UPDATED 2022 7th Grade Math

Link Community Charter School

UNITS (6/6 SELECTED)	SUGGESTED DURATION
Unit 1: Ratios and Proportional Relationships	*20 lessons*
Unit 2: Operations with Rational Numbers	*26 lessons*
Unit 3: Expressions, Equations and Inequalities	*23 lessons*
Unit 4: Geometry	*26 lessons*
Unit 5: Percent and Applications of Percent	*24 lessons*
Unit 6: Probability and Populations	*19 lessons*

Unit 1: Ratios and Proportional Relationships

UPDATED 2022 7th Grade Math - *Last Updated on July 13, 2022*

STANDARDS ADDRESSED

New Jersey (NJSLS) - Grade 7 - Mathematics (2020)
7.RP.A.2
Recognize and represent proportional relationships between quantities.
7.RP.A.2.b
Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
7.RP.A.2.c
Represent proportional relationships by equations. For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as t = pn.
7.RP.A.2.d
Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate.
7.RP.A.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.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.
New Jersey (NJSLS) - Grade 6 - Mathematics (2020)
6.RP.A.1
Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. For example, “The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak.” “For every vote candidate A received, candidate C received nearly three votes.”

6.RP.A.2
Understand the concept of a unit rate a/b associated with a ratio a:b with b ≠ 0, and use rate language in the context of a ratio relationship. For example, “This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar.” “We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger.”1
6.RP.A.3
Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.
6.G.A.1
Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.
6.G.A.3
Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.

Unit 1: Ratios and Proportional Relationships

UPDATED 2022 7th Grade Math - *Last Updated on July 13, 2022*

DESIRED RESULTS

Established Goals

In this module, students build on their knowledge of ratios and unit rates from Grade 6. Students will learn about proportional relationships and constant of proportionality and apply their understanding to tables and graphs. Students will be able to reason about ratios and proportional relationships to find the unit rate and apply this knowledge to solving multi-step ratio word problem. Lastly, students will use their understanding of proportional relationships to the context of scale drawings.

Transfer

Students will be able to independently use their learning to...

- determine if ratios are equivalent
- find the unit rate when given a set of ratios, a table, or a graph.

Meaning

Big Ideas & Understandings	Essential Questions
Students will understand that... • The unit rate of equivalent ratios is called the constant of proportionality and can be used to represent proportional relationships. • If a proportional relationship is described by the set of ordered pairs that satisfies the equation ? = ?? , where ? is a positive constant, then ? is called the constant of proportionality. • A proportional relationship is a correspondence between two types of quantities such that the measures of quantities of the first type are proportional to the measures of quantities of the second type. Proportional relationships are used in the context of rates. • Measures of one type of quantity are proportional to measures of a second type of quantity if there is a number ? so that for every measure ? of a quantity of the first type, the corresponding measure ? of a quantity of the second	**Students will keep considering...** • What is a ratio? • What is a unit rate? • What is the constant of proportionality? • How are unit rates used in the real world? • How can we compute unit rates for ratios and rates specified by rational numbers? • How do you determine a proportional relationship? What about non-proportional relationships? • How can we represent proportionality using a table, graph, equation, and or verbal description? • How can the constant of proportionality be found in various representations of linear data? • How can we use ratios in our day to day lives? ◦ What topics come to mind when discussing ratios? • Why are equivalent ratios important? ◦ How do we find equivalent ratios?

Meaning	
type is given by ??? ; that is, ? = ??? . The number ? is called the constant of proportionality.	◦ Why do we find equivalent ratios?

Acquisition	
Knowledge	**Skills**
Students will know... • Ratio relationships are used in the context of working with equivalent ratios. • A ratio is an ordered pair of numbers which are not both zero. A ratio is denoted ? ： ? to indicate the order of the numbers: the number ? is first and the number ? is second. • Unit rate is often a useful means for comparing ratios and their associated rates when measured in different units. The unit rate allows us to compare varying sizes of quantities by examining the number of units of one quantity per one unit of the second quantity. This value of the ratio is the unit rate. • Scale Drawing and Scale Factor • One to one correspondence • Equivalent Ratio • Rate • Ratio Table	**Students will be skilled at...** • Identifying the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. • Determining if ratios are proportional • Finding equivalent ratios

ASSESSMENT EVIDENCE (DIAGNOSTIC / FORMATIVE / SUMMATIVE)

Assessments

Evaluation Criteria	Assessment Evidence
Rubrics/Checklists:	Performance Task(s): • Pre-Assessment broken into chunks as start of the week opening do-now • Weekly Robust Exit Tickets (quick quiz) • Performance Task - Timing TBD • Mid-Module Assessment • End-of-Module Assessment
	Other Evidence: • Tracking sheets with anecdotal • Stations observational data and work products • Exit Tickets

Unit 1: Ratios and Proportional Relationships

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LEARNING PLAN

Summary of Key Learning Events and Instruction:

Day 1-5: Week 1: Topic A (Proportional Relationships)

- Lesson 1-6
- Daily do now (equip pre-assessment)
- Friday check in

Day 6-10: Week 2: Topic B (Unit Rate and the Constant of Proportionality) and Mid Mod

- Lesson 7-10
- Daily do now (equip pre-assessment)
- Mid Mod

Day 11-15: Week 3: Topic C (Ratios and Rates Involving Fractions)

- Lesson 11-15
- Daily do now (equip pre-assessment)
- Friday check in

Day 16-19: Week 4: Topic D (Ratios of Scale Drawings)

- Lesson 16-22
- Daily do now (equip pre-assessment)
- Friday check in

Day 20-22: Week 5:

- Lesson
- Daily do now (equip pre-assessment)
- Friday check in

SUPPORTING MATERIALS/RESOURCES/STRATEGIES FOR DIFFERENTIATION

- Provide students a choice board, allowing students to pick assignments from different levels based on difficulty.
- Provide supportive strategies:
- Educator or para reading aloud text or tech read-aloud
- Develop or provide graphic organizers
- Small group and one-on-one instruction
- Easy to find information on Google Classroom
- Personal copies of anchor charts and notes
- Vocabulary list with visuals
- Extended time on assignments and assessments
- Allow students to demonstrate understanding of a problem using models, captions and, when possible, explaining the reasoning orally and/or in writing.
- Provide tech support for recording oral or video answers
- Provide breaks between tasks, use positive reinforcement, use proximity
- Assure students have experiences that are on the Concrete- Pictorial- Abstract spectrum by using manipulatives
- Use any suggestions provided by the specific text for a curriculum

Unit 2: Operations with Rational Numbers

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STANDARDS ADDRESSED

New Jersey (NJSLS) - Grade 6 - Mathematics (2020)
6.NS.C.5
Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.
6.NS.C.6
Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.
6.NS.C.7
Understand ordering and absolute value of rational numbers.
6.EE.A.2
Write, read, and evaluate expressions in which letters stand for numbers.
6.EE.A.3
Apply the properties of operations to generate equivalent expressions. For example, apply the distributive property to the expression 3 (2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y.
6.EE.A.4
Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). For example, the expressions y + y + y and 3y are equivalent because they name the same number regardless of which number y stands for.
6.EE.B.5
Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.
6.EE.B.6
Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.

6.EE.B.7
Solve real-world and mathematical problems by writing and solving equations of the form x + p = q and px = q for cases in which p, q and x are all nonnegative rational numbers.
New Jersey (NJSLS) - Grade 7 - Mathematics (2020)
7.NS.A.1.a
Describe situations in which opposite quantities combine to make 0. For example, in the first round of a game, Maria scored 20 points. In the second round of the same game, she lost 20 points. What is her score at the end of the second round?
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.1.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.
7.NS.A.1.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.
7.NS.A.1.d
Apply properties of operations as strategies to add and subtract rational numbers.
7.NS.A.2.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.
7.NS.A.2.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.

7.NS.A.2.c
Apply properties of operations as strategies to multiply and divide rational numbers.
7.NS.A.2.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.1
7.EE.A.2
Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. For example, a + 0.05a = 1.05a means that “increase by 5%” is the same as “multiply by 1.05.”
7.EE.B.4.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?

Unit 2: Operations with Rational Numbers

UPDATED 2022 7th Grade Math - *Last Updated on July 13, 2022*

DESIRED RESULTS

Established Goals

In this module, students build on their understanding of rational numbers to add, subtract, multiply, and divide signed numbers. Previous work in computing the sums, differences, products, and quotients of fractions and decimals serves as a significant foundation as well.

Transfer

Students will be able to independently use their learning to...

- Students recognize that the rules for adding and subtracting integers apply to rational numbers.
- Students use properties of operations to add and subtract rational numbers

Meaning

Big Ideas & Understandings	Essential Questions
Students will understand that... •	**Students will keep considering...** • How can we predict that the sum of two numbers is positive, negative or zero? • What is the difference between the opposite and the absolute value of a number? • Which methods can be used to compute rational numbers? • How do we add integers with different signs? • How can concrete and pictorial models represent operations with integers? • How can any difference a – b of two rational numbers be restated as an equivalent addition statement? • How do we determine if the product or quotient of two numbers is positive or negative?

Acquisition	
Knowledge	**Skills**
Students will know... • Additive Identity (The additive identity is the number 0.) • Additive Inverse (An additive inverse of a number is a number such that the sum of the two numbers is 0. The additive inverse of a number ? is the opposite of ? (i.e., −?) because if we add both numbers using the vector approach above, we get ? + (−?) = 0.) • Formula for the Distance Between Two Numbers (If ? and ? are numbers on a number line, then the distance between ?? and ? is |? − ?|.) • Multiplicative Identity (The multiplicative identity is the number 1.) • Repeating Decimal Expansion (A decimal expansion is repeating if, after some digit to the right of the decimal point, there is a finite string of consecutive digits called a block after which the decimal expansion consists entirely of consecutive copies of that block repeated forever. A common notation for a repeating decimal expansion is to write out the decimal expansion until the end of the first block and then writing a line over the block. For example, 3.125 is a compact way to write the repeating decimal expansion 3.125252525....) • Terminating Decimal Expansion (A terminating decimal expansion is a repeating decimal expansion with period 1 and repeating digit 0. For example, the terminating decimal expansion of 1 4 is 0.25000…, or 0.250. A number with a terminating decimal expansion can be written as a finite decimal. For example, the terminating decimal expansion 0.25000... represents the same number as the finite decimal 0.25.)	**Students will be skilled at...** • Students add positive integers by counting up and negative integers by counting down (using curved arrows on the number line). • Students know the opposite of a number is called the additive inverse because the sum of the two numbers is zero. • Students model integer addition on the number line by using horizontal arrows • Students understand addition of integers as putting together or counting up. For negative numbers “counting up” is actually counting down. • Students use arrows to show the sum of two integers, ? + ?, on a number line and to show that the sum is distance |?| from ? to the right if ? is positive and to the left if ? is negative. • Students understand the rules for adding rational numbers • Students justify the rule for subtraction: Subtracting a number is the same as adding its opposite. • Students justify the distance formula for rational numbers on a number line • Students recognize that the rules for adding and subtracting integers apply to rational numbers. • Students use properties of operations to add and subtract rational numbers without the use of a calculator. • Students 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. • Students use the commutative and associative properties of addition to rewrite numerical expressions in different forms. • Students use the properties and facts of operations to

Acquisition	
	extend multiplication of whole numbers to multiplication of integers. • Students understand that the context of a real-life situation often determines whether a rational number should be represented as a fraction or decimal. • Students interpret word problems and convert between fraction and decimal forms of rational numbers. • Students recognize that the rules for multiplying and dividing integers apply to rational numbers. • Students interpret products and quotients of rational numbers by describing real-world contexts. • Students compare equivalent forms of expressions and recognize that there are multiple ways to represent the context of a word problem. • Students write and evaluate expressions to represent real-world scenarios. • Students recognize and use mathematics as a tool to solve real-life problems. • Students use algebra to solve equations, using techniques of making zero (adding the additive inverse) and making one (multiplying by the multiplicative inverse) to solve for the variable.

ASSESSMENT EVIDENCE (DIAGNOSTIC / FORMATIVE / SUMMATIVE)

Assessments

Evaluation Criteria	Assessment Evidence
Rubrics/Checklists:	Performance Task(s): • Pre-Assessment broken into chunks as start of the week opening do-now • Weekly Robust Exit Tickets (quick quiz) • Performance Task - Timing TBD • Mid-Module Assessment • End-of-Module Assessment
	Other Evidence: • Tracking sheets with anecdotal • Stations observational data and work products • Exit Tickets

Unit 2: Operations with Rational Numbers

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LEARNING PLAN

Summary of Key Learning Events and Instruction:

Day 1 & 2: Week 1: Topic

- Lesson
- Daily do now (equip pre-assessment)
- Friday check in

Day 3-5: Week 2: Topic

- Lesson
- Daily do now (equip pre-assessment)
- Mid Mod

Day 6-10: Week 3: Topic

- Lesson
- Daily do now (equip pre-assessment)
- Friday check in

Day 11-16: Week 4: Topic

- Lesson
- Daily do now (equip pre-assessment)
- Friday check in

Day 17-19: Week 5:

- Lesson
- Daily do now (equip pre-assessment)
- Friday check in

Day 19-23: Week 6:

- Lesson
- Daily do now (equip pre-assessment)
- Friday check in

SUPPORTING MATERIALS/RESOURCES/STRATEGIES FOR DIFFERENTIATION

- Provide students a choice board, allowing students to pick assignments from different levels based on difficulty.
- Provide supportive strategies:
- Educator or para reading aloud text or tech read-aloud
- Develop or provide graphic organizers
- Small group and one-on-one instruction
- Easy to find information on Google Classroom
- Personal copies of anchor charts and notes
- Vocabulary list with visuals
- Extended time on assignments and assessments
- Allow students to demonstrate understanding of a problem using models, captions and, when possible, explaining the reasoning orally and/or in writing.
- Provide tech support for recording oral or video answers
- Provide breaks between tasks, use positive reinforcement, use proximity
- Assure students have experiences that are on the Concrete- Pictorial- Abstract spectrum by using manipulatives
- Use any suggestions provided by the specific text for a curriculum

Unit 3: Expressions, Equations and Inequalities

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STANDARDS ADDRESSED

New Jersey (NJSLS) - Grade 7 - Mathematics (2020)
7.EE.A.1
Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
7.EE.A.2
Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. For example, a + 0.05a = 1.05a means that “increase by 5%” is the same as “multiply by 1.05.”
7.EE.B.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.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.2
Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.
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.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.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.
New Jersey (NJSLS) - Grade 6 - Mathematics (2020)
6.EE.A.2
Write, read, and evaluate expressions in which letters stand for numbers.
6.EE.B.6
Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.
6.EE.B.7
Solve real-world and mathematical problems by writing and solving equations of the form x + p = q and px = q for cases in which p, q and x are all nonnegative rational numbers.
6.G.A.4
Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.

Unit 3: Expressions, Equations and Inequalities

UPDATED 2022 7th Grade Math - *Last Updated on July 13, 2022*

DESIRED RESULTS

Established Goals

This module, consolidates and expands upon students' understanding of equivalent expressions as they apply the properties of operations (associative, commutative, and distributive) to write expressions in both standard form (by expanding products into sums) and in factored form (by expanding sums into products).

Transfer

Students will be able to independently use their learning to...

- Students recognize that rewriting an expression in a different form can shed light on the problem and how the quantities in it are related.
- Students use vertical angles, adjacent angles, angles on a line, and angles at a point in a multistep problem to write and solve simple equations for an unknown angle in a figure.
- Students understand that an inequality is a statement that one expression is less than (or equal to) or greater than (or equal to) another expression

Meaning

Big Ideas & Understandings	Essential Questions
Students will understand that... • Terms that contain exactly the same variable symbol can be combined by addition or subtraction because the variable represents the same number. Any order, any grouping can be used where terms are added (or subtracted) in order to group together like terms. Changing the orders of the terms in a sum does not affect the value of the expression for given values of the variable(s). • Algebraic Approach: To solve an equation algebraically means to use the properties of operations and if-then moves to simplify the equation into a form where the solution is easily recognizable. For the equations we are studying this year (called linear equations), that form is an equation that looks like ?? = a number, where the number	**Students will keep considering...** • How can we generate equivalent expressions? • What is an equation? • How can we create an equation (or inequality) for a given situation? • What does it mean to evaluate algebraic expressions? • How can we solve multi-step equations? • How can we check that solution? • How can we simplify equations, using the number properties, before looking for a solution? • How should we apply inverse operations to solve equations and or inequalities? • How should we deal with negative coefficients, when solving inequalities?

Meaning	
is the solution. The properties of operations are used to modify one side of an equation at a time by changing the expression on a side into another equivalent expression. • If-Then Moves: If ? is a solution to an equation, it will continue to be a solution to the new equation formed by adding or subtracting a number from both sides of the equation. It will also continue to be a solution when both sides of the equation are multiplied by or divided by a nonzero number. We use these if-then moves to make zeros and ones in ways that simplify the original equation. The if-then moves are used to modify both sides of an equation simultaneously in a controlled way. The two expressions in the new equation are different than the two expressions in the old equation, but the solutions are the same.	• How can we model solutions to multi-step inequalities?

Acquisition	
Knowledge	**Skills**
Students will know... • An Expression in Expanded Form (description) (An expression that is written as sums (and/or differences) of products whose factors are numbers, variables, or variables raised to whole number powers is said to be in expanded form. A single number, variable, or a single product of numbers and/or variables is also considered to be in expanded form.) • An Expression in Factored Form (description) (An expression that is a product of two or more expressions is said to be in factored form.) • An Expression in Standard Form (description) (An expression that is in expanded form where all like terms	**Students will be skilled at...** • Students generate equivalent expressions using the fact that addition and multiplication can be done in any order (commutative property) and any grouping (associative property). • Students recognize how any order, any grouping can be applied in a subtraction problem by using additive inverse relationships (adding the opposite) to form a sum and likewise with division problems by using the multiplicative inverse relationships (multiplying by the reciprocal) to form a product. • Students recognize that any order does not apply to expressions mixing addition and multiplication, leading to

Acquisition	
have been collected is said to be in standard form.) • Circle (Given a point ? in the plane and a number ? > 0, the circle with center ? and radius ? is the set of all points in the plane whose distance from the point ? is equal to ?.) • Circular Region or Disk (Given a point ? in the plane and a number ? > 0, the circular region (or disk) with center ? and radius ? is the set of all points in the plane whose distance from the point ? is less than or equal to ?.) • Circumference (The circumference of a circle is the distance around the circle.) • Coefficient of a Term (The coefficient of a term is the number found by multiplying all of the number factors in a term together.) • Diameter of a Circle (The diameter of a circle is the length of any segment that passes through the center of a circle whose endpoints lie on the circle. If ? is the radius of a circle, then the diameter is 2?.) • Interior of a Circle (The interior of a circle with center ? and radius ? is the set of all points in the plane whose distance from the point ? is less than ?.) • Pi (The number pi, denoted ??, is the value of the ratio given by the circumference to the diameter, that is, ? = (circumference)/(diameter).) • Term (description) (Each summand of an expression in expanded form is called a term.) • Adjacent Angles • Cube: : A cube is a right rectangular prism all of whose edges are of equal length. • Distribute • Equation: An equation is a statement of equality between two expressions. • Equivalent Expressions: Two expressions are equivalent if both expressions evaluate to the same number for every substitution of numbers into all the letters in both	the need to follow the order of operations. • Students use area and rectangular array models and the distributive property to write products as sums and sums as products. • Students 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. • Students recognize that rewriting an expression in a different form can shed light on the problem and how the quantities in it are related. • Students recognize the identity properties of 0 and 1 and the existence of inverses (opposites and reciprocals) to write equivalent expressions. • Students rewrite rational number expressions by collecting like terms and combining them by repeated use of the distributive property. • Students understand that an equation is a statement of equality between two expressions. • Students 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 • Students understand and use the addition, subtraction, multiplication, division, and substitution properties of equality to solve word problems leading to equations of the form px + ? = ? and ?(? + ?) = ? where ?, ?, and ? are specific rational numbers. • Students 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. • Students use vertical angles, adjacent angles, angles on a line, and angles at a point in a multistep problem to write and solve simple equations for an unknown angle in a figure.

Acquisition	
expressions. This description becomes clearer through lots of examples and linking to the associative, commutative, and distributive properties. • Expression (middle school description): An expression is a numerical expression, or it is the result of replacing some (or all) of the numbers in a numerical expression with variables. • Factor • Figure • Identity • Inequality • Length of a Segment • Linear Expression • Measure of an Angle • Number Sentence: A number sentence is a statement of equality (or inequality) between two numerical expressions. • Numerical Expression (middle school description): A numerical expression is a number, or it is any combination of sums, differences, products, or divisions of numbers that evaluates to a number. • Preserves the inequality symbol: means the inequality symbol stays the same. • Properties of Operations (distributive, commutative, associative) • Reverses the inequality symbol: means the inequality symbol switches less than with greater than and less than or equal to with greater than or equal to. • Right Rectangular Prism • Segment • Solution: A solution to an equation with one variable is a number that, when substituted for all instances of the variable in both expressions, makes the equation a true number sentence. • Square	• Students justify the properties of inequalities that are denoted by < (less than), ≤ (less than or equal to), > (greater than), and ≥ (greater than or equal to). • Students understand that an inequality is a statement that one expression is less than (or equal to) or greater than (or equal to) another expression • Students interpret a solution to an inequality as a number that makes the inequality true when substituted for the variable • Students convert arithmetic inequalities into a new inequality with variables • Students solve word problems leading to inequalities that compare px + ? and ?, where ?, ?, and ? are specific rational numbers. • Students interpret the solutions in the context of the problem. • Students graph solutions to inequalities taking care to interpret the solutions in the context of the problem. • Students develop the definition of a circle using diameter and radius. • Students know that the distance around a circle is called the circumference and discover that the ratio of the circumference to the diameter of a circle is a special number called pi, written ?. • Students know the formula for the circumference ? of a circle, of diameter ?, and radius ?. They use scale models to derive these formulas. • Students know the formula for the area of a circle and use it to solve problems. • Students examine the meaning of quarter circle and semicircle. • Students 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.

Acquisition	
• Surface of a Prism • Term • Triangle • True or False Number Sentence • Truth Values of a Number Sentence • Value of a Numerical Expression: The value of a numerical expression is the number found by evaluating the expression. • Variable (middle school description): A variable is a symbol (such as a letter) that represents a number (i.e., it is a placeholder for a number). • Vertical Angles: Two angles are vertical angles (or vertically opposite angles) if their sides form two pairs of opposite rays.	• Students find the areas of triangles and simple polygonal regions in the coordinate plane with vertices at grid points by composing into rectangles and decomposing into triangles and quadrilaterals. • Students find the area of regions in the coordinate plane with polygonal boundaries by decomposing the plane into triangles and quadrilaterals, including regions with polygonal holes. • Students find composite areas of regions in the coordinate plane by decomposing the plane into familiar figures (triangles, quadrilaterals, circles, semicircles, and quarter circles). • Students find the surface area of three-dimensional objects whose surface area is composed of triangles and quadrilaterals. They use polyhedron nets to understand that surface area is simply the sum of the area of the lateral faces and the area of the base(s). • Students solve real-world and mathematical problems involving volume and surface areas of three dimensional objects composed of cubes and right prisms.

ASSESSMENT EVIDENCE (DIAGNOSTIC / FORMATIVE / SUMMATIVE)

Assessments

Evaluation Criteria	Assessment Evidence
Rubrics/Checklists:	Performance Task(s): • Pre-Assessment broken into chunks as start of the week opening do-now • Weekly Robust Exit Tickets (quick quiz) • Performance Task - Timing TBD • Mid-Module Assessment • End-of-Module Assessment
	Other Evidence: • Tracking sheets with anecdotal • Stations observational data and work products • Exit Tickets

Unit 3: Expressions, Equations and Inequalities

UPDATED 2022 7th Grade Math - *Last Updated on July 13, 2022*

LEARNING PLAN

Summary of Key Learning Events and Instruction:

Day 1-5: Week 1: Topic A

- Lesson 1-5/6
- Daily do now (equip pre-assessment)
- Friday check in

Day 6-10: Week 2: Topic B

- Lesson 7-11
- Daily do now (equip pre-assessment)
- Mid Mod

Day 11-14: Week 3: Topic B

- Lesson 12-15
- Daily do now (equip pre-assessment)
- Friday check in

Day 15-18: Week 4: Mid Mod / Topic C

- Mid Mod
- Lesson 16-19
- Daily do now (equip pre-assessment)
- Friday check in

Day 19-23: Week 5: Topic C

- Lesson 20-26
- Daily do now (equip pre-assessment)
- Friday check in

Day 24-26: Week 6: End of Mod

- Review
- End of Mod

SUPPORTING MATERIALS/RESOURCES/STRATEGIES FOR DIFFERENTIATION

- Provide students a choice board, allowing students to pick assignments from different levels based on difficulty.
- Provide supportive strategies:
- Educator or para reading aloud text or tech read-aloud
- Develop or provide graphic organizers
- Small group and one-on-one instruction
- Easy to find information on Google Classroom
- Personal copies of anchor charts and notes
- Vocabulary list with visuals
- Extended time on assignments and assessments
- Allow students to demonstrate understanding of a problem using models, captions and, when possible, explaining the reasoning orally and/or in writing.
- Provide tech support for recording oral or video answers
- Provide breaks between tasks, use positive reinforcement, use proximity
- Assure students have experiences that are on the Concrete- Pictorial- Abstract spectrum by using manipulatives
- Use any suggestions provided by the specific text for a curriculum

Unit 4: Geometry

UPDATED 2022 7th Grade Math - *Last Updated on July 13, 2022*

STANDARDS ADDRESSED

New Jersey (NJSLS) - Grade 7 - Mathematics (2020)
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.A.2
Draw (with technology, with ruler and protractor, as well as freehand) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.
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.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.
New Jersey (NJSLS) - Grade 6 - Mathematics (2020)
6.G.A.1
Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.
6.G.A.2
Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas V = l w h and V = B h to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.

Unit 4: Geometry

UPDATED 2022 7th Grade Math - *Last Updated on July 13, 2022*

DESIRED RESULTS

Established Goals
In this module, topics of angles, area, surface area, and volume are presented in the most challenging form students have experienced yet. This module assumes students understand the basics; the goal is to build fluency in these difficult problems.

Transfer
Students will be able to independently use their learning to... • Students solve for unknown angles in word problems and in diagrams involving complementary, supplementary, vertical, and adjacent angles. • Students construct viable arguments to explain why the given information can or cannot give a triangle correspondence between identical triangle

Meaning	
Big Ideas & Understandings	**Essential Questions**
Students will understand that... • Understand volume as a measure of filling an object and surface area as a measure of wrapping or covering an object. • Understand that three-dimensional figures may have the same volume but quite different surface areas or they may have the same surface areas but different shapes and volumes. • Understand how changes in one or more dimensions of a rectangular prism or cylinder will affect the prism's volume. • Understand the effect on surface area and volume of applying a scale factor to a rectangular prism. • Algebra can be used to find unknown angles.	**Students will keep considering...** • How can one part of a circle help determine the measure of another part? • How are area and circumference connected? • How can we determine area, given circumference? • Can we determine diameter or radius, given area or circumference? • How will we be able to solve for given angles in geometry? • How can measuring angles help us classify polygons? • How can one angle help determine the measure of another angle? • How does volume differ from surface area of prisms? • Why are geometry and geometric figures relevant and important? • How can geometric ideas be communicated using a

Meaning	
	variety of representations?

Acquisition	
Knowledge	**Skills**
Students will know... • Right Rectangular Pyramid (Given a rectangular region ? in a plane ? and a point ? not in ?, the rectangular pyramid with base ? and vertex ? is the union of all segments ?? for any point ? in ?. It can be shown that the planar region defined by a side of the base ? and the vertex ? is a triangular region called a lateral face. If the vertex lies on the line perpendicular to the base at its center (i.e., the intersection of the rectangle's diagonals), the pyramid is called a right rectangular pyramid.) • Surface of a Pyramid (The surface of a pyramid is the union of its base region and its lateral faces.) • Three Sides Condition (Two triangles satisfy the three sides condition if there is a triangle correspondence between the two triangles such that each pair of corresponding sides are equal in length.) • Triangle Correspondence (A triangle correspondence between two triangles is a pairing of each vertex of one triangle with one and only one vertex of the other triangle. A triangle correspondence also induces a correspondence between the angles of the triangles and the sides of the triangles.) • Triangles with Identical Measures (Two triangles are said to have identical measures if there is a triangle correspondence such that all pairs of corresponding sides are equal in length and all pairs of corresponding angles are equal in measure. Two triangles with identical	**Students will be skilled at...** • Students solve for unknown angles in word problems and in diagrams involving complementary and supplementary angles. • Students solve for unknown angles in word problems and in diagrams involving complementary, supplementary, vertical, and adjacent angles. • Students solve for unknown angles in word problems and in diagrams involving all learned angle facts. • Students use notation to denote a triangle correspondence and use the triangle correspondence to talk about corresponding angles and sides. • Students use a compass, protractor, and ruler to draw geometric shapes based on given conditions • Students use a protractor, ruler, and setsquare to draw parallelograms based on given conditions. • Students draw triangles under different criteria to explore which criteria result in many, a few, or one triangle • Students use conditions that determine a unique triangle to determine when two triangles are identical. • Students construct viable arguments to explain why the given information can or cannot give a triangle correspondence between identical triangles • Students 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.

Acquisition	
measures are sometimes said to be identical. Note that for two triangles to have identical measures, all six corresponding measures (i.e., 3 angle measures and 3 length measures) must be the same.) • Two Angles and the Included Side Condition (Two triangles satisfy the two angles and the included side condition if there is a triangle correspondence between the two triangles such that two pairs of corresponding angles are each equal in measure and the pair of corresponding included sides are equal in length.) • Two Angles and the Side Opposite a Given Angle Condition (Two triangles satisfy the two angles and the side opposite a given angle condition if there is a triangle correspondence between the two triangles such that two pairs of corresponding angles are each equal in measure and one pair of corresponding sides that are both opposite corresponding angles are equal in length.) • Two Sides and the Included Angle Condition (Two triangles satisfy the two sides and the included angle condition if there is a triangle correspondence between the two triangles such that two pairs of corresponding sides are each equal in length and the pair of corresponding included angles are equal in measure.)	• Students describe three-dimensional figures built from cubes by looking at horizontal slicing planes. • Students determine the area of composite figures in real-life contextual situations using composition and decomposition of polygons and circular regions • Students determine the area of composite figures and of missing regions using composition and decomposition of polygons. • Students determine the surface area of three-dimensional figures, including both composite figures and those missing sections.

ASSESSMENT EVIDENCE (DIAGNOSTIC / FORMATIVE / SUMMATIVE)

Assessments

Evaluation Criteria	Assessment Evidence
Rubrics/Checklists:	Performance Task(s): • Pre-Assessment broken into chunks as start of the week opening do-now • Weekly Robust Exit Tickets (quick quiz) • Performance Task - Timing TBD • Mid-Module Assessment • End-of-Module Assessment
	Other Evidence: • Tracking sheets with anecdotal • Stations observational data and work products • Exit Tickets

Unit 4: Geometry

UPDATED 2022 7th Grade Math - *Last Updated on July 13, 2022*

LEARNING PLAN

Summary of Key Learning Events and Instruction:

Day 1-5: Week 1: Topic A

- Lesson 1-4
- Daily do now (equip pre-assessment)
- Friday check in

Day 6-10: Week 2: Topic B

- Lesson 5-10
- Daily do now (equip pre-assessment)
- Mid Mod

Day 11-15: Week 3: Topic B

- Lesson 11-15
- Daily do now (equip pre-assessment)
- Friday check in

Day 16-20: Week 4: Mid Unit & Topic C

- Mid Unit
- Lesson 16-19
- Daily do now (equip pre-assessment)
- Friday check in

Day 20-24: Week 5: Topic D / E

- Lesson 20-25
- Daily do now (equip pre-assessment)
- Friday check in

Day 25 & 26: Week 6: Topic E

- Lesson 26 & 27
- Review
- End of Mod

SUPPORTING MATERIALS/RESOURCES/STRATEGIES FOR DIFFERENTIATION

- Provide students a choice board, allowing students to pick assignments from different levels based on difficulty.
- Provide supportive strategies:
- Educator or para reading aloud text or tech read-aloud
- Develop or provide graphic organizers
- Small group and one-on-one instruction
- Easy to find information on Google Classroom
- Personal copies of anchor charts and notes
- Vocabulary list with visuals
- Extended time on assignments and assessments
- Allow students to demonstrate understanding of a problem using models, captions and, when possible, explaining the reasoning orally and/or in writing.
- Provide tech support for recording oral or video answers
- Provide breaks between tasks, use positive reinforcement, use proximity
- Assure students have experiences that are on the Concrete- Pictorial- Abstract spectrum by using manipulatives
- Use any suggestions provided by the specific text for a curriculum

Unit 5: Percent and Applications of Percent

UPDATED 2022 7th Grade Math - *Last Updated on July 13, 2022*

STANDARDS ADDRESSED

New Jersey (NJSLS) - Grade 7 - Mathematics (2020)
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.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.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.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.2.c
Apply properties of operations as strategies to multiply and divide rational numbers.
7.NS.A.1.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.

7.RP.A.2.b
Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.

New Jersey (NJSLS) - Grade 6 - Mathematics (2020)
6.RP.A.3.c
Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.

Unit 5: Percent and Applications of Percent

UPDATED 2022 7th Grade Math - *Last Updated on July 13, 2022*

DESIRED RESULTS

Established Goals

In this module, students deepen their understanding of ratios and proportional relationships from Module 1 by solving a variety of percent problems. They convert between fractions, decimals, and percent to further develop a conceptual understanding of percent (introduced in Grade 6 Module 1) and use algebraic expressions and equations to represent and solve multistep percent scenarios.

Transfer

Students will be able to independently use their learning to...

- Students understand that ? percent is the number ? / 100 and that the symbol % means percent.
- Students convert between a fraction, decimal, and percent, including percent that are less than 1% or greater than 100%.
- Students solve various types of percent problems by identifying the type of percent problem and applying appropriate strategies.
- Students write and use algebraic expressions and equations to solve percent word problems

Meaning

Big Ideas & Understandings	Essential Questions
Students will understand that... • One percent is the number 1/100 and is written 1%. The number P% is the same as the number P/100. • Usually, there are three ways to write a number: a percent, a fraction, and a decimal. The fraction and decimal forms of P% are equivalent to P/100.	**Students will keep considering...** • What is a percent? • How can we determine the percent of any given number? • How do proportions relate to percentages? • How can proportional relationships be used to solve percent problems? • What is the correlation between percent increase and percent decrease? • How can we identify if the type of percent problem that is being asked is as a comparison of quantities or a part of a whole?

Acquisition	
Knowledge	**Skills**
Students will know... • Absolute Error (Given the exact value ?? of a quantity and an approximate value ?? of it, the absolute error is |? − ?|.) • Percent Error (The percent error is the percent the absolute error is of the exact value, i.e., |?−?| |?| · 100%, where ? is the exact value of the quantity and ? is an approximate value of the quantity.) • Area • Circumference • Coefficient of the Term • Complex Fraction • Constant of Proportionality • Discount Price • Equation • Equivalent Ratios • Expression • Fee • Fraction • Greatest Common Factor • Length of a Segment • One-to-One Correspondence • Original Price: The original price is the starting price. It is sometimes called the cost or wholesale price. • Percent • Perimeter • Pi • Proportional Relationship • Proportional To • Rate • Ratio • Rational Number • Sales Price • Scale Drawing	**Students will be skilled at...** • Students understand that ? percent is the number ? / 100 and that the symbol % means percent. • Students convert between a fraction, decimal, and percent, including percent that are less than 1% or greater than 100%. • Students write a non-whole number percent as a complex fraction. • Students understand that the whole is 100% and use the formula Part = Percent × Whole to problem-solve when given two terms out of three from the part, whole, and percent. • Students solve word problems involving percent using expressions, equations, and numeric and visual models. • Students use the context of a word problem to determine which of two quantities represents the whole. • Students understand that the whole is 100% and think of one quantity as a percent of another using the formula Quantity = Percent × Whole to problem-solve when given two terms out of three from a quantity, whole, and percent. • When comparing two quantities, students compute percent more or percent less using algebraic, numeric, and visual models. • Students solve percent problems when one quantity is a certain percent more or less than another. • Students solve percent problems involving a percent increase or decrease. • Students find 100% of a quantity (the whole) when given a quantity that is a percent of the whole by using a variety of methods including finding 1%, equations, mental math using factors of 100, and double number line models. • Students solve word problems involving finding 100% of a given quantity with and without using equations. • Students solve various types of percent problems by

Acquisition	
• Scale Factor: The scale factor is the number that determines whether the new drawing is an enlargement or a reduction of the original. If the scale factor is greater than 100%, then the resulting drawing is an enlargement of the original drawing. If the scale factor is less than 100%, then the resulting drawing is a reduction of the original drawing. • Unit Rate	identifying the type of percent problem and applying appropriate strategies. • Students extend mental math practices to mentally calculate the part, the percent, or the whole in percent word problems. • Students solve percent problems where quantities and percent change. • Students use a variety of methods to solve problems where quantities and percent change, including double number lines, visual models, and equations. • Students solve real-world percent problems involving tax, gratuities, commissions, and fees. • Students solve word problems involving percent using equations, tables, and graphs. • Students identify the constant of proportionality (e.g., tax rate, commission rate) in graphs, equations, and tables, and in the context of the situation. • Students write and use algebraic expressions and equations to solve percent word problems

ASSESSMENT EVIDENCE (DIAGNOSTIC / FORMATIVE / SUMMATIVE)

Assessments

Evaluation Criteria	Assessment Evidence
Rubrics/Checklists:	Performance Task(s): • Pre-Assessment broken into chunks as start of the week opening do-now • Weekly Robust Exit Tickets (quick quiz) • Performance Task - Timing TBD • Mid-Module Assessment • End-of-Module Assessment
	Other Evidence: • Tracking sheets with anecdotal • Stations observational data and work products • Exit Tickets

Unit 5: Percent and Applications of Percent

UPDATED 2022 7th Grade Math - *Last Updated on July 13, 2022*

LEARNING PLAN

Summary of Key Learning Events and Instruction:

Day 1-5: Week 1: Topic A

- Lesson 1-5
- Daily do now (equip pre-assessment)
- Friday check in

Day 6-10: Week 2: Topic A / B

- Lesson 6-10
- Daily do now (equip pre-assessment)
- Mid Mod

Day 11-15: Week 3: Finish Topic B / Mid Mod / Start Topic C

- Lesson 11
- Mid Mod
- Lesson 12 & 13
- Daily do now (equip pre-assessment)
- Friday check in

Day 16-20: Week 4: Topic C / Topic D

- Lesson 14 & 15
- Lesson 16 & 17
- Daily do now (equip pre-assessment)
- Friday check in

Day 21-25: Week 5: Topic D / End of Mod

- Lesson 18
- Review
- End of Mod

SUPPORTING MATERIALS/RESOURCES/STRATEGIES FOR DIFFERENTIATION

- Provide students a choice board, allowing students to pick assignments from different levels based on difficulty.
- Provide supportive strategies:
- Educator or para reading aloud text or tech read-aloud
- Develop or provide graphic organizers
- Small group and one-on-one instruction
- Easy to find information on Google Classroom
- Personal copies of anchor charts and notes
- Vocabulary list with visuals
- Extended time on assignments and assessments
- Allow students to demonstrate understanding of a problem using models, captions and, when possible, explaining the reasoning orally and/or in writing.
- Provide tech support for recording oral or video answers
- Provide breaks between tasks, use positive reinforcement, use proximity
- Assure students have experiences that are on the Concrete- Pictorial- Abstract spectrum by using manipulatives
- Use any suggestions provided by the specific text for a curriculum

Unit 6: Probability and Populations

UPDATED 2022 7th Grade Math - *Last Updated on July 13, 2022*

STANDARDS ADDRESSED

New Jersey (NJSLS) - Grade 7 - Mathematics (2020)
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.8.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.
7.SP.C.8.b
Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., “rolling double sixes”), identify the outcomes in the sample space which compose the event.
7.SP.C.8.c
Design and use a simulation to generate frequencies for compound events. For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood?
7.SP.A.1
Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.
7.SP.A.2

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

7.SP.B.3
Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.

7.SP.B.4
Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.

Unit 6: Probability and Populations

UPDATED 2022 7th Grade Math - *Last Updated on July 13, 2022*

DESIRED RESULTS

Established Goals

In this module, students begin their study of probability, learning how to interpret probabilities and how to compute probabilities in simple settings. Additionally, students build on their knowledge of data distributions that they studied in Grade 6, compare data distributions of two or more populations, and are introduced to the idea of drawing informal inferences based on data collected from random samples.

Transfer

Students will be able to independently use their learning to...

- Students understand that a probability is a number between 0 and 1 that represents the likelihood that an event will occur.
- Students use given data to estimate probabilities

Meaning

Big Ideas & Understandings	Essential Questions
Students will understand that... • Reading, understanding, interpreting, and communicating data are critical in modeling a variety of real-world situations, drawing appropriate inferences, making informed decisions, and justifying those decisions. • Probability quantifies the likelihood that something will happen and enables us to make predictions and informed decisions. • The chance of an event happens may be represented by use of decimals, fractions, and or percentages	**Students will keep considering...** • How can we make generalizations from a sample to a population? • How can random sampling be used to draw inferences about a population? • How can we analyze data/graphs and describe patterns? • What influences the probability that a given event will occur? • What is the difference between experimental and theoretical probability? • What determines whether an event is dependent or independent? • Why would we construct more than one kind of graph from the same set of data?

Acquisition	
Knowledge	**Skills**
Students will know... • Chance Experiment (description) (A chance experiment consists of observing a single outcome of a chance process.) • Chance Process (description) (A chance process is any process that is repeatable and results in one of two or more well-defined outcomes each time it is repeated. The act of performing the process and producing a result is called a trial. In a chance process, trials are independent from each other in that the result of one trial does not influence the result of any other trial. In the context of probability, observing a single outcome of a chance process is sometimes called a chance experiment.) • Event (An event is a subset of outcomes of the sample space. A simple event is an event with a single outcome. A compound event is an event that is the union of two or more simple events.) • Frequency of an Event (The frequency of an event is the number of trials for which the event occurred in performing a fixed number of trials of a chance process.) • Long-Run Relative Frequency (description) (The long-run relative frequency is the number that the relative frequencies get closer and closer to as more and more trials are performed. The long-run relative frequency for a large number of trials provides an estimate of the probability of that event occurring that can be used when the probability of that event is hard to calculate from the probability model.) • Population (description) (A population is any entire collection of people, animals, plants, or things that someone is interested in learning about. Each person or object in the population is called a member.) • Probability (description) (The probability of an event is a number between 0 and 1 that measures the chance that	**Students will be skilled at...** • Students understand that a probability is a number between 0 and 1 that represents the likelihood that an event will occur. • Students interpret a probability as the proportion of the time that an event occurs when a chance experiment is repeated many times. • Students estimate probabilities by collecting data on an outcome of a chance experiment. • Students use given data to estimate probabilities • Students calculate probabilities of compound events. • Students distinguish between theoretical probabilities and estimated probabilities. • Students differentiate between a population and a sample. • Students differentiate between a population characteristic and a sample statistic. • Students investigate statistical questions that involve generalizing from a sample to a larger population. • Students select a random sample from a population. • Students begin to develop an understanding of sampling variability. • Students use data from a random sample to estimate a population mean. • Students understand the term sampling variability in the context of estimating a population mean.

Acquisition	
the event will occur.) • Probability Model (description) (A probability model is a mathematical representation of a chance process defined by its sample space, events within the sample space, and the assignment of a probability for each and every event.) • Probability Simulation (illustration) (A probability simulation is the use of a random number generator (e.g., spinners, coin toss, computers) to generate outcomes that are consistent with a given probability model. For example, to estimate the probability that a family with 4 children will include 3 or more boys, the children in a family might be represented by a sequence of four random digits with even digits representing a girl and odd digits representing a boy. This would generate “families” using a model that is consistent with a family having 4 children and each child being equally likely to be male or female. A large number of simulated “families” could be generated using technology, and then the relative frequency of those with 3 or more boys provides an estimate of the probability that a family with 4 children will include 3 or more boys.) • Random Sample (A random sample of size ?? is a sample that is selected using a process that ensures that every different possible sample of size ?? had the same chance of being selected as the sample. This selection process implies that every individual member of the population has the same chance of being included in the sample.) • Relative Frequency of an Event (The relative frequency of an event is the value given by the frequency of the event divided by the total number of trials.) • Sample (A sample is any subset of a population.) • Sample Space (The sample space of a chance process is the set of all possible outcomes. For example, the sample space for the experiment of rolling a die is the set {1, 2, 3, 4, 5, 6}.) • Sample Statistic (description) (A sample statistic or	

Acquisition	
statistic is a number (e.g., mean, standard deviation) that is calculated from a sample. Statistics are used to estimate, predict, or make decisions about population parameters.) • Statistical Inference (Statistical inference is the process of drawing conclusions about population parameters using sample statistics. In Grade 7, this can be described as “the process of drawing conclusions about populations using information from a sample of the population.” The words in the definition above are described in this section.) • Uniform Probability Model (A uniform probability model is a probability model that assigns the same probability for all simple events of the sample space.)	

ASSESSMENT EVIDENCE (DIAGNOSTIC / FORMATIVE / SUMMATIVE)

Assessments

Evaluation Criteria	Assessment Evidence
Rubrics/Checklists:	Performance Task(s): • Pre-Assessment broken into chunks as start of the week opening do-now • Weekly Robust Exit Tickets (quick quiz) • Performance Task - Timing TBD • Mid-Module Assessment • End-of-Module Assessment
	Other Evidence: • Tracking sheets with anecdotal • Stations observational data and work products • Exit Tickets

Unit 6: Probability and Populations

UPDATED 2022 7th Grade Math - *Last Updated on July 13, 2022*

LEARNING PLAN

Summary of Key Learning Events and Instruction:

Day 1-4: Week 1: Topic A

- Lesson 1-4
- Daily do now (equip pre-assessment)
- Friday check in

Day 5-9: Week 2: Topic A / B

- Lesson 5-10/11
- Daily do now (equip pre-assessment)
- Mid Mod

Day 10-14: Week 3: Finish Topic B / Mid Mod / Start Topic C

- Lesson 12
- Mid Mod
- Lesson 13-16
- Daily do now (equip pre-assessment)
- Friday check in

Day 15-18: Week 4: Topic C

- Lesson 17-20
- Daily do now (equip pre-assessment)
- Friday check in

Day 19-23: Week 5: Topic D

- Lesson 21-23
- Review
- End of Mod

SUPPORTING MATERIALS/RESOURCES/STRATEGIES FOR DIFFERENTIATION

- Provide students a choice board, allowing students to pick assignments from different levels based on difficulty.
- Provide supportive strategies:
- Educator or para reading aloud text or tech read-aloud
- Develop or provide graphic organizers
- Small group and one-on-one instruction
- Easy to find information on Google Classroom
- Personal copies of anchor charts and notes
- Vocabulary list with visuals
- Extended time on assignments and assessments
- Allow students to demonstrate understanding of a problem using models, captions and, when possible, explaining the reasoning orally and/or in writing.
- Provide tech support for recording oral or video answers
- Provide breaks between tasks, use positive reinforcement, use proximity
- Assure students have experiences that are on the Concrete- Pictorial- Abstract spectrum by using manipulatives
- Use any suggestions provided by the specific text for a curriculum