points on the graph of a proportional relationship mean in terms of the situation or context of the problem, including the point (0,0).
- I can use ratio tables and ratio reasoning to compute unit rates associated with ratios of fractions in the context of measured quantities such as recipes, lengths, areas, and speed.
- I can use tables to find an equivalent ratio given a part-to-part ratio then find the total of those quantities.
- I can solve multi-step ratio problems including fractional markdowns, markups, commissions, fees, etc.
- I can use equations and graphs to represent proportional relationships arising from ratios and rates involving fractions.
- I can interpret what points on the graph of the relationship mean in terms of the situation or context of the problem.
- I can understand that percent is a number out of one hundred
- I can convert between a fraction, decimal, and percent
- I can write a non-whole number percent as a complex fraction.
- I can understand that the whole is 100% and use the formula to find a missing piece
- I can solve various types of percent problems by identifying the type of percent problem and applying appropriate strategies.
- I can use the scale factor as a percent.
- I can make a scale drawing of a picture or geometric figure using that scale, recognizing that the enlarged or reduced distances in a scale drawing are proportional to the corresponding distances in the original picture.

• I can compute the area in the actual picture, given a scale drawing. • I can identify the scale factor. • I can solve percent problems when one quantity is a certain percent more or less than another. • I can solve percent problems involving a percent increase or decrease. • I can find 100% of a quantity when given a quantity that is a percent of a whole by using a variety of methods • I can solve word problems involving finding 100% of a given quantity with and without using equations. • I can extend mental math practices to mentally calculate the part, the percent, and the whole in percent word problems • I can understand the terms *original price, selling price, markup, markdown, markup rate,* and *markdown rate* • I can identify the original price as the whole and solve multistep markup and markdown problems • I can understand equations for markup and markdown problems and use them to solve problems • I can understand the meaning of percent error and how to find it. • I can solve percent problems when quantities and percents change • I can use a variety of methods to solve problems when quantities and percents change • I can solve simple interest problems using formula I=PRT • I can use the formula I=PRT to recognize that units for both interest rate and time must be compatible. • I can justify the propertities of inequalities that are denoted by ‹ (less than), ≤ (less than or equal), > (greater than), and ≥ (greater than or equal.	• I can understand scale factor to be the constant of proportionality. • I can make scale drawings in which the horizontal and vertical scales are different. • Given Drawing 1 and Drawing 2 (a scale model of Drawing 1 with scale factor), I can understand that Drawing 1 is also a scale model of Drawing 2 and compute the scale factor. • Given three drawings that are scale drawings of each other and two scale factors, I can compute the other related scale factor. • Given a scale drawing, I can compute the lengths in the actual picture using the scale factor. • Look up target for Topic B, Lesson 15 • I can understand that a scale drawing is either the reduction or the enlargement of a two-dimensional picture. • I can compare the scale drawing with the original picture and determine if the scale drawing is a reduction or an enlargement. • I can match points and figures in one picture with points and figures in the other picture. • I can recognize that the enlarged or reduced distances in a scale drawing are proportional to the corresponding distance in the original picture. • I can recognize the scale factor to be the constant of proportionality. • I can make a scale drawing with a given scale factor given a picture or description of geometric figures. • I can compute the lengths in the actual picture using the scale, given a scale drawing. • I can identify the scale factor in order to make comparisons of size then devise a strategy for efficiently finding actual lengths using the scale.

Unit 2: Rational Numbers

Students are able to:

- I can add positive integers by counting up and negative integers by counting down.
- I can understand that the opposite of a number is called the additive inverse because the sum of the two numbers is zero.
- I can model integer addition on the number line by using arrows to indicate direction of movement.
- I can recognize that the length of an arrow on the number line is the absolute value of the integer.
- I can understand addition of integers as putting together or counting up, using the number line.
- I can use arrows to show the sum of two integers, p + q, on a number line and show that the sum is distance $|q|$ from p to the right if q is positive and to the left if q is negative.
- I can understand the rules for adding integers:
  - Add integers with the same sign by adding the absolute values and using the common sign.
  - Add integers with opposite signs by subtracting the smaller absolute value from the larger absolute value and using the sign of the number with the larger absolute value.
- I can justify the rules using arrows and a number line and extend their findings to begin to include sums of rational numbers.
- I can justify the rule for subtraction: Subtraction is the same as adding it's opposite.
- I can justify the rule for subtraction for all rational numbers from the inverse relationship between addition and subtraction: (m – n) + = m.
- I can justify the distance formula for rational numbers on a number line (i.e., using p and q to represent variables,|p - q|)
- I know the definition of subtraction in terms of addition and use the definition of subtraction to justify the distance formula.
- I can solve word problems involving changes in distance or temperature.
- I recognize that the rules for adding and subtracting integers apply to rational numbers.
- I can use the number line to model addition, subtraction, and absolute value of integers.
- I can use properties of operations to add and subtract rational numbers without the use of a calculator.
- I can recognize that any problem involving addition and subtraction of rational numbers can be written as a problem using addition and subtraction of positive numbers only.
- I can use the commutative and associative properties of addition to rewrite numerical expressions in different forms.
- I can explain that multiplying by a positive integer is repeated addition and that adding a number multiple times has the same effect as removing the opposite value the same number of times.
- I can use the properties and facts of operations to extend multiplication of whole numbers to multiplication of integers.
- I can understand the rules for multiplication of integers and that multiplying the absolute values of integers result in the absolute value of the product.
- I can understand that (-1)(-1) = (1), and see that it can be proven to be true mathematically through the use of distributive property and additive inverse.
- I can use the rules for multiplication of signed numbers and give real-world examples.

• I can recognize that division is the reverse process of multiplication, and that integers can be divided provided the divisor is not zero. If p and q are integers, then – (p/q) = -p/q = p/-q • I can understand that every quotient of integers is a rational number and divide signed numbers by dividing their absolute values to get the absolute value of the quotient. The quotient is positive if the divisor and dividend have the same signs and negative if they have opposite signs. • I can understand that the context of a real-life situation often determines whether a rational number should be represented as a fraction or decimal. • I can understand that decimals specify points on the number line by repeatedly subdividing intervals into tenths. • I can convert positive decimals to fractions and fractions to decimals when the denominator is a product of only factors of 2 and/or 5. • I can understand that every rational number can be converted to a decimal. • I can represent fractions as decimal numbers that either terminate in zeros or repeat, representing repeating decimals using a bar over the shortest sequence of repeating digits. • I can interpret word problems and convert between fraction and decimal forms of rational numbers. • I can recognize that the rules for multiplying and dividing integers apply to rational numbers. • I can interpret products and quotients of rational numbers by describing real-world contexts.	• I can use properties of operations (commutative, associative and distributive properties) to multiply and divide rational numbers without the use of a calculator. • I can recognize that any problem involving multiplication and division can be written as a problem involving only multiplication. • I can determine the sign of an expression that contains products and quotients by checking whether the number of negative terms is even or odd. • I can use tape diagrams to solve equations of the form px + q = r and p(x +q) = r, and identify the sequence of operations used to find the solution. • I can translate word problems to write and solve algebraic equations using tape diagrams to model the steps they record algebraically. • I can create equivalent forms of expressions in order to see structure, reveal characteristics, and make connections to context. • I can compare equivalent forms of expressions and recognize that there are multiple ways to represent the context of a word problem. • I can write and evaluate expressions to represent real-world scenarios. • I can perform various calculations involving rational numbers to solve a problem related to the change in an investment's balance over time. • Students recognize and use mathematics as a tool to solve real-life problems.

Unit 3: Expressions & Equations

- I can generate equivalent expressions using the fact that addition and multiplication can be done in any order and any grouping.
- I can use the additive inverse property to form a sum and multiplicative inverse property to form a product.
- I can use the order of operations to accurately solve questions.
- I can use an area/rectangular array model and distributive property to write products as sums and sums as products.
- I can use the fact that the opposite of a number is the same as multiplying by -1 to write the opposite of a sum in standard form.
- I can recognize that rewriting an expression in a different form can shed light on the problem and how the quantities in it are related.
- I can recognize the identity properties of 0 and 1 and the existence of inverse (opposites and reciprocals) to write equivalent.
- I can rewrite rational number expressions by collecting like terms and combining them by repeated use of the distributive property.
- I can understand that an equation is a statement of equality between two expressions.
- I can build an algebraic expression using the context of a word problem and use that expression to write an equation that can be used to solve the word problem.
- I can understand and use the addition, subtraction, multiplication, division, and subtraction properties of equality to solve word problems leading to equations.
- I can understand that any equation with rational coefficients can be written as an equation with expressions that involve only integer coefficients by multiplying both sides by the least common multiple of all the rational number terms.
- I can use vertical and adjacent angles and angles on a line and angles at a point in a multi-step problem to write and solve simple equations for an unknown angle in a figure.
- I can justify the propertities of inequalities that are denoted by ‹ (less than), ≤ (less than or equal), > (greater than), and ≥ (greater than or equal).
- I can understand that an inequality is a statement that one expression is less than (or equal to) or greater than (or equal to) another expression, such as $2x + 3 < 5$ or $3x + 50 \geq 100$.
- I can interpret a solution to an inequality as a number that makes the inequality true when substituted for the variable.
- I can convert arithmetic inequalities into a new inequality with variables and check to see if different values of the variable make an inequality true or false.
- I can graph solutions to inequalities taking care to interpret the solutions in the context of the problem.
- I can develop the definition of circle using diameter and radius.
- I can discover that the ratio of the circumference to the diameter of a circle is pi (π).
- I can use scale models to derive the formulas for the circumference of a circle of diameter and radius.
- I can use 22/7 & 3.14 as estimates for π.
- I can explain the relationship between the circumference and area of a circle.
- I know the formula for the area of a circle and use it to solve problems.
- I can examine the meaning of quarter circle and semicircle.
- I can solve area and perimeter problems for regions made out of rectangles, quarter circles, semicircles, and circles, including solving for unknown lengths when the area or perimeter is given.
- I can use the known formula for the volume of a right rectangular prism.
- I can understand the volume of a right prism to be the area of the base times the height.
- I can compute volumes of right prisms involving fractional values for length.
- I can solve real-world problems involving volume and surface areas of three-dimensional objects.

Unit 4: Percent and Proportional Relationships
Students are able to:

- I can understand that percent is a number out of one hundred.
- I can convert between a fraction, decimal, and percent.
- I can write a non-whole number percent as a complex fraction.
- I understand that the whole is 100% and use the formula to find a missing piece.
- I can solve word problems involving percent using expressions, equations, and numeric and visual models.
- I can determine which of two quantities represents the whole in a word problem.
- I can use a formula to find a quantity (quantity = percent X whole).
- I can compute percent using algebraic, numeric, and visual models.
- I can solve percent problems when one quantity is a certain percent more or less than another.
- I can solve percent problems involving a percent increase or decrease.
- I can find 100% of a quantity when given a quantity that is a percent of a whole by using a variety of methods.
- I can solve word problems involving finding 100% of a given quantity with and without using equations.
- I can solve various types of percent problems by identifying the type of percent problem and applying appropriate strategies.
- I can extend mental math practices to mentally calculate the part, the percent, and the whole in percent word problems.
- I can understand the terms *original price, selling price, markup, markdown, markup rate, and markdown rate*.
- I can identify the original price as the whole and solve multistep markup and markdown problems.
- I can understand equations for markup and markdown problems and use them to solve problems.
- I can use a variety of methods to solve problems where quantities and percents of change.
- I can solve simple interest problems using the formula I = Prt.
- I can use the formula I=Prt to recognize that units for both interest rate and time must be compatible.
- I can solve real-world percent problems: tax, gratuities, commissions, and fees.
- I can solve word problems: percent using equations, tables, and graphs.
- I can identify the constant of proportionality (tax rate, commission rates, etc.) in graphs, equations, tables, and in the context of the situation.
- I make a scale drawing of a picture or geometric figure using a scale factor as a percent and recognizing if the original is enlarged or reduced.
- I understand scale factor to be the constant or proportionality.
- I make scale drawings where horizontal and vertical scales are different.
- I understand that two similar figures are scale models and compute the scale factor.
- I can compute the related scale factor of a similar figure, given three figures and two scale factors.
- I can compute the lengths in the actual picture using the scale factor.
- I can solve area problems related to scale drawings and percent.
- I can write and use algebraic expressions and equations to solve percent word problems related to populations of people and compilations.
- I can write and use algebraic expressions and equations to solve percent word problems related to mixtures.
- I can solve counting problems related to computing percents.

Unit 5: Statistics & Probability
Students will be able to:

- I can construct a frequency histogram and understand that the number of intervals may affect the shape of the histogram.
- I can construct a relative frequency histogram and recognize that the shape does not change when relative frequency is used.
- I understand that the mean is a balance point by calculating the distances of the data points from the mean and call the distances, ***deviations***.
- I understand that the mean is the value such that the sum of the deviations is equal to zero.
- I can interpret the mean of a data set as a "typical" value.
- I can compare distributions based on their means, but variability must also be considered.
- I can calculate the mean absolute deviation (MAD) for a given data set.
- I can interpret MAD as the average distance of data values from the mean.
- I can understand that probability is a number between 0 and 1 that represents the likelihood that an event will occur.
- I can interpret a probability as the proportion of the time that an event occurs when a chance experiment is repeated many times.
- I can estimate probabilities by collecting data on an outcome of a chance experiment.
- I can use given data to estimate probabilities.
- I can determine the possible outcomes for simple chance experiments.
- I can determine for which outcomes in the sample space the event will occur, given a description of a chance experiment and an event.
- I can distinguish between chance experiments with equally likely outcomes and chance experiments for which the outcomes are not equally likely.
- I can calculate probabilities of events for chance experiments that have equally likely outcomes.
- I can use data from a random sample to estimate a population proportion.
- I can calculate probabilities for chance experiments that do not have equally likely outcomes.
- I understand that probabilities can be estimated based on observing outcomes of a chance experiment.
- I can compare estimated probabilities to those predicted by a probability model.
- I can design my own simulation.
- I can use two more devices in simulations: colored disks & a random number table.
- I will use estimated probabilities to judge whether a given probability model is plausible.
- I will use estimated probabilities to make informed decisions.
- I can differentiate between a population and a sample.
- I can differentiate between a population characteristic and a sample statistic.
- I investigate statistical questions that involve generalizing from a sample to a larger population.
- I understand that how a sample is selected is important if the goal is to generalize from the sample to a larger population.
- I understand that random selection from a population tends to produce samples that are representative of the population.
- I can select a random sample from a population.
- I can begin to develop an understanding of sampling variability.
- I can select a random sample from a population.
- I can design a plan for selecting a random sample from that population.
- I can use data from a random sample to estimate a population mean.
- I understand the term "sampling variability" in the context of estimating a population mean.
- I use data from a random sample to estimate a population mean.
- I understand the term sampling variability in the context of estimating a population proportion.

• I know that increasing the sample size decreases sampling variability. • I can use tree diagrams to organize and represent the outcomes in the sample space. • I can calculate probabilities of compound events. • I can understand the terms *original price, selling price, markup, markdown, markup rate, and markdown rate*. • I can identify the original price as the whole and solve multistep markup and markdown problems. • I can understand equations for markup and markdown problems and use them to solve problems. • I can describe what I expect to see when I observe many outcomes of an experiment. • I can distinguish between theoretical and estimated probabilities. • I can understand that a meaningful difference between two sample means is one that is greater than would have been expected due to just sampling variability. • I can express the difference in sample means as a multiple of a measure of variability. • I understand that a difference in sample means provides evidence that the population means are different.	

Unit 6: Geometry
Student will be able to:

- I can solve for unknown angles in word problems and in diagrams involving complementary and supplementary angles.
- I can solve for unknown angles in word problems and in diagrams involving complementary, supplementary, vertical, and adjacent angles.
- I can use a triangle correspondence to recognize when two triangles match identically.
- I can use notation to denote a triangle correspondence and use the triangle correspondence to talk about corresponding angles and sides.
- I can label equal angles and sides of triangles with multiple arcs or tic marks.
- I can use a compass, protractor, and ruler to draw geometric shapes based on given conditions.
- I can use a protractor, ruler, and setsquare to draw parallelograms based on given conditions.
- I can draw triangles under different criteria to explore which criteria result in many, a few, or one triangle.
- I understand that two triangles are identical if all corresponding sides are equal under some correspondence; three side lengths of a triangle determine a unique triangle.
- I understand that two triangles are identical if two corresponding sides and the included angle are equal under some correspondence; two sides and an included angle of a triangle determine a unique triangle.
- I understand that two triangles are identical if two pairs of corresponding angles and one pair of corresponding sides are equal under some correspondence; two angle measurements and a given side length of a triangle determine a unique triangle.
- I understand that the two angles and any side condition can be separated into two conditions: (1) the two angles and included side condition and (2) the two angles and the side opposite a given angle condition.
- I understand that three given lengths determine a triangle, provided the largest length is less than the sum of the other two lengths; otherwise, no triangle can be formed.
- I understand that if two side lengths of a triangle are given, then the third side length must be between the difference and the sum of the first two side lengths.
- I understand that two angle measurements determine many triangles, provided the angle sum is less than 180°; otherwise, no triangle can be formed.
- I understand that two sides of a triangle and an acute angle, not included between the two sides, may not determine a unique triangle.
- I understand that two sides of a triangle and a 90° angle (or obtuse angle), not included between the two sides, determine a unique triangle.
- I can use information such as vertical angles and common sides in the structure of triangle diagrams to establish whether conditions that determine a unique triangle exist.
- I can use conditions that determine a unique triangle to determine when two triangles are identical.
- I can construct viable arguments to explain why the given information can or cannot give a triangle correspondence between identical triangles.
- I can use conditions that determine a unique triangle to construct viable arguments that angle measures and lengths are equal between triangles.
- I can describe rectangular regions that result from slicing a right rectangular prism by a plane perpendicular to one of the faces.
- I can describe polygonal regions that result from slicing a right rectangular pyramid by a plane perpendicular to the base and by another plane parallel to the base.
- I can describe polygonal regions that result from slicing a right rectangular prism or pyramid by a plane that is not necessarily parallel or perpendicular to a base.

• I understand that two sides of a triangle and an acute angle, not included between the two sides, may not determine a unique triangle. • I understand that two sides of a triangle and a 90° angle (or obtuse angle), not included between the two sides, determine a unique triangle. • I can determine the area of composite figures in real-life contextual situations using composition and decomposition of polygons and circular regions. • I can use the area properties to justify the repeated use of the distributive property to expand the product of linear expressions. • I can determine the area of composite figures and of missing regions using composition and decomposition of polygons.	• I can determine the area of composite figures and of missing regions using composition and decomposition of polygons. • I can determine the surface area of three-dimensional figures, those that are composite figures and those that have missing sections. • I can use the formula $l = wh$ to determine the volume of a right prism. Students identify the base and compute the area of the base by decomposing it into pieces. • I can compute volumes of three-dimensional objects composed of right prisms by using the fact that volume is additive. • I can write algebraic expressions using and words and numbers.

Students will know:

- How to add, subtract, multiply and divide rational numbers (negative and positive).
- How to write an equation for a situation.
- How to solve 2-step linear equations.
- How to solve problems involving proportional relationships found in similar figures.
- How to find surface area and volume of 2 and 3-D figures.
- How to communicate mathematically.
- How probability is determined and makes predictions.
- How to create and compare data displays.
- How to graph ordered pairs with both positive and negative coordinates.
- How to do prime factorization.
- How to apply problem solving strategies.
- How to convert measurement systems.

Students will be able to:

- Apply and use their prior knowledge of proportional relationships and simple linear equations to work with a broader set of linear relationships.
- Apply and use linear functions.
- Apply and use known understandings of proportionality so that students see the connection of linear relationships that are the basis for high school mathematics.
- Apply and reinforce an important connection between numerical operations and geometric relationships.
- Apply their understanding of surfaces area and volume of cylinders, and volume of cones and pyramids.
- Apply their understanding of rational numbers and proportionality to concepts of probability.
- Apply their coordinate graphing skills using the entire coordinate plane.
- Apply their understanding of math concepts and use mathematical language.

Evidence of Assessment

What evidence will be collected to determine whether or not the understandings have been developed, the knowledge and skill attained, and the Common Core State Standards met? [Anchor the work in performance tasks that involve application, supplemented as needed by prompted work, quizzes, observations, etc.]

Types of Learning Activities

Learning Activities:

1. Work in MathXL
2. Weekly blogging on a specific topic
3. Topic quizzes through MathXL
4. Completing activities and assignments in a math notebook
5. Module Assessment

Direct Instruction	**Indirect Instruction**	**Experiential Learning**	**Independent Study**	**Interactive Instruction**
Structured Overview ____Mini presentation x Drill & Practice ____Demonstrations ____Other (List)	Problem-based Case Studies ____Inquiry Reflective Practice ____Project Paper ____Concept Mapping ____Other (List)	Virt. Field Trip ____Experiments Simulations ____Games ____Field Observ. ___Role-playing ____Model Bldg. ____Surveys ____Other (List)	Essays Self-paced computer Journals ____Learning Logs ____Reports Directed Study ____Research Projects ____Other (List)	Discussion Debates ___Role Playing Panels ____Peer Partner Learning ____Project team ____Laboratory Groups ___Think, Pair, Share Cooperative Learning Tutorial Groups _Interviewing Conferencing Other (List)

Learning Activities:

Unit 1: Ratios & Proportions
Unit Overview

EngageNY Ratio & Proportional Relationships (Grade 7-Module 1)

Topic A: Proportional Relationships (**7.RP.2a**)

- Lesson 1: An Experience in Relationships as Measuring Rate
- Lesson 2: Proportional Relationships
- Lessons 3–4: Identifying Proportional and Non-Proportional Relationships in Tables
- Lessons 5–6: Identifying Proportional and Non-Proportional Relationships in Graphs

Topic B: Unit Rate and the Constant of Proportionality (**7.RP.2b**, **7.RP.2c**, **7.RP.2d**, **7.EE.4a**)

- Lesson 7: Unit Rate as the Constant of Proportionality
- Lessons 8–9: Representing Proportional Relationships with Equations
- Lesson 10: Interpreting Graphs of Proportional Relationships

Topic C: Ratios and Rates Involving Fractions (**7.RP.1**, **7.RP.3**, **7.EE.4a**)

- Lessons 11–12: Ratios of Fractions and Their Unit Rates
- Lesson 13: Finding Equivalent Ratios Given the Total Quantity
- Lesson 14: Multistep Ratio Problems
- Lesson 15: Equations of Graphs of Proportional Relationships Involving Fractions

EngageNY: Percent & Proportional Relationships (Grade 7-Module 4)

Topic A: Finding the Whole (7.RP.A.1, 7.RP.A.2c, 7.RP.A.3)

- Lesson 1: Percent
- Lesson 2: Part of a Whole as a Percent
- Lesson 3: Comparing Quantities with Percent
- Lesson 4: Percent Increase and Decrease
- Lesson 5: Finding One-Hundred Percent Given Another Percent
- Lesson 6: Fluency with Percents

Topic B: Percent Problems Including More than One Whole (7.RP.A.1, 7.RP.A.2, 7.RP.A.3, 7.EE.B.3)

- Lesson 7: Markup and Markdown Problems
- Lesson 8: Percent Error Problems
- Lesson 9: Problem-Solving when the Percent Changes
- Lesson 10: Simple Interest
- Lesson 11: Tax, Commissions, Fees, and Other Real-World Percent Problems

Topic C: Scale Drawings (7.RP.A.2b, 7.G.A.1)

- Lesson 12: The Scale Factor as a Percent for a Scale Drawing
- Lesson 13: Changing Scales
- Lesson 14: Computing Actual Lengths from a Scale Drawing
- Lesson 15: Solving Area Problems Using Scale Drawings

EngageNY Ratio & Proportional Relationships (Grade 7-Module 1)

Topic D: Ratios of Scale Drawings (**7.RP.2b**, **7.G.1**)

- Lesson 16: Relating Scale Drawings to Ratios and Rates Lesson 17: The Unit Rate as the Scale Factor
- Lesson 18: Computing Actual Lengths from a Scale Drawing
- Lesson 19: Computing Actual Areas from a Scale Drawing
- Lesson 20: An Exercise in Creating a Scale Drawing
- Lessons 21–22: An Exercise in Changing Scales

EngageNY: Percent & Proportional Relationships (Grade 7-Module 4)

Topic D: Population, Mixture, and Counting Problems Involving Percents (7.RP.A.2c, 7.RP.A.3, 7.EE.B.3)

- Lesson 16: Population Problems
- Lesson 17: Mixture Problems
- Lesson 18: Counting Problems

Unit 1 Assessment

Unit 2: Rational Numbers, Integers, Exponents & Scientific Notation
Unit Overview

EngageNY: Rational Numbers (Grade 7 – Module 2)

Topic A: Addition and Subtraction of Integers and Rational Numbers (**7.NS.A.1**)

- Lesson 1: Opposite Quantities Combine to Make Zero
- Lesson 2: Using the Number Line to Model the Addition of Integers
- Lesson 3: Understanding Addition of Integers
- Lesson 4: Efficiently Adding Integers and Other Rational Numbers
- Lesson 5: Understanding Subtraction of Integers and Other Rational Numbers
- Lesson 6: The Distance Between Two Rational Numbers
- Lesson 7: Addition and Subtraction of Rational Numbers
- Lessons 8–9: Applying the Properties of Operations to Add and Subtract Rational Numbers

Topic B: Multiplication and Division of Integers and Rational Numbers (**7.NS.A.2**)

- Lesson 10: Understanding Multiplication of Integers
- Lesson 11: Develop Rules for Multiplying Signed Numbers
- Lesson 12: Division of Integers

Topic C: Applying Operations with Rational Numbers to Expressions and Equations (**7.NS.A.3**, **7.EE.A.2**, **7.EE.B.4a**)

- Lesson 17: Comparing Tape Diagram Solutions to Algebraic Solutions
- Lessons 18–19: Writing, Evaluating, and Finding Equivalent Expressions with Rational Numbers
- Lesson 21: If-Then Moves with Integer Number Cards

EngageNY: Rational Numbers (Grade 8 – Module 1)

Topic A: Exponential Notation and Properties of Integer Exponents (8.EE.1)

- Lesson 1: Exponential Notation
- Lesson 2: Multiplication of Numbers in Exponential Form 16
- Lesson 3: Numbers in Exponential Form Raised to a Power 27
- Lesson 4: Numbers Raised to the Zeroth Power 35
- Lesson 5: Negative Exponents and the Laws of Exponents

Topic B: Magnitude and Scientific Notation (8.EE.3, 8.EE.4)

- Lesson 7: Magnitude
- Lesson 8: Estimating Quantities
- Lesson 9: Scientific Notation
- Lesson 10: Operations with Numbers in Scientific Notation
- Lesson 11: Efficacy of the Scientific Notation
- Lesson 12: Choice of Unit
- Lesson 13: Comparison of Numbers Written in Scientific Notation and Interpreting Scientific Notation Using Technology

Unit 2 Assessment

Unit 3: Expressions and Equations
Unit Overview

EngageNY: Rational Numbers (Grade 7 – Module 3)

Topic A: Use Properties of Operations to Generate Equivalent Expressions (7.EE.A.1, 7.EE.A.2)

- Lessons 1–2: Generating Equivalent Expressions
- Lessons 3–4: Writing Products as Sums and Sums as Products
- Lesson 5: Using the Identity and Inverse to Write Equivalent Expressions
- Lesson 6: Collecting Rational Number Like Terms

EngageNY: Linear Equations (Grade 8 – Module 4)

Topic A: Writing and Solving Linear Equations (8.EE.C.7)

- Lesson 3: Linear Equations in x
- Lesson 4: Solving a Linear Equation
- Lesson 5: Writing and Solving Linear Equations
- Lesson 6: Solutions of a Linear Equation
- Lesson 7: Classification of Solutions
- Lesson 8: Linear Equations in Disguise
- Lesson 9: An Application of Linear Equations

EngageNY: Rational Numbers (Grade 7 – Module 3)

Topic B: Solve Problems Using Expressions, Equations, and Inequalities (7.EE.B.3, 7.EE.B.4, 7.G.B.5)

- Lesson 7: Understanding Equations
- Lessons 8–9: Using the If-Then Moves in Solving Equations
- Lessons 10–11: Angle Problems and Solving Equations
- Lesson 12: Properties of Inequalities
- Lesson 13: Inequalities
- Lesson 14: Solving Inequalities
- Lesson 15: Graphing Solutions to Inequalities

EngageNY: Linear Equations (Grade 8 – Module 4)

Topic B: Linear Equations in Two Variables and Their Graphs (8.EE.B.5)

- Lesson 10: A Critical Look at Proportional Relationships
- Lesson 11: Constant Rate
- Lesson 12: Linear Equations in Two Variables
- Lesson 13: The Graph of a Linear Equation in Two Variables
- Lesson 14: The Graph of a Linear Equation—Horizontal and Vertical Lines

Topic C: Slope and Equations of Lines (8.EE.B.5, 8.EE.B.6)

- Lesson 15: The Slope of a Non-Vertical Line
- Lesson 16: The Computation of the Slope of a Non-Vertical Line
- Lesson 17: The Line Joining Two Distinct Points of the Graph $y = mx + b$ has Slope m
- Lesson 18: There is Only One Line Passing Through a Given Point with a Given Slope
- Lesson 19: The Graph of a Linear Equation in Two Variables is a Line
- Lesson 20: Every Line is a Graph of a Linear Equation
- Lesson 21: Some Facts about Graphs of a Linear Equation in Two Variables

- Lesson 22: Constant Rates Revisited
- Lesson 23: The Defining Equation of a Line

Topic D: Systems of Linear Equations and Their Solutions (8.EE.B.5, 8.EE.C.8)

- Lesson 24: Introduction to Simultaneous Equations
- Lesson 25: Geometric Interpretation of the Solutions of a Linear System
- Lesson 26: Characterization of Parallel Lines
- Lesson 27: Nature of Solutions of a System of Linear Equations
- Lesson 28: Another Computational Method of Solving a Linear System
- Lesson 29: Word Problems
- Lesson 30: Conversion Between Celsius and Fahrenheit

Unit 3 Assessment

Second Semester

Unit 4: Statistics and Probability

Unit Overview

EngageNY: Statistics (Grade 6 – Module 6)

Topic A: Understanding Distributions

- Lesson 4: Creating a Histogram
- Lesson 5: Describing a Distribution Displayed in a Histogram

Topic B: Summarizing a Distribution that is Approximately Symmetric Using the Mean and Mean Absolute Deviation

- Lesson 7: The Mean as a Balance Point
- Lesson 8: Variability in a Data Distribution
- Lesson 9: The Mean Absolute Deviation (MAD)
- Lesson 10-11: Describing Distributions Using the Mean and MAD

Topic C: Summarizing a Distribution that is Skewed Using the Median and the Interquartile Range

- Lesson 13: Describing Variability Using the Interquartile Range (IQR)
- Lesson 14: Summarizing a Distribution Using a Box Plot
- Lesson 15: More Practice with Box Plots

EngageNY: Statistics & Probability (Grade 7 – Module 5)

Topic A: Calculating and Interpreting Probabilities (7.SP.C.5, 7.SP.C.6, 7.SP.C.7, 7.SP.C.8a, 7.SP.C.8b)

- Lesson 1: Chance Experiments
- Lesson 2: Estimating Probabilities by Collecting Data
- Lesson 3: Chance Experiments with Equally Likely Outcomes
- Lesson 4: Calculating Probabilities for Chance Experiments with Equally Likely Outcomes
- Lesson 5: Chance Experiments with Outcomes that Are Not Equally Likely
- Lesson 6: Using Tree Diagrams to Represent a Sample Space and to Calculate Probabilities
- Lesson 7: Calculating Probabilities of Compound Events

Topic B: Estimating Probabilities (7.SP.C.6, 7.SP.C.7, 7.SP.C.8c)

- Lesson 8: The Difference Between Theoretical Probabilities and Estimated Probabilities
- Lesson 9: Comparing Estimated Probabilities to Probabilities Predicted by a Model
- Lessons 10–11: Using Simulation to Estimate a Probability
- Lesson 12: Using Probability to Make Decisions

Topic C: Random Sampling and Estimated Population Characteristics (**7.SP.A.1**, **7.SP.A.2**)

- Lesson 13: Populations, Samples, and Generalizing from a Sample to a Population
- Lesson 14: Selecting a Sample
- Lesson 15: Random Sampling
- Lesson 16: Methods for Selecting a Random Sample
- Lesson 17: Sampling Variability
- Lesson 18: Estimating a Population Mean

- Lesson 19: Understanding Variability when Estimating a Population Proportion
- Lesson 20: Estimating a Population Proportion

Topic D: Comparing Populations (**7.SP.B.3**, **7.SP.B.4**)

- Lesson 21: Why Worry About Sampling Variability?
- Lessons 22–23: Using Sample Data to Decide if Two Population Means Are Different

Unit 4 Assessment

Unit 5: Geometry
Unit Overview

EngageNY: Geometry (Grade 7 – Module 6)

Topic A: Unknown Angles (7.G.B.5)
- Lesson 1: Complementary and Supplementary Angles
- Lessons 2–4: Solve for Unknown Angles using Equations

Topic B: Constructing Triangles (**7.G.A.2**)
- Lesson 5: Unique Triangles
- Lesson 6: Drawing Geometric Shapes
- Lesson 7: Drawing Parallelograms
- Lesson 8: Drawing Triangles
- Lesson 9: Conditions for a Unique Triangle—Three Sides and Two Sides and the Included Angle
- Lesson 10: Conditions for a Unique Triangle—Two Angles and a Given Side
- Lesson 11: Conditions on Measurements that Determine a Triangle
- Lesson 12: Unique Triangles—Two Sides and a Non-Included Angle
- Lessons 13–14: Checking for Identical Triangles
- Lesson 15: Using Unique Triangles to Solve Real-World and Mathematical Problems

Topic C: Slicing Solids (7.G.A.3)
- Lessons 16: Slicing a Right Rectangular Prism with a Plane
- Lesson 17: Slicing a Right Rectangular Pyramid with a Plane
- Lesson 18: Slicing on an Angle
- Lesson 19: Understanding Three-Dimensional Figures

Topic D: Problems Involving Area and Surface Area (**7.G.B.6**)
- Lesson 20: Real-World Area Problems
- Lesson 21: Mathematical Area Problems
- Lesson 22: Area Problems with Circular Regions
- Lessons 23–24: Surface Area

Topic E: Problems Involving Volume (**7.G.B.6**)
- Lesson 25: Volume of Right Prisms
- Lesson 26: Volume of Composite Three-Dimensional Objects
- Lesson 27: Real-World Volume Problems

EngageNY: Geometry (Grade 8 – Module 2)

Topic A: Definitions and Properties of the Basic Rigid Motions (8.G.A.1)
- Lesson 1: Why Move Things Around?
- Lesson 2: Definition of Translation and Three Basic Properties
- Lesson 3: Translating Lines
- Lesson 4: Definition of Reflection and Basic Properties
- Lesson 5: Definition of Rotation and Basic Properties
- Lesson 6: Rotations of 180 Degrees

Topic B: Sequencing the Basic Rigid Motions (8.G.A.2)
- Lesson 7: Sequencing Translations
- Lesson 8: Sequencing Reflections and Translations
- Lesson 9: Sequencing Rotations
- Lesson 10: Sequences of Rigid Motions

Topic C: Congruence and Angle Relationships (**8.G.A.2**, **8.G.A.5**)

- Lesson 11: Definition of Congruence and Some Basic Properties
- Lesson 12: Angles Associated with Parallel Lines
- Lesson 13: Angle Sum of a Triangle
- Lesson 14: More on the Angles of a Triangle

EngageNY: Similiarity (Grade 8 – Module 3)

Topic A: Dilation (**8.G.A.3**)

- Lesson 1: What Lies Behind "Same Shape"?
- Lesson 2: Properties of Dilations
- Lesson 3: Examples of Dilations
- Lesson 4: Fundamental Theorem of Similarity (FTS)
- Lesson 5: First Consequences of FTS
- Lesson 6: Dilations on the Coordinate Plane
- Lesson 7: Informal Proofs of Properties of Dilations (optional)

Topic B: Similar Figures (**8.G.A.4**, **8.G.A.5**)

- Lesson 8: Similarity
- Lesson 9: Basic Properties of Similarity
- Lesson 10: Informal Proof of AA Criterion for Similarity
- Lesson 11: More About Similar Triangles
- Lesson 12: Modeling Using Similarity

Unit 5 Assessment

Unit 6: Pythagorean Theorem

Unit Overview

EngageNY: Geometry (Grade 8 – Module 7)

Topic A: Square and Cube Roots (**8.NS.A.1**, **8.NS.A.2**, **8.EE.A.2**)

- Lesson 1: The Pythagorean Theorem
- Lesson 2: Square Roots
- Lesson 3: Existence and Uniqueness of Square and Cube Roots
- Lesson 4: Simplifying Square Roots (optionalLesson 5: Solving Radical Equations

Topic B: Decimal Expansions of Numbers (**8.NS.A.1**, **8.NS.A.2**, **8.EE.A.2**)

- Lesson 6: Finite and Infinite Decimals
- Lesson 7: Infinite Decimals
- Lesson 8: The Long Division Algorithm
- Lesson 9: Decimal Expansions of Fractions, Part 1
- Lesson 10: Converting Repeating Decimals to Fractions
- Lesson 11: The Decimal Expansion of Some Irrational Numbers
- Lesson 12: Decimal Expansions of Fractions, Part 2
- Lesson 13: Comparing Irrational Numbers
- Lesson 14: Decimal Expansion of π

Topic C: The Pythagorean Theorem (**8.G.B.6**, **8.G.B.7**, **8.G.B.8**)

- Lesson 15: Pythagorean Theorem, Revisited
- Lesson 16: Converse of the Pythagorean Theorem
- Lesson 17: Distance on the Coordinate Plane
- Lesson 18: Applications of the Pythagorean Theorem

Topic D: Applications of Radicals and Roots (**8.G.B.7**, **8.G.C.9**)

- Lesson 19: Cones and Spheres
- Lesson 20: Truncated Cones
- Lesson 21: Volume of Composite Solids
- Lesson 22: Average Rate of Change
- Lesson 23: Nonlinear Motion

Unit 6 Assessment

MS1A 13-14 Pacing Guide/Check list