**MS Scope and Sequence**

**Course Overview: 7th Grade Mathematics**

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| **Teacher: Nick Dimille | Year: 20/21** |
| **Course Enduring Understandings:***What do you want students to understand? What inferences should they be able to make?**Source: Massachusetts Curriculum Framework for Mathematics* Students will understand how to: * Use proportional relationships to solve real-world problems
* Use properties of operations to work with expressions and linear equations involving rational numbers
* Work with two- and three-dimensional shapes to solve problems involving area, surface area, volume
* Draw inferences about populations based on samples
 | **Course Essential Question(s):***What thought provoking questions foster learning and inquiry to get to the Enduring Understandings?*  * How can you use proportional relationships to understand how variables are related to each other through different representations?
* How do you translate real-world problems to algebraic expressions or equations?
* How are two-dimensional shapes related to three-dimensional shapes in terms of area, surface area, and volume?
* How do differences in sampling affect a data set and the inferences and generalizations drawn?
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| **Course Mission Statement/North Star:***By the end of this course, students will independently use their learning to …**What kind of long-term independent accomplishments are desired?* *Application of skill and content**The “Why are we doing this?”*By the end of the course, students will: * Move fluently between different representations of rational numbers (fractions, decimals, percents).
* Solve single- and multi-step problems (including percent problems) using ratios and understanding of proportionality.
* Graph proportional relationships and link unit rate to slope.
* Add, subtract, multiply, and divide rational numbers using properties of operations.
* Write and solve simple equations to solve real world problems.
* Solve real world problems involving area, surface area, and volume of two- and three- dimensional shapes.
* Compare two data distributions.
* Access prior knowledge that could be relevant to the solution of a problem.

In addition, students will independently use their understanding of rational numbers, equations, ratios and proportions, geometry, and statistics to solve complex real-world problems. Students will be able to apply the appropriate tools – such as drawing models, using a simpler problem, and writing an equation – to strategically solve these problems and justify their answers, both orally and in writing.  |
| **What are your grade level SEL Skills?** |
| **Final Assessment:***How will you assess independent student mastery of your course essential skills and questions? (Questions and Format)*At APR, we acknowledge that schools in America are systematically racist institutions. In order to continue to develop and work towards being an anti-racist school, APR commits to deeper learning within the context of equitable practices of building knowledge, producing authentic work, and developing 21ist century skills in order to foster mastery, identity and creativity within our students ([Deeper Learning Guidance, DESE](https://drive.google.com/file/d/1YEQUBJf71eLyO8cuTHTNExEFEhCktKJg/view?usp=sharing)). Aligned to that commitment, the final assessment will focus around deeper learning tasks that focus on two domains: 7.NS (Number Sense) and 7.EE (Expressions and Equations.) These domains are part of the major work of 7th grade and the skills embedded in them are essential to students’ success in 8th grade mathematics. The task will include the following skills: * Adding, subtracting, multiplying, and dividing rational numbers. A subtraction problem should require students to demonstrate an understanding of subtraction as equivalent to adding the additive inverse. The other problems should require students to demonstrate mastery of the properties of operations as strategies to add, subtract, multiply, and divide rational numbers.
* Solving real-world problems involving the four operations with rational numbers.
* Using the properties of operations to generate equivalent expressions.
* Solving multi-step equations and inequalities using the properties of operations and inverse operations.
* Solving multi-step real-life mathematical problems with positive and negative numbers using equations and inequalities.
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Please note, the following scope and sequence is an approximate number of weeks for each unit, because we do not currently have specific dates for the 2020-21 SY. There are intentionally several flex weeks, to account for unforeseen events, MCAS, and to build in more time for just in time scaffolds, deeper learning tasks, or review of current content.

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| **Unit** | **Key Skills & Content****(Highlighted in yellow are priority standards)** | **Approximate # of Weeks** | **Notes/Rationale for Adjustments****Suggested Mastery Assessments** |
| **Unit 0** | *Flex Week,* allows for teachers to create procedures and routines with students that will be for both remote and in person learning. | 1 week | N/A |
| [**Unit 1**](#kix.n4n50s34znoe)**Operations with Rational Numbers**  | * Additive Inverse, number lines
* Additive inverse, properties of operations
* Rules to multiplying and dividing signed numbers
* Convert between fractions and decimals
* Solve problems involving all four operations with rational numbers
 | 5 weeks (4 weeks in 19-20 SY)  | * Note that this unit is focused on 7th grade priority standards
* Many of these skills also align with the APR course mission statement.
* This is the students’ first time working with positive and negative rational numbers Note that the standards are largely sequenced as conceptual → procedural → application. Use additive inverse, properties of operations, and models to solidify conceptual understanding for students.
* Additional time was added to make sure that students build a strong understanding of operations with rational numbers. This skill is worked on throughout 7th grade and beyond.
* Make sure to interleave integers, fractions, decimals, and +/- numbers throughout the unit.
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| [**Unit 2**](#kix.furc5cs3ny06)**Proportional Relationships**  | * Unit Rate, proportionality
* Constant of Proportionality
* Fractional ratio and rates
* Connecting representations
 | 5 weeks (4 weeks in 19-20 SY)  | * Note that this unit is focused on 7th grade priority standards
* Many of these skills also align with the APR course mission statement → “Graph proportional relationships and link unit rate to slope.”
* Students begin work with RP standards in sixth grade, mainly focusing on whole number proportional relationships. And summer homework was assigned for students to review ratios and unit rate. Use summer homework data to inform student understanding of ratios / unit rates. This data will determine how much just in time scaffolds that you may have to build into the unit.
* Suggested Mastery: Mixture of traditional assessment and deeper learning tasks (there are a lot of real world applications in this unit, so I suggest that you incorporate deeper learning throughout the unit as smaller chunked tasks when applicable).
* Due to the length of the unit, a mid-point check in is recommended, this can be a quiz, a short project, etc.
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| [**Unit 3**](#kix.9ilbweg8ol9t)**Percent and Scaling**  | * Scale factor, reduction, enlargement
* Percent increase, percent decrease
* Makeup, markdown, tax, tip, commission
 | 5 weeks (4 weeks in 19-20 SY)  | * Note that this unit is focused on 7th grade priority standards
* Focus time on the vocabulary for this standard.
* Start with one step problems, and move onto multi-step problems using a variety of contexts.
* A lot of room for use of real-world examples, such as finding sales online, in print media, and on TV, interest, and sales tax (deeper learning)
* Students start working with percent in 6th grade, but will most likely need just in time scaffolds / review of the concepts
* Due to the length of the unit, a mid-point check in is recommended, this can be a quiz, a short project, etc.
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| [**Unit 4**](#kix.keynmojksqw1)**Numerical and Algebraic Expressions**  | * Communicative, associative, and distributive properties; equivalent expressions
* Order of operations
* Combine like terms and simplify expressions with rational number coefficients
 | 2 weeks  | * Note that this unit is focused on 7th grade priority standards
* Students learned commutative, identity, and distributive properties in 6th grade with whole numbers. In 7th grade students are able to apply properties of operations to rational numbers.

*(Don’t forget to include factoring in review)* * These skills are all review skills of 6th grade, the standard focuses on furthering those skills with rational number coefficients.
* Continual review of rational number computation from unit 1 (can be done on IXL, homework, etc.)
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| [**Unit 5**](#kix.4wretbk3lkza)**Equations and Inequalities**  | * Solve multi-step equations
* Solve equation using inverse operations
* Solve inequalities, interpret, and graph the solution
 | 5 weeks (4 weeks in 19-20 SY)  | * Note that this unit is focused on 7th grade priority standards
* Weeks can be flexible between unit 4 and unit 5.
* In 6th grade,s students solved one step equations and inequalities using inverse operation. They were also assigned summer homework on this topic, use for data as you start this unit.
* Students solve multi-step real-world and mathematical problems. The problems should contain a combination of whole numbers, positive and negative integers, fractions, and decimals.

It is important here to interleave throughout the unit but specifically the end of the unit. * Need to build in just in time scaffolds for converting between fractions, decimals and percents.
* Work with students in recognizing whether a word problem can be represented by an equation or inequality.
* Continual review of rational number computation from unit 1 (can be done on IXL, homework, etc.)
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| [**Unit 6**](#kix.awhhfjp24aaq)**Geometry**  | * Complementary, supplementary, adjacent, and vertical angles
* Circles
* Triangles
* Area, composite figures
* Surface Area
* Volume
* Cross Sections
 | 5 weeks (4 weeks in 19-20 SY)  | * Geometry was taught during remote learning, and students will have to review concepts such as → area of triangles, volume of rectangular prisms, surface area, and area of composite figure
* Suggested Mastery Assessment
	+ A cumulative mastery task that focuses on all aspects of the standards rooted in deeper learning
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| [**Unit 7**](#kix.5rp5qpl45ahb)**Statistics**  | * Sampling to draw inferences about a population
* Measures of center and measures of variability (IQR, MAD)
 | 2 weeks  | * Although it's part of the 6th grade standard to go over MAD, it was not covered in 6th grade due to time constraints
* Students will need just in time scaffolds with measures of center and measures of variability - students learned during remote learning- first learned in 6th grade.
* Depending on time use a flex week to design a deeper learning task that can be embedded throughout the unit or as an end of unit task.
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| [**Unit 8**](#kix.1ltu0odiuhfe)**Probability**  | * Theoretical probability
* Experimental probability
 | 2 weeks  | * No changes made from 19-20 SY.
* Depending on time use a flex week to design a deeper learning task that can be embedded throughout the unit or as an end of unit task.
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| **Total:**  | * **32 weeks for units 0 - 8**
* **3 weeks for MCAS**
	+ 2 weeks for review, 1 week for taking the MCAS (math and ELA)
* **3 weeks flex**
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| [**Unit 1: Operations with Rational Numbers**](https://drive.google.com/drive/folders/1N0RX7m9-jALQq7D8IfTaiGdeQQApVhPi?usp=sharing)  | **5 weeks**  |
| **Meaning**  |
| **Enduring Understandings:***What do you want students to understand? What inferences should they be able to make?*Students will understand: * Integers represent positive and negative situations including temperature, altitude, and debt
* The properties of operations for addition, subtraction, multiplication, and division hold true for rational numbers.
* That subtracting is a number is equivalent to adding its inverse
* The quotient or product of two negative or two positive numbers is positive.
* The quotient or product of two numbers, in which one of the numbers is negative, is negative.
* How to interpret the sums, differences, products, and quotients by describing real-world contexts
* When to use addition, subtraction, multiplication, and division to solve real-world problems
* When an estimated versus exact answer is appropriate
 | **Essential Question(s):***What thought provoking questions foster learning and inquiry to get to the Enduring Understandings?* * Why do we need positive and negative numbers?
* How can you use equivalent forms of numbers and the properties of operations to solve problems?
* How can real-world situations be modeled to show the operations needed?
* When is estimation an appropriate strategy?
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| **Acquisition**  |
| **Content Standards:** *(CCSS, State, national, AP)***7.NS.A: Apply and extend previous understandings of operations with fractions.****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.* + **7.NS.A.1a**: 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*.
	+ **7.NS.A.1b**: 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.
	+ **7.NS.A.1c:** 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.
	+ **7.NS.A.1d**: 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.
	+ **7.NS.A.2a**: 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.
	+ **7.NS.A.2b**: 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.
	+ **7.NS.A.2c**: Apply properties of operations as strategies to multiply and divide rational numbers.
	+ **7.NS.A.2d**: 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.
 | **Skill Standards:** *(Thinking Skills, Group work skills, content-area habits, Social Emotional Skills, study skills, etc.)** **SEMP 4. Model with mathematics**

Students use multiple strategies to demonstrate the same meaning of an operation which include modeling with manipulatives or on a number line * **SEMP 6. Attend to precision**

Students are working being independent thinkers by self-correcting any errors they find * **SEMP 7. Look for and make use of structure**

Students make use of what they already know about operations and their properties and extend that understanding to rational numbers * **SEMP 8. Look for and express regularity in repeated reasoning.**

Students use several examples of integer multiplication to generalize a formal rule  |
| **Notes / Texts*** Aligns to MATCH Fishtank Unit 2
* [Aligns to EngageNY Module 2]
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| [**Unit 2: Proportional Relationships**](https://drive.google.com/drive/folders/19NFQl9tOlov00i73YNsaXjShi-jH_dLy?usp=sharing)  | **5 weeks**  |
| **Meaning**  |
| **Enduring Understandings:***What do you want students to understand? What inferences should they be able to make?*Students will understand: * A fraction represents a part of a whole; a ratio represents a comparison of two quantities. A proportion is two ratios that are equal in value.
* A unit rate is a rate that is expressed as a quantity of one. A rate is a ratio that is expressed in two different units.
* A proportional relationship between two quantities is a collection of equivalent ratios, related to each other by a constant of proportionality.
* Proportional relationships can be represented in different, related ways, including a table, equation, graph, and written description. Knowing one representation provides the information needed to represent the relationship in a different way.
* There are many applications that can be solved using proportional reasoning, including problems with price increases and decreases, commissions, fees, unit prices, and constant speed.
 | **Essential Question(s):***What thought provoking questions foster learning and inquiry to get to the Enduring Understandings?* * How are fractions different than ratios?
* What is a unit rate and how does it help us solve real-world problems?
* How can we use proportional relationships to solve real-world problems?
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| **Acquisition**  |
| **Content Standards: *(CCSS, State, national, AP)*****7.RP.A: Analyze proportional relationships and use them to solve real-world and mathematical problems.*** **7.RP.A.1**: Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. *For example, if a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction 1/2/1/4 miles per hour, equivalently 2 miles per hour*.
* **7.RP.A.2**: Recognize and represent proportional relationships between quantities.
	+ **7.RP.A.2a**: 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.A.2b**: Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
	+ **7.RP.A.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 as t = pn*.
	+ **7.RP.A.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.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.
 | **Skill Standards:** *(Thinking Skills, Group work skills, content-area habits, Social Emotional Skills, study skills, etc.)** **SFMP 1. Make sense of problems and persevere in solving them.**

Students solve multi-step ratio and real-world percent problems* **SFMP 3. Construct viable arguments and critique the reasoning of others**

Students recognize proportional relationships from non-proportional ones and discuss their reasoning with others* **SFMP 4. Model with Mathematics**

Students learn to represent proportional relationships as tables, graphs, verbal descriptions, diagrams, and equations. * **SFMP 7 Look for and make use of structure**

Students use units in their ratios requiring them to attend to the units such as 8 miles in 4 hours at a rate of 2 miles per hour. Source: The Common Core Mathematics Companion: Standards Decoded (Miles, Williams)  |
| **Notes / Texts**Aligns to MATCH Fishtank Unit 1[This article outlines the progression of 6th grade to 7th grade standards on ratio and proportion](https://commoncoretools.files.wordpress.com/2012/02/ccss_progression_rp_67_2011_11_12_corrected.pdf) This might be a great read to understand where students are coming from in 6th grade.  |

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| [**Unit 3: Percent and Scaling**](https://drive.google.com/drive/folders/1o8npAKinXi0UiEOVKVD6aFLNmARxS4qW?usp=sharing)  | **5 weeks**  |
| **Meaning**  |
| **Enduring Understandings:***What do you want students to understand? What inferences should they be able to make?*Students will understand:* Percentages can be used to understand the relationship between parts of quantities and the whole quantity. Percentages can also be used to understand how quantities change in relation to their starting values. As a result, we can use percentages to model many real-world applications such as price changes and simple interest.
* Scale drawings are proportional to one another by a measure called the scale factor.
* Scales, such as “1 inch represents 10 miles,” enable us to draw and work with large or small objects and measures at scale, for example maps and floor plans.
 | **Essential Question(s):***What thought provoking questions foster learning and inquiry to get to the Enduring Understandings?* * What do percents tell us? Why are they so often used?
* What is the value of a scale drawing?
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| **Acquisition**  |
| **Content Standards: *(CCSS, State, national, AP)*****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.G.A.1**: Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.**7.NS.A.3**: Solve real-world and mathematical problems involving the four operations with rational numbers. Computations with rational numbers extend the rules for manipulating fractions to complex fractions.**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."* | **Skill Standards:** *(Thinking Skills, Group work skills, content-area habits, Social Emotional Skills, study skills, etc.)** **SFMP 1. Make sense of problems and persevere in solving them.**

Students solve multi-step ratio and real-world percent problemsStudents solve problems using scale drawings. * **SFMP 4 Model with Mathematics**

Students use drawings and hands-on materials to model geometric shapes and relationships Students write expressions and equations to model contextual problems * **SFMP 6. Attend to precision**

Students communicate their reasoning using precise mathematical vocabulary Source: The Common Core Mathematics Companion: Standards Decoded (Miles, Williams)  |
| **Notes/ Texts:*** Aligns to MATCH Fishtank Unit 5
* [Aligns to EngageNY Modules 1 and 4?]
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| [**Unit 4: Numerical and Algebraic Expressions**](https://drive.google.com/drive/folders/1SxlLmjs0nRSdYsUCh_lnfDSy6Z-vc-I7?usp=sharing) | **2 weeks**  |
| **Meaning**  |
| **Enduring Understandings:***What do you want students to understand? What inferences should they be able to make?*Students will understand: * The order of operations is a guide to understanding how an expression is organized and how it can be evaluated.
* Expressions can be expanded, factored, added, and subtracted using the properties of operations and the rules of operating with rational numbers.
* Expressions can be rewritten into equivalent, often simpler forms that can be interpreted in new and different ways.
 | **Essential Question(s):***What thought provoking questions foster learning and inquiry to get to the Enduring Understandings?* * How can we prove that properties of rational numbers are true?
* Why is it important to have an order of operations?
* How can we use properties of real numbers to determine or generate equivalent expressions?
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| **Acquisition**  |
| **Content Standards: *(CCSS, State, national, AP)*****7.NS.A.3**:Solve real-world and mathematical problems involving the four operations with rational numbers. **7.EE.A: 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."*
 | **Skill Standards:** *(Thinking Skills, Group work skills, content-area habits, Social Emotional Skills, study skills, etc.)** **SFMP 2. Reason abstractly and quantitatively.**

Students use expressions in different forms to understand how quantities in an equation are related. * **SFMP 4. Model with Mathematics**

Students write expressions and equations to model contextual problems * **SFMP 6 Attend to precision**

Students communicate their reasoning using precise mathematical vocabulary Source: The Common Core Mathematics Companion: Standards Decoded (Miles, Williams)  |
| **Notes / Texts*** Aligns to MATCH Fishtank Unit 3
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| [**Unit 5: Equations and Inequalities**](https://drive.google.com/drive/folders/1SxlLmjs0nRSdYsUCh_lnfDSy6Z-vc-I7?usp=sharing) | **5 weeks**  |
| **Meaning**  |
| **Enduring Understandings:***What do you want students to understand? What inferences should they be able to make?*Students will understand:* Inverse operations (reverse PEMDAS) are used to solve equations.
* Variables represents unknown quantities, and solving for the variable means finding the value of that unknown quantity that makes the equation true.
* Equations and inequalities are powerful tools that can be used to model and solve real-world situations with unknown quantities.
* Equations can be solved by reasoning about the arithmetic needed to uncover the value of the unknown. Equations can also be solved algebraically by using properties of operations and equality.
* Inequalities have infinite solutions, which can be represented graphically on a number line. In context, these solutions are sometimes constrained by what makes sense for the situation; for example, if solving for the maximum number of people who can fit onto a boat, the solution set would be limited to positive integers.
 | **Essential Question(s):***What thought provoking questions foster learning and inquiry to get to the Enduring Understandings?** How can expressions be manipulated to create equivalent representations?
* How can we use numbers and symbols to represent mathematical ideas?
* How are real-life problems represented with variables and constructed into equations and inequalities to be solved?
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| **Acquisition**  |
| **Content Standards: *(CCSS, State, national, AP)*****7.EE.B: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 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation*.
* **7.EE.B.4:** Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.
	+ **7.EE.B.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.EE.B.4b:** 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*.
 | **Skill Standards:** *(Thinking Skills, Group work skills, content-area habits, Social Emotional Skills, study skills, etc.)** **SFMP 1. Make sense of problems and persevere in solving them.**

Students solve multi-step real-world mathematical problems. Students use equations and inequalities to solve problems. * **SFMP 2. Reason abstractly and quantitatively.**

Students solve problems by reasoning about quantities. * **SFMP 4. Model with Mathematics**

Students write equations to model contextual problems. * **SFMP 6 Attend to precision**

Students estimate answers to problems as a check to accurate solutions.  |
| **Notes / Texts*** Aligns to MATCH Fishtank Unit 4
* [Aligns to EngageNY Module 3]
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| [**Unit 6: Geometry**](https://drive.google.com/drive/folders/1_loMjGdiViPXxMOUZHlNUA2jpsUrx_sr?usp=sharing) | **5 weeks**  |
| **Meaning**  |
| **Enduring Understandings:***What do you want students to understand? What inferences should they be able to make?*Students will understand:* Geometry allows us to precisely describe our physical environment. Angles and sides make up geometric figures and appear in out environment in real life objects.
* When two lines intersect, a pair of congruent vertical angles are created. This angle relationship, along with complementary and supplementary angle relationships, can be used to determine missing angle measures in diagrams.
* Area is an aspect of a 2D shape; volume and surface area are aspect of 3D shapes. Volume and surface area of a 3D shape can be calculated using the area of the faces of that shape.
* A circle is a closed shape that is defined by the set of points that are the same distance from the center of the circle. The distance from the center to any point on the circle is called the radius, and the distance across the circle through the center is called the diameter. The measurement around a circle is called the circumference and is proportional to the diameter of the circle with a constant of proportionality equivalent to
* $π$. The area of a circle can be found using the formula $A=πr^{2}$.
* In any triangle, the sum of any two side lengths must be longer than the measure of the third side. Given different conditions about the side and angle measures of a triangle, one unique triangle may be formed, more than one triangle may be formed, or no triangle may be formed.
 | **Essential Question(s):***What thought provoking questions foster learning and inquiry to get to the Enduring Understandings?** How do geometric models describe spatial relationships?
* How can angle relationships be used to calculate missing angles in a figure?
* How is the area of 2D shapes connected to volume and surface area of 3D shapes?
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| **Acquisition**  |
| **Content Standards: *(CCSS, State, national, AP)*****7.G.A: 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.

**7.G.B: Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.****7.G.B.4***:* Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.**7.G.B.5**: Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.**7.G.B.6**: Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. | **Skill Standards:** *(Thinking Skills, Group work skills, content-area habits, Social Emotional Skills, study skills, etc.)** **SFMP 1. Make sense of problems and persevere in solving them**

Students solve problems involving geometric principles * **SFMP 4. Model with Mathematics**

Students use drawings and hands-on materials to model geometric shoes and relationships * **SFMP 5. Use appropriate tools strategically**

Students draw free hand and use technology to other tools to draw geometric shapes Source: The Common Core Mathematics Companion: Standards Decoded (Miles, Williams)  |
| **Notes / Texts*** Aligns to MATCH Fishtank Unit 6
* [Aligns to EngageNY Module 6]
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| [**Unit 7: Statistics**](https://drive.google.com/drive/folders/1CeOuTLn7h10t0UXP5YfRUQOOVwNw1ET9?usp=sharing) | **2 weeks**  |
| **Meaning**  |
| **Enduring Understandings:***What do you want students to understand? What inferences should they be able to make?** Random samples tend to produce the most representative samples of populations. The larger the sample size, the more accurate and less variable the data tends to be.
* A generalization about a population is only valid if the sample is representative of that population
* Studying sample statistics is a way to reasonably understand and make predictions about larger population characteristics.
* between two or more populations. The mean and mean absolute deviation can shed light on differences between populations and how meaningful these differences are compared to sampling variability.Two data sets can be compared using measures of center and variability
* The results of a statistical observation can be used to support or refute an argument.
* Sample data can be used to compare characteristics of interest
 | **Essential Question(s):***What thought provoking questions foster learning and inquiry to get to the Enduring Understandings?** How can we gather, organize, and display data to communicate information about the real-world?
* How can we analyze data to make inferences or predictions, based on surveys, experiments, and probability?
* How do people use data to influence others?
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| **Acquisition**  |
| **Content Standards: *(CCSS, State, national, AP)*****7.SP.A: *Use 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*.

**7.SP.B: 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 variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable*.* **7.SP.B.4:** Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book. | **Skill Standards:** *(Thinking Skills, Group work skills, content-area habits, Social Emotional Skills, study skills, etc.)* * **SFMP 2. Reason abstractly and quantitatively.**

Students make generalizations and predictions based on random samples. Students compare statistical measures on two populations. * **SFMP 3. Construct viable arguments and critique the reasoning of others**

Students use statistical methods as justifications for predictions and inferences * **SFMP 4. Model with Mathematics**

Students develop probability models and use them to find probabilities of events. * **SFMP 5. Use appropriate tools strategically.**

Students used organized lists, tables, tree diagrams, and simulation tools. * **SFMP 6. Attend to precision**

Students calculate measures of center and variability with accuracy Source: The Common Core Mathematics Companion: Standards Decoded (Miles, Williams)  |
| **Notes / Texts*** Aligns to MATCH Fishtank Unit 7
* Aligns to EngageNY Module 5
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| [**Unit 8: Probability**](https://drive.google.com/drive/folders/1zYkQaiYbGYSCKrd7MCiFkqhZS0eMuRNm?usp=sharing) | **2 weeks**  |
| **Meaning**  |
| **Enduring Understandings:***What do you want students to understand? What inferences should they be able to make?** The probability of an event or combination of events occurring is determined by the number of desired or favorable outcomes divided by the total number of outcomes possible. This value ranges from 0, where the event is impossible, to 1, where the event is certain to occur, with various levels of likelihood in between.
* Experimental or theoretical probabilities can be used to estimate or predict long-run frequencies.
* The results of a statistical observation can be used to support or refute an argument.
* Real-world situations can be simulated using various probability models in order to test hypotheses or make predictions based on data.
 | **Essential Question(s):***What thought provoking questions foster learning and inquiry to get to the Enduring Understandings?** How can we use statistics and probability to draw conclusions about real-world situations?
* How do people use data to influence others?
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| **Acquisition**  |
| **Content Standards: *(CCSS, State, national, AP)*****7.SP.C: 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.
	+ **7.SP.C.7a:** 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*.
	+ **7.SP.C.7b:** 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.8**: Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.
	+ **7.SP.C.8a:** 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.
	+ **7.SP.C.8b:** Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event.
	+ **7.SP.C.8c:** Design and use a simulation to generate frequencies for compound events. *For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood?*
 | **Skill Standards:** *(Thinking Skills, Group work skills, content-area habits, Social Emotional Skills, study skills, etc.)* * **SFMP 2. Reason abstractly and quantitatively.**

Students use reasoning to determine the likelihood of an event.* **SFMP 4. Model with Mathematics**

Students construct and use probability models for chance events. * **SFMP 5. Use appropriate tools strategically.**

Students select from tree diagrams, organized lists, tables, and simulations to determine probabilities. * **SFMP 6. Attend to precision.**

Students calculate probabilities. Source: The Common Core Mathematics Companion: Standards Decoded (Miles, Williams)  |
| **Notes / Texts*** Aligns to MATCH Fishtank Unit 8
* [Aligns to EngageNY Module 5]
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