ILEARN Summative Proficiency Level Descriptors: Mathematics (Grades 6-8)

The LEARN Performance Level Descriptors (PLDs) reflect the learning path for each standard based on students' natural progression of skills and levels of thinking for specific content. These learning progressions should be used to assess and teach students at various developmental levels. The ILEARN PLDs present learning progressions for each assessed standard. They are divided into four "buckets" in alignment with the ILEARN proficiency levels: Below Proficiency, Approaching Proficiency, At Proficiency, and Above Proficiency.

Indiana researched each assessed academic standard to refine and confirm the PLDs over the course of two years. These updated, evidence-based PLDs go beyond a single test; they represent key elements of student learning. Evidence-based PLDs are the heart of a cohesive system of teaching, learning, and assessment. To learn more about the ILEARN's evidence-based PLDs, refer to this short video and supporting presentation.

This PLD map represents the Summative standards assessed in grades six through eight, organized by domain and vertically aligned. Students may move through the learning progressions of each concept in various ways depending on the current knowledge they possess. Using the ILEARN Checkpoint student-level proficiency data for each reporting category alongside classroom assessments, educators can pinpoint where students are along the continuum of each standard's learning progression. Using high-quality teaching practices and materials, educators can support student growth horizontally across proficiency levels or vertically between grade levels. The ILEARN Item Specifications and 2023 Math Frameworks can assist educators in further defining each proficiency level and providing high-quality instruction.For more support using and interpreting PLDs, visit the PLD Guide.

Number Sense					
Standard	**Reporting Category: Subdomain**	**Below**	**Approaching**	**At**	**Above**
Concept begins in grade six.					
6.NS.1 Use positive and negative numbers to represent and compare quantities in real-world contexts, explaining the meaning of 0 in each situation. (E) *(Checkpoint 1)*	Integers and Rational Numbers	• Identify the positive or negative number that represents a given quantity in a real-world situation.	• Identify and interpret real-world situations that can be modeled using a positive number, negative number, or 0.	• Represent and/or compare positive and negative numbers in a given real-world situation, and identify, interpret, or explain the meaning of 0 in each situation.	• Critique a representation of a real-world situation or explain the structure of a model that involves positive numbers, negative numbers, or 0 in a given context.
7.NS.1 Show on a number line	Computing	• Identify and write the	• Determine when two	• Calculate the sum of	• Reason about

that a number and its opposite have a sum of 0 (are additive inverses). Find and interpret sums of rational numbers in real-world contexts. *(Checkpoint 1)*	with Rational Numbers	opposite of a number plotted on a given number line and use this understanding to find number pairs that sum to zero, including in simple real-world situations.	numbers on a number line sum to zero and identify or write expressions that represent this relationship. ● Calculate sums of positive and negative integers or decimals on a number line or solve simple real-world problems using these sums.	two positive and negative numbers and/or interpret the results by describing real-world situations. ● Explain how a number line can be used to add rational numbers.	generalizations of adding positive and negative numbers when given an addition expression or a number line.
8.NS.1 Give examples of rational and irrational numbers, and explain the difference between them. State decimal equivalents for any number. For rational numbers, show that the decimal equivalent terminates or repeats, and convert a repeating decimal into a rational number. *(Summative Only)*	Real Numbers	● Classify given numbers as rational or irrational.	● Convert given fractions into decimals and classify them as terminating or repeating ● Convert a repeating decimal into a rational number.	● Classify a given number as rational or irrational and justify the reasoning for each classification.	● Analyze, justify, and apply reasoning to prove or disprove a generalization about rational or irrational numbers.
Concept continues in AI.QE.6					
Standard	**Reporting Category: Subdomain**	**Below**	**Approaching**	**At**	**Above**
Concept begins in grade six.					
6.NS.2 Explain how opposite signs of numbers indicate locations on opposite sides of 0 on the number line; identify the opposite of the opposite of a number. *(Checkpoint 1)*	Integers and Rational Numbers	● Identify or write the opposite of a given number with or without a given number line.	● Plot 0 and/or the opposite of a given number on a number line, demonstrating the equal distances of opposites from 0 on either side of the number line.	● Identify and/or write the opposite of the opposite of a given number. ● Reason about the opposite signs of numbers, their locations on a number line, and/or their absolute	● Apply knowledge of the opposites of numbers to: ○ Evaluate multiple expressions representing opposite relationships for accuracy, or

				values to justify solutions.	○ Interpret and make claims about given generalizations. ● Justify claims and generalizations using symbols, equations, and explanations about the relationship between opposite numbers.
7.NS.2 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. *(Checkpoint 1)*	Computing with Rational Numbers	● Identify or write the absolute value of a given number. ● Calculate the distance between given integers plotted on a labeled number line to solve simple real-world problems.	● Identify expressions that represent the distance between a positive and negative number as the absolute value of their difference. ● Calculate the difference between positive and negative integers or decimals on a number line or solve simple real-world problems using these differences.	● Calculate the difference between rational numbers and/or interpret the results by describing real-world situations. ● Explain how a number line can be used to subtract rational numbers. ● Identify or write expressions that represent the distance between a positive and negative number as the absolute value of their difference.	● Reason about generalizations of subtracting positive and negative numbers when given a subtraction expression or a number line.
8.NS.2 Use rational approximations of irrational numbers to compare the size of irrational numbers, plot them approximately on a number line, and estimate the value of expressions involving irrational numbers. *(Checkpoint 1)*	Real Numbers	● Plot rational approximations of irrational numbers on a number line. ● Identify an irrational number that is greater than or less than a given whole number. ● Identify the approximate value to the nearest whole number of an irrational number.	● Identify approximated values of irrational numbers to the nearest tenth, including those with a numerical operation in the radicand, requiring simplification prior to approximation. ● Compare irrational numbers within intervals.	● Compare a rational number and a rational approximation of an irrational number in the form radical (k) or k*pi, using inequalities, number lines, or verbal statements. ● Determine rational and/or irrational numbers that meet given comparison requirements.	● Analyze and compare values using rational approximations of complex irrational expressions and large non-perfect square radicals. ● Order sets of rational and irrational numbers from least to greatest and justify comparisons.

Standard	Reporting Category: Subdomain	Below	Approaching	At	Above
Concept continues in AI.NF.1.					
Concept directly aligns back to 5.NS.1					
6.NS.3 Compare and order rational numbers and plot them on a number line. Write, interpret, and explain statements of order for rational numbers in real-world contexts. *(Checkpoint 1)*	Integers and Rational Numbers	• Identify the location of rational numbers on a number line. • Compare or order sets of rational numbers within the same type (integers, decimals to the thousandths, or fractions/mixed numbers).	• Identify or write inequalities that correctly compare rational numbers in mathematical or real-world contexts. • Evaluate the correctness of statements involving the order or comparison of rational numbers. • Identify quantities that are greater than or less than a given rational number.	• Record comparisons using the >, =, and < symbols when comparing a set of rational numbers consisting of integers, decimals to the thousandths, and/or fractions/mixed numbers. • Record comparisons using the >, =, and < symbols when comparing rational numbers in simple real-world situations. • Identify a rational number that lies between two given rational numbers.	• Evaluate and explain comparisons of rational numbers with minimal differences in value in mathematical or real-world contexts.
8.NS.2 Use rational approximations of irrational numbers to compare the size of irrational numbers, plot them approximately on a number line, and estimate the value of expressions involving irrational numbers. *(Checkpoint 1)*	Real Numbers	• Plot rational approximations of irrational numbers on a number line. • Identify an irrational number that is greater than or less than a given whole number. • Identify the approximate value to the nearest whole number of an irrational number.	• Identify approximated values of irrational numbers to the nearest tenth, including those with a numerical operation in the radicand, requiring simplification prior to approximation. • Compare irrational numbers within intervals.	• Compare a rational number and a rational approximation of an irrational number in the form radical (k) or k*pi, using inequalities, number lines, or verbal statements. • Determine rational and/or irrational numbers that meet given comparison	• Analyze and compare values using rational approximations of complex irrational expressions and large non-perfect square radicals. • Order sets of rational and irrational numbers from least to greatest and justify comparisons.

				requirements.	
Concept continues in AI.NF.1.					
Standard	**Reporting Category: Subdomain**	**Below**	**Approaching**	**At**	**Above**
Concept directly aligns back to 5.CA.3-10.					
6.NS.4 Solve real-world problems with positive fractions and decimals by using one or two operations. (E) *(Checkpoint 1)*	Operations with Positive Numbers	● Solve simple real-world problems involving decimals to the hundredths, benchmark fractions and/or mixed numbers, and one or two operations.	● Solve simple real-world problems that involve decimals to the hundredths, positive fractions, and mixed numbers, including converting numbers into equivalent forms when necessary to solve the problem.	● Solve complex real-world problems that involve decimals up to the thousandths, positive fractions, and mixed numbers, and that require precise computation with a combination of operations.	● Evaluate the reasoning of or critique an argument involving the solution to a complex real-world problem. ● Solve complex, real world, non-routine problems that involve decimals up to the thousandths, positive fractions, and mixed numbers, and that require precise computation with a combination of operations.
7.AF.2 Solve real-world problems with rational numbers by using one or two operations. (E) *(Summative Only)*	Expressions, Equations, and Inequalities	● Identify the solution to a mathematical or real-world problem involving addition/subtraction or multiplication/division of more than two integers. ● Identify the solution to a mathematical or real-world problem involving two or more unique integer operations. ● Simplify expressions	● Solve a real-world problem involving addition/subtraction or multiplication/division of more than two rational numbers, at least one of which is negative. ● Identify the solution to a mathematical or real-world problem involving two or more unique rational number operations. ● Solve simple real-world	● Compute fluently with rational numbers using an algorithmic approach. ● Solve mathematical and real-world problems involving two or more unique rational number operations. ● Interpret values in context as positive or negative to solve real-world problems. ● Solve complex	● Solve complex real-world problems involving positive and negative rational numbers and interpret the solution. ● Determine one or more equivalent expressions when one expression is given.

		with integers using the order of operations.	problems involving rational numbers when the structure requires selecting the correct operation or first step and when interpreting the context is necessary to determine the unknown.	real-world problems involving rational numbers.	
8.NS.4 Solve real-world problems with rational numbers by using multiple operations. (E) *(Checkpoint 1)*	Real Numbers	• Identify expressions or steps to solving real-world problems with rational numbers and two or more steps.	• Determine solutions to simple real-world problems that involve rational numbers by recognizing operations, including applying one percent calculation or unit conversion.	• Determine solutions to real-world problems involving multiple operations with rational numbers that require selecting operations based on the structure of the content and integrating percent reasoning with multiple steps. • Solve complex real-world problems involving rational numbers that require interpreting signed values, combining multiple operations, and applying percent reasoning or conversions in the appropriate order.	• Determine solutions to complex real-world problems involving multiple operations with rational numbers that require advanced reasoning with percentages. • Solve extended real-world problems involving rational numbers that require integrating signed quantities, multi-step percent changes (including repeated or negative percents), additive or multiplicative adjustments, and selective conversions to produce and compare accurate final values.
Concept continues in several Algebra I standards.					
Standard	**Reporting Category: Subdomain**	**Below**	**Approaching**	**At**	**Above**
Concept directly aligns back to 4.CA.3.					

6.NS.5 Apply the order of operations and properties of operations (i.e., identity, inverse, commutative properties of addition and multiplication, associative properties of addition and multiplication, and distributive property) to evaluate numerical expressions with nonnegative rational numbers, including those using grouping symbols, such as parentheses, and involving whole number exponents. (E) *(Checkpoint 1)*	Operations with Positive Numbers	• Evaluate numerical expressions for a solution when expressions include positive whole numbers and parentheses. • Identify equivalent numerical expressions generated using one of the properties of operations when expressions include positive whole numbers and parentheses. • Identify the first step in evaluating a numerical expression using the order of operations when expressions include positive whole numbers and parentheses.	• Apply the order of operations to evaluate or identify equivalent expressions for numerical expressions including positive whole numbers, benchmark fractions and decimals, exponents of 2 and 3, and parentheses and brackets. • Identify one or more equivalent expressions by applying a mathematical property.	• Apply the order of operations and mathematical properties to evaluate numerical expressions with positive rational numbers and a combination of parentheses, brackets, and whole number exponents, including 0 and 1. • Generate equivalent numerical expressions by applying one mathematical property.	• Place grouping symbols within a numerical expression to set it equal to a given value. • Apply the order of operations to evaluate numerical expressions that may involve complex rational expressions (rational expressions in the numerator and denominator), rational expressions divided by a whole number, whole number divided by a rational expression, more than one set of grouping symbols, or the distributive property.
7.NS.3 Use the properties of operations, particularly the distributive property, leading to products such as (–1)(–1) = 1 and the rules for multiplying signed numbers. (E) *(Checkpoint 1)*	Computing with Rational Numbers	• Multiply two integers or simple rational numbers with opposite signs using a model. • Determine whether a multiplication expression with two or three rational numbers will result in a positive or negative product.	• Apply properties to multiply two or three rational numbers without the use of a model. • Apply the distributive property to integer expressions involving a coefficient multiplied by a sum or difference. • Apply the distributive property to simplify expressions with integers and evaluate numerical expressions that include addition and subtraction inside parentheses with an	• Apply the distributive property to simplify expressions with rational numbers. • Evaluate numerical expressions written as a coefficient multiplied by a sum or difference.	• Identify, generate, and justify multiple equivalent expressions with rational numbers and variables using the properties of operations and the rules for multiplying signed numbers. • Analyze and generalize the sign and magnitude of products of rational numbers and variable expressions. • Determine whether a product is greater than, less than, or equal to zero and select or

			integer coefficient and identify equivalent expressions.		construct inequalities that accurately represent the product.
7.NS.4 Explain that if p and q are integers, then –(p/q) = (–p)/q = p/(–q) for all nonzero integers. (E) *(Checkpoint 1)*	Computing with Rational Numbers	• Identify equivalent fractions that satisfy –(p/q) = (–p)/q = p/(–q) when p and q are integers in tasks that do not require simplification. • Identify the sign of the quotient when dividing two rational numbers in straightforward cases.	• Generate an equivalent fraction that satisfies $-(\frac{p}{q}) = \frac{-p}{q} = \frac{p}{-q}$ when p and q are integers. • Identify equivalent fractions that satisfy $-(\frac{p}{q}) = \frac{-p}{q} = \frac{p}{-q}$ and $-(\frac{p}{q}) \neq \frac{-p}{-q}$ when p and q are integers. • Calculate the quotient of two rational numbers using a model.	• Identify equivalent fractions that satisfy $-(\frac{p}{q}) = \frac{-p}{q} = \frac{p}{-q}$ and $-(\frac{p}{q}) \neq \frac{-p}{-q}$, and $\frac{-p}{-q} = \frac{p}{q}$ when p and q are integers in tasks that require simplification. • Calculate the quotient of two rational numbers using properties of operations or rules for dividing signed numbers.	• Generate or identify multiple equivalent fractions representing negative rational numbers, including expressions with variables, double negatives, and non-simplified forms that require careful sign interpretation. • Determine or justify the missing value in an equivalence statement involving negative rational numbers (including variable forms) and explain the reasoning used to verify equivalency.
7.NS.7 Compute fluently with rational numbers using an algorithmic approach. (E) *(Summative Only)*	Computing with Rational Numbers	• Identify the solution of mathematical problems involving the four operations with integers.	• Identify the solution to a problem in real-world context involving the four operations with rational numbers.	• Compute fluently with rational numbers using an algorithmic approach. • Solve mathematical and real-world problems involving the four operations with rational numbers.	• Determine one or more equivalent expressions when one expression is given. • Solve mathematical and real-world problems involving the four operations with rational numbers and interpret the solution.
Concept ends in grade seven.					
Standard	**Reporting Category: Subdomain**	**Below**	**Approaching**	**At**	**Above**

Concept directly aligns back to 4.CA.4.					
6.NS.6 Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers from 1 to 100, with a common factor as a multiple of a sum of two whole numbers with no common factor. *(Checkpoint 1)*	Operations with Positive Numbers	• Identify the greatest common factor of two whole numbers related to familiar multiplication facts of 2, 3, 4, 5, and 6. • Identify equivalent expressions that demonstrate the distributive property by rewriting the sum of two whole numbers as a common factor multiplied by a sum of whole numbers.	• Identify the greatest common factor of any two whole numbers less than or equal to 100. • Identify the least common multiple of any two whole numbers less than or equal to 12. • Use the distributive property to generate a missing number in equivalent expressions that demonstrate the distributive property by rewriting the sum of two whole numbers as a common factor multiplied by a sum of whole numbers.	• Generate the greatest common factor of any two whole numbers less than or equal to 100. • Generate the least common multiple of any two whole numbers less than or equal to 12. • Apply the distributive property to write an equivalent expression for the sum of two whole numbers using a multiple of the sum.	• Solve a real-world problem using the greatest common factor or least common multiple.
7.NS.5 Find the prime factorization of whole numbers and write the results using exponents. *(Checkpoint 1)*	Exponents and Roots	• Classify numbers as either prime or composite. • Identify the correct prime factorization of whole numbers that are multiples of 10 using only the prime numbers 2, 3, and 5 when provided options fully simplified into prime factors. • Find a missing factor in a prime factorization equality statement when all factors are 2, 3, or 5.	• Identify the prime factorization of whole numbers less than 225, including numbers that are not multiples of 10, when given options that are not fully simplified into prime factors. • Determine the missing exponent in a prime factorization expression. • Identify equivalent prime factorization forms, using primes up to 7 and exponents of 3 or less.	• Generate the prime factorization of whole numbers. • Determine the value of variables in an exponential expression when given the numerical value of the product.	• Analyze and justify the accuracy of a prime factorization expressed with exponents, including factorizations involving multi-step decomposition of whole numbers 225 or greater.
8.NS.3 Given a numeric expression with common	Real Numbers	• Apply the product of powers, power of a	• Apply the product of powers, power of a	• Apply the product of powers, power of a	• Apply multiple exponent properties flexibly to

rational number bases and integer exponents, apply the properties of exponents to generate equivalent expressions. (E) *(Checkpoint 1)*		power, and negative exponent properties to identify equivalent, fully simplified numerical expressions using integer bases and exponents. ● Identify unknown exponents in simple equality statements involving a single exponent property.	power, negative exponent, and quotient of powers properties to generate or identify equivalent expressions, including expressions that are not fully simplified. ● Determine missing exponents in simple equality statements involving two properties.	power, negative exponent, quotient of powers, and zero exponent properties to generate or identify equivalent expressions, including those with fractional bases. ● Find missing exponents in complex expressions. ● Simplify expressions involving negative integers in the quotient property.	analyze, compare, and generate more than two equivalent expressions. ● Find the value of more than one missing exponent.
Concept continues in AI.NF.2.					
Standard	**Reporting Category: Subdomain**	**Below**	**Approaching**	**At**	**Above**
Concept begins in grade six.					
6.NS.7 Apply the properties of operations (i.e., identity, inverse, commutative, associative, distributive properties) to create equivalent linear expressions and to justify whether two linear expressions are equivalent when the two expressions name the same number regardless of which value is substituted into them. (E) *(Checkpoint 2)*	Expressions and Data Analysis	● Identify and name a variable, coefficient, constant, and term within a given algebraic expression. ● Identify equivalent linear expressions that result from combining like terms or applying the commutative property to expressions with compatible whole numbers.	● Identify equivalent linear expressions that result from applying one or more properties, including the distributive property, commutative property, or associative property, and combining like terms.	● Apply one or more properties of operations and/or combine like terms to generate equivalent linear expressions. ● Justify whether two expressions are equivalent using substitution.	● Apply properties of operations, combining like terms, or decomposing terms to write multiple equivalent equations.
7.AF.1 Apply the properties of operations (e.g., identity, inverse, commutative, associative, distributive	Expressions, Equations, and Inequalities	● Identify equivalent linear expressions involving the application of one property of	● Apply a single property of operations or combine like terms to create equivalent linear	● Apply more than one property of operations, including combining like terms, to create	● Apply multiple properties of operations, including combining like terms, to

properties) to create equivalent linear expressions, including situations that involve factoring out a common number (e.g., given 2x - 10, create an equivalent expression 2(x - 5)). Justify each step in the process. (E) *(Checkpoint 3)*		operations and simple multiplication. • Find missing values in simple expressions by applying the commutative property. • Identify the correct steps to solve an equation or apply a specific property of operations.	expressions. • Select multiple equivalent expressions when one property or combining like terms is applied and expressions are limited to whole numbers. • Select a justification for why two expressions are or are not equivalent.	equivalent expressions. • Find missing values in equivalent expressions. • Select multiple equivalent expressions when more than one property, including combining like terms, is applied. • Justify each step used to solve an equation or to apply one or more of the properties of operations, including combining like terms.	analyze and create equivalent expressions in non-standard or structurally complex forms. • Justify the reasoning used to simplify an expression, including cases involving nested parentheses, negative coefficients, or less familiar arrangement of terms.
Concept ends in grade seven.					
Standard	**Reporting Category: Subdomain**	**Below**	**Approaching**	**At**	**Above**
Concept aligns directly back to 5.NS.3.					
6.NS.8 Evaluate positive rational numbers with whole number exponents. *(Summative Only)*	Integers and Rational Numbers	• Determine the relationship between the base and exponent in an exponential expression.	• Identify or write an equivalent expression to a given exponential expression with a rational base and a whole number exponent.	• Evaluate an exponential expression with a rational base and a whole number exponent.	• Analyze an error made when evaluating an exponential expression with a positive rational number base.
7.NS.6 Apply the inverse relationship between squaring and finding the square root of a perfect square whole number. Find square roots of perfect square whole numbers. *(Checkpoint 1)*	Exponents and Roots	• Identify numbers that are perfect squares. • Calculate square roots of perfect square whole numbers less than or equal to 144. • Represent the inverse relationship between squaring and square	• Calculate square roots of perfect square whole numbers and identify or write equivalent expressions involving square roots and squared numbers using the inverse relationship, including values	• Find negative square roots of perfect squares. • Determine missing values in equality statements involving square roots and squared numbers. • Distinguish accurate	• Apply the inverse relationship between squaring and square roots to evaluate, compare, or generate complex expressions involving radicals, exponents, and variables and justify the

		rooting symbolically using numbers or variables in simple expressions.	between 144 and 400. ● Apply the inverse relationship between squaring and square roots to determine up to two equivalent expressions for a given whole-number value.	equivalent expressions from incorrect forms.	reasoning used. ● Analyze statements involving squared numbers and square roots to determine missing values or verify correctness, providing an explanation that clearly connects each step to the inverse relationship.
8.NS.3 Given a numeric expression with common rational number bases and integer exponents, apply the properties of exponents to generate equivalent expressions. (E) *(Checkpoint 1)*	Real Numbers	● Apply the product of powers, power of a power, and negative exponent properties to identify equivalent, fully simplified numerical expressions using integer bases and exponents. ● Identify unknown exponents in simple equality statements involving a single exponent property.	● Apply the product of powers, power of a power, negative exponent, and quotient of powers properties to generate or identify equivalent expressions, including expressions that are not fully simplified. ● Determine missing exponents in simple equality statements involving two properties.	● Apply the product of powers, power of a power, negative exponent, quotient of powers, and zero exponent properties to generate or identify equivalent expressions, including those with fractional bases. ● Find missing exponents in complex expressions. ● Simplify expressions involving negative integers in the quotient property.	● Apply multiple exponent properties flexibly to analyze, compare, and generate more than two equivalent expressions. ● Find the value of more than one missing exponent.
Concept continues in AI.NF.2.					

Ratios and Proportional Reasoning					
Standard	**Reporting Category: Subdomain**	**Below**	**Approaching**	**At**	**Above**
Concept directly aligns back to 5.NS.2 and 5.NS.4.					

6.RP.1 Convert between any two representations (fractions, decimals, percents) of positive rational numbers without the use of a calculator. (E) *(Checkpoint 1)*	Operations with Positive Numbers	• Convert between decimals and percents when the decimal is less than 1 and written as hundredths. • Convert between fractions and decimals when the fraction's denominator is 10 or 100.	• Convert between fractions, decimals, and percents when fractions are benchmark fractions or easily converted to a denominator of 10.	• Convert between fractions, decimals, and percents when more complex fractions (e.g., fractions requiring simplification) and decimals (e.g., greater than 1 or written as thousandths) are used. • Justify solutions involving conversions among fractions, decimals, and percents by applying the understanding that each form represents the same numerical value as parts of a whole, a base-10 representation, or parts per hundred.	• Apply knowledge of equivalent forms of positive rational numbers to create or justify complex conversions.
6.RP.2 Understand the concept of a unit rate and use terms related to rate in the context of a ratio relationship. *(Checkpoint 3)*	Working with Ratios	• Calculate the value of one unit from a given rate within a simple real-world context. • Identify unit rates or ratios represented by tables, tape diagrams, or double number lines.	• Write a ratio represented by a table, tape diagram, or double number line. • Calculate the unit rate in the form of a ratio or fraction from a given rate within a simple real-world context. • Calculate and compare unit rates from multiple given real-world contexts.	• Calculate the unit rate from a given ratio in a real-world context and apply it to solve a real-world problem. • Identify examples of unit rates within real-world contexts.	• Apply knowledge of unit rates as they are related to rates to reason through, critique, and justify steps to solving a problem.
7.RP.2 Use proportional relationships to solve ratio and percent problems with multiple operations (e.g., simple interest, tax, markups, markdowns, gratuities,	Proportional Relationships	• Calculate an unknown percent, part, or whole of a given percent statement using benchmark percentages.	• Calculate an unknown percent, part, or whole of a given percent statement using any whole number percent equal to or less than	• Apply proportional relationships to solve complex real-world problems involving a single percent applied with one or more	• Apply proportional relationships to solve complex real-world problems involving more than one percent operation, working

conversions within and across measurement systems, and percent increase and decrease). (E) *(Checkpoint 2)*		• Identify the result of a single percent calculation in a simple, familiar context.	100. • Identify the complementary percentages (remaining percent) when applying a single percentage to a total in context.	operations. • Identify the solution to a ratio and percent problem requiring the application of more than one percent and/or the conversion of units.	backward to determine original values, or applying percent change in complex contexts, including those requiring unit conversions. • Generate or identify expressions that represent percent increase or decrease.
Concept ends in grade seven.					
Standard	**Reporting Category: Subdomain**	**Below**	**Approaching**	**At**	**Above**
Concept directly aligns back to 5.CA.11.					
6.RP.3 Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. *(Checkpoint 3)*	Working with Rates and Ratios	• Identify ratios in real-world context and determine if they represent part-to-part or part-to-whole. • Identify or complete a ratio table that represents a given ratio within the context of a real-world problem. • Plot points on a coordinate grid to represent a given ratio table and identify equivalent ratios that lie on the line that is formed.	• Complete a ratio table using multiplication or division to identify one or more equivalent ratios. • Determine which comparison statements about ratios are true by examining two given ratio tables, focusing on cases where one corresponding value is the same. • Identify solutions to simple real-world problems about equivalent ratios by interpreting the values of points plotted on a coordinate plane.	• Construct and apply a table of equivalent ratios to solve problems • Compare ratios in two ratio tables to solve problems. • Graph and interpret pairs of values on a coordinate plane to solve problems about ratios.	• Construct and apply a table of equivalent ratios to solve complex problems about ratios in a part-to-part-to-part scenario. • Compare ratios in two ratio tables to solve complex problems about ratios in a part-to-part-to-part scenario.

7.RP.1 Identify the unit rate or constant of proportionality in tables, graphs, equations, and verbal descriptions of proportional relationships. *(Checkpoint 2)*	Proportional Relationships	• Identify the constant of proportionality from a table, graph, or verbal description in simple cases involving whole-number ratios.	• Identify whether two quantities are in a proportional relationship. • Calculate the constant of proportionality from tables or verbal descriptions with whole numbers and positive decimal values. • Identify the constant of proportionality from graphs that do not explicitly show the pair (1, r).	• Calculate the constant of proportionality from graphs that do not explicitly show the ordered pair (1, r). • Calculate the constant of proportionality from tables, graphs, or verbal descriptions, including situations with fractional values. • Identify the constant of proportionality from an equation.	• Interpret the constant of proportionality given a table, graph, equation, or verbal description of a proportional relationship in context. • Solve problems or make predictions using the constant of proportionality in context.
Concept ends in grade seven.					
Standard	**Reporting Category: Subdomain**	**Below**	**Approaching**	**At**	**Above**
Concept begins in grade six.					
6.RP.4 Solve real-world and other mathematical problems involving rates and ratios using models and strategies such as reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. (E) *(Checkpoint 3)*	Solving Problems with Rates, Ratios, and Proportions	• Solve simple real-world problems by applying a given whole number or monetary part-part rate.	• Solve simple real-world problems using given part-to-part rates in ratio form or by interpreting and applying rates from tape diagrams or the context of the problem.	• Solve real-world problems using part-to-part or part-to-whole rates interpreted from tables and double line graphs. • Solve real-world problems by calculating the unit rate from rates in given tables, tape diagrams, double number lines, or the context of the problem and applying that unit rate to determine the final solution.	• Solve complex real-world problems by calculating and comparing rates or unit rates interpreted from models or tables.

7.RP.2 Use proportional relationships to solve ratio and percent problems with multiple operations (e.g., simple interest, tax, markups, markdowns, gratuities, conversions within and across measurement systems, and percent increase and decrease). (E) *(Checkpoint 2)*	Proportional Relationships	• Calculate an unknown percent, part, or whole of a given percent statement using benchmark percentages. • Identify the result of a single percent calculation in a simple, familiar context.	• Calculate an unknown percent, part, or whole of a given percent statement using any whole number percent equal to or less than 100. • Identify the complementary percentages (remaining percent) when applying a single percentage to a total in context.	• Apply proportional relationships to solve complex real-world problems involving a single percent applied with one or more operations. • Identify the solution to a ratio and percent problem requiring the application of more than one percent and/or the conversion of units.	• Apply proportional relationships to solve complex real-world problems involving more than one percent operation, working backward to determine original values, or applying percent change in complex contexts, including those requiring unit conversions. • Generate or identify expressions that represent percent increase or decrease.
Concept ends in grade seven.					
Standard	**Reporting Category: Subdomain**	**Below**	**Approaching**	**At**	**Above**
Concept begins in grade six.					
6.RP.5 Use variables to represent two quantities in a proportional relationship in a real-world problem; write an equation to express one quantity, the dependent variable, in terms of the other quantity, the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. (E) *(Checkpoint 3)*	Solving Problems with Rates, Ratios, and Proportions	• Identify the independent and dependent variables in a real-world situation.	• Complete a table of values to represent a proportional relationship in a real-world situation. • Analyze the relationship between the independent and dependent values in a table to identify an equation expressing the dependent variable in terms of the independent variable.	• Analyze the relationship between the independent and dependent values of a real-world situation to write an equation. • Solve real-world problems using the relationship between the independent and dependent variables when the variables represent whole numbers.	• Critique statements made about a proportional relationship. • Write equations to represent complex real-world problems and explain how each part of the equation represents the problem.

7.AF.5 Define slope as vertical change for each unit of horizontal change, and apply that a constant rate of change or constant slope describes a linear function. Identify and describe situations with constant or varying rates of change. *(Checkpoint 2)*	Slope	• Identify the meaning of slope in simple contexts. • Interpret slope as vertical change per unit of horizontal change.	• Calculate the rate of change in simple contexts.	• Identify and describe simple real-world situations that represent constant or varying rates of change. • Determine if different contexts are best represented by a linear model when situations use common, familiar language describing constant versus varying rates of change and justify reasoning. • Produce a valid input-output pair for a given situation based on the rate of change.	• Determine if different contexts are best represented by a linear model when situations use less familiar and less predictable language describing constant versus varying rates of change. • Apply a constant rate of change in the form of slope to a real-world problem to draw mathematical conclusions. • Identify and explain the difference between when a percentage is used in the context of varying or constant rate of change. • Analyze complex real-world situations that represent constant and varying rates of change that may need to be inferred from context. • Analyze the rate of change from a table or graph, including zero change, and explain whether it is constant or varying.
8.AF.3 Understand that a function assigns to each x-value (independent variable) exactly one y-value (dependent variable), and that the graph of	Functions	• Identify independent and dependent variables given a table, graph, or set of ordered pairs.	• Define the meaning of a function. • Select ordered pairs that satisfy a given functional rule.	• Apply understanding of functions to determine if the graph of a relation is a function or nonfunction.	• Explain if a given representation of a relation in a real-world situation is a function. • Critique an explanation

a function is the set of ordered pairs (x,y). *(Checkpoint 2)*			• Select values from a list that could complete a table without violating the function definition. • Identify whether a single set or table of ordered pairs could represent a function. • Demonstrate that the graph of a function represents all ordered pairs (x, y) that satisfy the function rule.	• Match a set or table of ordered pairs to a given equation of a function.	determining if a relation in any form is a function. • Select graphs that represent a function when the points are discrete or require careful interpretation. • Evaluate which values would make a relation a function and justify the reasoning.
Concept continues in several Algebra I standards.					
Standard	**Reporting Category: Subdomain**	**Below**	**Approaching**	**At**	**Above**
Concept begins in grade six.					
6.RP.5 Use variables to represent two quantities in a proportional relationship in a real-world problem; write an equation to express one quantity, the dependent variable, in terms of the other quantity, the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. (E) *(Checkpoint 3)*	Solving Problems with Rates, Ratios, and Proportions	• Identify the independent and dependent variables in a real-world situation.	• Complete a table of values to represent a proportional relationship in a real-world situation. • Analyze the relationship between the independent and dependent values in a table to identify an equation expressing the dependent variable in terms of the independent variable.	• Analyze the relationship between the independent and dependent values of a real-world situation to write an equation. • Solve real-world problems using the relationship between the independent and dependent variables when the variables represent whole numbers.	• Critique statements made about a proportional relationship. • Write equations to represent complex real-world problems and explain how each part of the equation represents the problem.
7.AF.6 Graph a line given its slope and a point on the line.	Slope	• Determine if the slope of a given graph is	• Identify the slope of a line from its graph when	• Determine the slope of a line given its graph	• Explain the process to find the slope of a line.

Find the slope of a line given its graph. (E) *(Checkpoint 2)*		positive, negative, 0, or undefined. ● Identify the slope of a line from a graph in straightforward situations.	the slope is represented as a fraction. ● Identify the correct graph of a line when given its slope in fractional form and a point on the line.	when the slope of the line simp- lifies to an integer value. ● Calculate the slope of a line given its graph. ● Select the correct graph of a line given an integer value for slope and a point on the line. ● Graph a line given its slope and a point on the line.	● Find additional points on a line when given the slope and one point. ● Calculate the slope of a line from a graph in more complex situations, such as a coordinate plane with fractional increments.
8.AF.4 Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear, has a maximum or minimum value). Sketch a graph that exhibits the qualitative features of a function that has been verbally described. (E) *(Checkpoint 2)*	Functions	● Identify one or more intervals of a given graph as increasing, decreasing, or constant in simple situations. ● Interpret increasing, decreasing, or constant behavior of functions when described in simple context. ● Determine whether a given graph increases or decreases at a constant or varying rate. ● Determine whether a graph or part of a graph is linear or nonlinear. ● Identify a maximum or minimum when visually clear on a given graph. ● Select the graph that best represents a qualitative description of a simple function.	● Construct a graph with minimal qualitative features based on a given description. ● Interpret variations in a linear rate of change in context. ● Classify different intervals on a graph as increasing, decreasing, or constant using inequalities. ● Represent increasing, decreasing, or constant intervals on a given graph by expressing those intervals as inequalities. ● Interpret the total change in value of a variable within an interval of a graph in context.	● Construct the graph of a function that matches a given description of more than one qualitative feature. ● Describe multiple qualitative properties of the functional relationship between two quantities when given a graph. ● Classify different intervals on a graph as both increasing/decreasing and linear/nonlinear or constant. ● Represent increasing or decreasing and linear or nonlinear intervals on a given graph by expressing those intervals using inequalities.	● Classify different intervals on a graph as both increasing/decreasing and linear/nonlinear or constant when given a graph that has both increasing and decreasing intervals as well as linear and nonlinear components. ● Represent intervals on a graph, whether increasing, decreasing, linear, nonlinear, or constant, by expressing those intervals using inequalities. ● Sketch a graph of a function given many qualitative features or given data in the form of real-world data in context. ● Identify the maximum and minimum of less typical graphs, such as the graph of a line

					segment.
Concept continues in several Algebra I standards.					
Standard	**Reporting Category: Subdomain**	**Below**	**Approaching**	**At**	**Above**
Concept begins in grade six.					
6.RP.5 Use variables to represent two quantities in a proportional relationship in a real-world problem; write an equation to express one quantity, the dependent variable, in terms of the other quantity, the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. (E) *(Checkpoint 3)*	Solving Problems with Rates, Ratios, and Proportions	• Identify the independent and dependent variables in a real-world situation.	• Complete a table of values to represent a proportional relationship in a real-world situation. • Analyze the relationship between the independent and dependent values in a table to identify an equation expressing the dependent variable in terms of the independent variable.	• Analyze the relationship between the independent and dependent values of a real-world situation to write an equation. • Solve real-world problems using the relationship between the independent and dependent variables when the variables represent whole numbers.	• Critique statements made about a proportional relationship. • Write equations to represent complex real-world problems and explain how each part of the equation represents the problem.
7.RP.3 Represent real-world and other mathematical situations that involve proportional relationships. Write equations and draw graphs to represent these proportional relationships. Apply the definition of unit rate to y = mx. (E) *(Checkpoint 2)*	Proportional Relationships	• Identify an equation of the form y = kx that represents a proportional relationship when given a verbal description, table, or graph in which the constant of proportionality is given or simple to infer. • Identify a situation that can be modeled by a given equation in the form y = kx.	• Determine whether two quantities are in a proportional relationship. • Interpret the meaning of “k” in a proportional relationship represented by the equation y = kx as the constant of proportionality which can be found by calculating the unit rate in the relationship. • Determine the constant	• Construct equations from tables, graphs, or verbal descriptions. • Develop an equation to represent a real-world or mathematical proportional relationship given a table, graph, or verbal description in which the constant of proportionality must be calculated from non-consecutive and/or complex pairs of values,	• Develop two equations that represent a proportional relationship. • Interpret and analyze equations of proportional relationships to make predictions, evaluate statements, or draw conclusions in context.

			of proportionality from a table, graph, or verbal description and use it to identify an equation in the form y = kx. ● Draw graphs of proportional relationships given a table that includes the ordered pair that correlates to the constant of proportionality.	including cases with decimal rates or scaled values. ● Draw graphs to represent proportional relationships, given an equation, table, or verbal description where the constant of proportionality must be calculated.	
8.AF.5 Interpret the equation y = mx + b as defining a linear function whose graph is a straight line; give examples of functions that are not linear. Describe similarities and differences between linear and nonlinear functions from tables, graphs, verbal descriptions, and equations. *(Checkpoint 2)*	Linear Functions	● Determine the slope and y-intercept from a linear equation given in slope-intercept form. ● Identify which graph represents a linear function (straight vs. not straight). ● Identify an equation that represents a linear function when given simple equations in familiar formats.	● Classify given function equations as linear or non-linear. ● Classify a given table of values as representing a linear function or a non-linear function. ● Identify which table of values represents a linear function. ● Identify an accurate justification explaining why a given function is linear or nonlinear when the explanation uses straightforward, less complex language.	● Compare functions in different representations to determine whether each is linear or nonlinear when features are easily observable. ● Generate or identify multiple linear functions in the same representation (tables, equations, or graphs). ● Generate or identify multiple nonlinear functions in the same representation (tables, equations, or graphs). ● Compare similarities and differences between linear and nonlinear functions using properties such as rate of change, shape of the graph, and/or equation structure.	● Interpret and explain characteristics of linear functions as they apply to real-world situations. ● Describe connections between different representations of the same linear relationship. ● Compare functions in different representations to determine whether each is linear or nonlinear when representations require deeper analysis. ● Generate or identify (when explanation uses more advanced or formal mathematical language) a justification explaining why a given function is linear or nonlinear.
8.AF.6 Construct a function to	Linear	● Determine the rate of	● Create or identify an	● Construct a linear	● Interpret how the values

model a linear relationship between two quantities given a verbal description, table of values, or graph. Within the context of a problem, describe the meaning of m (rate of change) and b (y-intercept) in y = mx + b. (E) *(Checkpoint 2)*	Functions	change (*m*) or y-intercept (*b*) of a linear function represented by a table, graph, or verbal description when the values of *m* and *b* are provided. ● Match an equation to a given verbal description describing the relationship between two quantities in a linear relationship. ● Select statements that accurately interpret the starting value and/or rate of change given a table of values. ● Select a statement that accurately interprets the meaning of the rate of change when given a linear equation in context.	equation of a linear function represented by a table or verbal description when the rate of change and initial value are given or only one must be computed. ● Calculate the rate of change (*m*) or y-intercept (*b*) of a linear function in context represented by a table, graph, or verbal description. ● Match an equation of a linear function to its graphical representation. ● Select a table of values that corresponds to a given linear equation. ● Select a statement accurately interpreting the meaning of the rate of change and starting value/y-intercept given a linear equation in context.	equation in the form y = mx + b when given a verbal description, table, or graph where both *m* and *b* must be calculated or inferred from contextual information. ● Select a linear equation that corresponds to a given table of values. ● Describe the rate of change or y-intercept of a linear function in terms of the situation it models. ● Graph a linear equation presented in slope-intercept form. ● Create an equation of a linear function represented by a graph.	of the two quantities change together within a given linear function in context. ● Interpret the rate of change and initial value of a linear function in terms of the situation it models, its graph, or its table of values. ● Construct a linear function in slope-intercept form from more complex representations.
8.AF.7 Compare properties of two linear functions given in different forms, such as a table of values, equation, verbal description, and graph (e.g., compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed). *(Checkpoint 2)*	Linear Functions	● Compare a single property of two linear functions in different representations when no calculation is required.	● Compare initial values, rates of change, and/or output for a given input of two linear functions given in different forms when all values are whole numbers.	● Compare initial values and rates of change of two linear functions given in different forms when rational numbers are included. ● Find the difference in output for the same input for two linear functions given in different forms.	● Create a different representation of a linear function that has a greater or lesser slope and y-intercept. ● Compare slopes, y-intercepts, and outputs of two linear functions when one is represented as an equation not in

					slope-intercept form. ● Compare the input values of two linear functions, given in different forms, that produce the same output.
Concept continues in several Algebra I standards.					

Algebra and Functions					
Standard	**Reporting Category: Subdomain**	**Below**	**Approaching**	**At**	**Above**
Concept begins in grade six.					
6.AF.1 Define and use multiple variables when writing expressions to represent real-world and other mathematical problems, and evaluate them for given values. (E) *(Checkpoint 2)*	Expressions and Data Analysis	● Define and use expressions with one variable and one operation to represent a given verbal description.	● Define and use expressions with one variable to represent a given real-world situation and evaluate the expression for a given specific value.	● Define and use expressions with two variables to represent real-world and mathematical problems and evaluate the expression for a given specific value.	● Solve real-world problems by substituting given values for multiple variables in a given expression.
Concept supports several subsequent grade level concepts.					
Standard	**Reporting Category: Subdomain**	**Below**	**Approaching**	**At**	**Above**
Concept begins in grade six.					
6.AF.2 Demonstrate which values from a specified set, if any, make the equation or	Equations and Inequalities	● Determine whether a given value for a variable is a solution to an equation using	● Determine whether a given value for a variable is a solution to an inequality using	● Determine which number(s) from a given set make an equation or inequality true using	● Solve real-world problems by determining which number(s) from a given

inequality true. Use substitution to determine whether a given number in a specified set makes an equation or inequality true. (E) *(Checkpoint 2)*		substitution.	substitution.	substitution.	specific set make an equation or inequality true.
Concept supports several subsequent grade level concepts.					
Standard	**Reporting Category: Subdomain**	**Below**	**Approaching**	**At**	**Above**
Concept begins in grade six.					
6.AF.3 Solve equations of the form x + p = q, x - p = q, px = q, and x/p = q fluently for cases in which p, q and x are all nonnegative rational numbers. Represent real-world problems using equations of these forms and solve such problems. (E) *(Checkpoint 2)*	Equations and Inequalities	• Represent and/or solve a real-world problem using equations of the forms x + p = q, x - p = q, px = q, and x/p = q for cases in which p, q and x are whole numbers. • Solve equations of the form x + p = q, x - p = q, px = q, and x/p = q for cases in which p, q and x are whole numbers.	• Represent and/or solve a real-world problem using equations of the forms x + p = q, x - p = q, px = q, and x/p = q for cases in which p, q and x are whole numbers and/or decimals. • Solve equations of the form x + p = q, x - p = q, px = q, and x/p = q fluently for cases in which p, q and x are whole numbers and/or decimals.	• Represent and/or solve a real-world problem using equations of the forms x + p = q, x - p = q, px = q, and x/p = q for cases in which p, q and x include at least one fraction or mixed number. • Solve equations of the form x + p = q, x - p = q, px = q, and x/p = q fluently for cases in which p, q and x include at least one fraction or mixed number.	• Represent and solve a real-world problem using equations of the forms x + p = q, x - p = q, px = q, and x/p = q for cases in which p, q and x are all complex nonnegative rational numbers, and describe the solution in the context of the problem.
7.AF.3 Solve equations of the form px + q = r and p(x + q) = r fluently, where p, q, and r are specific rational numbers. Represent real-world problems using equations of these forms and solve such problems. (E)	Expressions, Equations, and Inequalities	• Identify numbers as solutions to linear equations of the forms px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers. • Identify an equation based on a simple	• Solve equations of the forms px + q = r and p(x + q) = r fluently, where p, q, and r are integers. • Identify a linear equation that represents a real world problem when the equation requires	• Represent real-world problems with equations of the forms px+q=r and p(x+q)=r involving rational numbers, including situations that require initial computation or interpretation.	• Represent a real-world problem using more than one equation that simplifies to the forms px + q = r and p (x + q) = r where p, q and r are rational numbers. • Explain whether a solution to a given

(Checkpoint 3)		real-world context when the resulting equation is of the form px+q=r (no computation or interpretation required).	grouping symbols. • Identify a step in solving equations of the form p(x+q)=r when p, q, and/or r are fractions or decimals.	• Solve equations of the forms px+q=r and p(x+q)=r where p, q, and r are rational numbers. • Select more than one equation that accurately models a given real-world problem.	problem is reasonable. • Compare an algebraic solution to an arithmetic solution, analyzing the sequence of the operations used in each approach.
6.AF.4 Write an inequality of the form x > c, x ≥ c, x < c, or x ≤ c, where c is a rational number, to represent a constraint or condition in a real-world or other mathematical problem. Explain that inequalities have infinitely many solutions and how to represent solutions on a number line diagram. *(Checkpoint 2)*	Equations and Inequalities	• Match an inequality of the form x > c, x ≥ c, x < c, or x ≤ c to a solution graphed on a number line.	• Write inequalities of the form x > c, x ≥ c, x < c, or x ≤ c to represent a mathematical or real-world problem with a constraint or condition.	• Write inequalities of the form x > c, x ≥ c, x < c, or x ≤ c to represent a real-world situation with a constraint or condition, and graph the solutions on a number line.	• Given two constraints or conditions within a real-world problem, identify or write a pair of inequalities to represent each and explain each inequality within the context of the problem.
7.AF.4 Solve inequalities of the form px + q (> or ≥) r or px + q (< or ≤) r, where p, q, and r are specific rational numbers. Represent real-world problems using inequalities of these forms and solve such problems. Graph the solution set of the inequality and interpret it in the context of the problem. *(Checkpoint 3)*	Expressions, Equations, and Inequalities	• Identify numbers as solutions to linear inequalities of the form px + q (> or ≥) r or px + q (< or ≤) r, where p, q, and r are specific integers. • Identify an inequality based on a simple real-world context when the resulting inequality is of the form px + q (> or ≥) r or px + q (< or ≤) r, where p, q, and r are integers and no computation is required.	• Solve inequalities of the form px + q (>, ≥, <, ≤) r, where p, q, and r are specific integers and the value of p is positive. • Identify the correct graph of the solution to an inequality given in the form px + q (>, ≥, <, ≤) r. • Determine solutions to real world problems that require simple inequality-based reasoning, even when the inequality does not need to be formally	• Graph the solution set of an inequality given in the form px + q (>, ≥, <, ≤) r. • Solve inequalities of the form px + q (>, ≥, <, ≤) r where p, q, and r are specific rational numbers and the value of p is positive or negative. • Construct inequalities to represent real world problems when the structure requires forming px + q (>, ≥, <, ≤) r. • Interpret solutions to	• Interpret solutions to complex real world problems represented by inequalities of the form px + q (> or ≥) r or px + q (< or ≤) r. • Critique a solution to a real-world problem for accuracy or reasonableness and justify arguments by applying understanding of inequalities. • Construct inequalities for complex real-world descriptions.

			written or solved algebraically. ● Determine if given rational numbers are in the solution set of an inequality.	simple real world problems represented by inequalities of the form px + q (>, ≥, <, ≤) r.	
8.AF.2 Generate linear equations in one variable with one solution, infinitely many solutions, or no solutions. Justify the classification given. *(Checkpoint 1)*	Linear Equations and Inequalities	● Classify one equation as having one solution, infinitely many solutions, or no solutions when given a linear equation and its solution.	● Classify one or more linear equations as having one solution, infinitely many solutions, or no solutions when given equations that do not require simplification.	● Generate a linear equation that has one solution, infinitely many solutions, or no solutions. ● Classify one or more linear equations that require simplification on one or both sides of the equation as having one solution, infinitely many solutions, or no solutions.	● Analyze and justify a claim about the number of solutions to a complex linear equation.
8.AF.1 Solve linear equations and inequalities with rational number coefficients fluently, including those whose solutions require expanding expressions using the distributive property and collecting like terms. Represent real-world problems using linear equations and inequalities in one variable and solve such problems. (E) *(Checkpoint 1)*	Linear Equations and Inequalities	● Determine whether a given number is a solution to a linear equation or inequality.	● Solve linear equations and inequalities in one variable with rational number coefficients, including solutions that require expanding expressions using the distributive property and collecting like terms on one side of the equation or inequality.	● Create and solve linear equations and inequalities in one variable with rational number coefficients, including solutions that require expanding expressions using the distributive property and collecting like terms to solve real-world problems.	● Use complex linear equations and inequalities to solve real-world problems and justify solutions.
Concept continues in AI.L.1 and AI.L.2.					
Standard	**Reporting Category: Subdomain**	**Below**	**Approaching**	**At**	**Above**

Concept directly aligns back to 5.CA.11.					
6.AF.5 Solve real-world and other mathematical problems by graphing points with rational number coordinates on a coordinate plane. Include the use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate. (E) *(Summative Only)*	Solving Problems	• Identify the parts of a coordinate plane and plot given points within the four quadrants or on the x- and y-axes.	• Calculate distance between two points to solve mathematical problems. • Represent the distance between two points on a coordinate plane using an expression, including absolute value symbols when necessary.	• Solve real-world and mathematical problems using order pairs or coordinates plotted on a coordinate plane.	• Solve real-world problems by determining multiple points that are a given distance away from an original point.
7.AF.5 Define slope as vertical change for each unit of horizontal change, and apply that a constant rate of change or constant slope describes a linear function. Identify and describe situations with constant or varying rates of change. *(Checkpoint 2)*	Slope	• Identify the meaning of slope in simple contexts. • Interpret slope as vertical change per unit of horizontal change.	• Calculate the rate of change in simple contexts.	• Identify and describe simple real-world situations that represent constant or varying rates of change. • Determine if different contexts are best represented by a linear model when situations use common, familiar language describing constant versus varying rates of change and justify reasoning. • Produce a valid input-output pair for a given situation based on the rate of change.	• Determine if different contexts are best represented by a linear model when situations use less familiar and less predictable language describing constant versus varying rates of change. • Apply a constant rate of change in the form of slope to a real-world problem to draw mathematical conclusions. • Identify and explain the difference between when a percentage is used in the context of varying or constant rate of change. • Analyze complex real-world situations that represent constant and varying rates of change that may need

					to be inferred from context. ● Analyze the rate of change from a table or graph, including zero change, and explain whether it is constant or varying.
8.AF.3 Understand that a function assigns to each x-value (independent variable) exactly one y-value (dependent variable), and that the graph of a function is the set of ordered pairs (x,y)**.** *(Checkpoint 2)*	Functions	● Identify independent and dependent variables given a table, graph, or set of ordered pairs.	● Define the meaning of a function. ● Select ordered pairs that satisfy a given functional rule. ● Select values from a list that could complete a table without violating the function definition. ● Identify whether a single set or table of ordered pairs could represent a function. ● Demonstrate that the graph of a function represents all ordered pairs (x, y) that satisfy the function rule.	● Apply understanding of functions to determine if the graph of a relation is a function or nonfunction. ● Match a set or table of ordered pairs to a given equation of a function.	● Explain if a given representation of a relation in a real-world situation is a function. ● Critique an explanation determining if a relation in any form is a function. ● Select graphs that represent a function when the points are discrete or require careful interpretation. ● Evaluate which values would make a relation a function and justify the reasoning.
Concept continues in several Algebra I standards.					
Standard	**Reporting Category: Subdomain**	**Below**	**Approaching**	**At**	**Above**
Concept directly aligns back to 5.CA.11.					
6.AF.5 Solve real-world and other mathematical problems by graphing points with rational number coordinates on a coordinate plane. Include the	Solving Problems	● Identify the parts of a coordinate plane and plot given points within the four quadrants or on the x- and y-axes.	● Calculate distance between two points to solve mathematical problems. ● Represent the distance	● Solve real-world and mathematical problems using order pairs or coordinates plotted on a coordinate plane.	● Solve real-world problems by determining multiple points that are a given distance away from an

use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate. (E) *(Summative Only)*			between two points on a coordinate plane using an expression, including absolute value symbols when necessary.		original point.
7.AF.6 Graph a line given its slope and a point on the line. Find the slope of a line given its graph. (E) *(Checkpoint 2)*	Slope	• Determine if the slope of a given graph is positive, negative, 0, or undefined. • Identify the slope of a line from a graph in straightforward situations.	• Identify the slope of a line from its graph when the slope is represented as a fraction. • Identify the correct graph of a line when given its slope in fractional form and a point on the line.	• Determine the slope of a line given its graph when the slope of the line simp- lifies to an integer value. • Calculate the slope of a line given its graph. • Select the correct graph of a line given an integer value for slope and a point on the line. • Graph a line given its slope and a point on the line.	• Explain the process to find the slope of a line. • Find additional points on a line when given the slope and one point. • Calculate the slope of a line from a graph in more complex situations, such as a coordinate plane with fractional increments.
8.AF.4 Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear, has a maximum or minimum value). Sketch a graph that exhibits the qualitative features of a function that has been verbally described. (E) *(Checkpoint 2)*	Functions	• Identify one or more intervals of a given graph as increasing, decreasing, or constant in simple situations. • Interpret increasing, decreasing, or constant behavior of functions when described in simple context. • Determine whether a given graph increases or decreases at a constant or varying rate. • Determine whether a graph or part of a graph is linear or nonlinear. • Identify a maximum or minimum when visually	• Construct a graph with minimal qualitative features based on a given description. • Interpret variations in a linear rate of change in context. • Classify different intervals on a graph as increasing, decreasing, or constant using inequalities. • Represent increasing, decreasing, or constant intervals on a given graph by expressing those intervals as inequalities. • Interpret the total	• Construct the graph of a function that matches a given description of more than one qualitative feature. • Describe multiple qualitative properties of the functional relationship between two quantities when given a graph. • Classify different intervals on a graph as both increasing/decreasing and linear/nonlinear or constant. • Represent increasing or decreasing and linear or	• Classify different intervals on a graph as both increasing/decreasing and linear/nonlinear or constant when given a graph that has both increasing and decreasing intervals as well as linear and nonlinear components. • Represent intervals on a graph, whether increasing, decreasing, linear, nonlinear, or constant, by expressing those intervals using inequalities. • Sketch a graph of a

		clear on a given graph. ● Select the graph that best represents a qualitative description of a simple function.	change in value of a variable within an interval of a graph in context.	nonlinear intervals on a given graph by expressing those intervals using inequalities.	function given many qualitative features or given data in the form of real-world data in context. ● Identify the maximum and minimum of less typical graphs, such as the graph of a line segment.
Standard	**Reporting Category: Subdomain**	**Below**	**Approaching**	**At**	**Above**
Concept directly aligns back to 5.CA.11.					
6.AF.5 Solve real-world and other mathematical problems by graphing points with rational number coordinates on a coordinate plane. Include the use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate. (E) *(Summative Only)*	Solving Problems	● Identify the parts of a coordinate plane and plot given points within the four quadrants or on the x- and y-axes.	● Calculate distance between two points to solve mathematical problems. ● Represent the distance between two points on a coordinate plane using an expression, including absolute value symbols when necessary.	● Solve real-world and mathematical problems using order pairs or coordinates plotted on a coordinate plane.	● Solve real-world problems by determining multiple points that are a given distance away from an original point.
7.RP.3 Represent real-world and other mathematical situations that involve proportional relationships. Write equations and draw graphs to represent these proportional relationships. Apply the definition of unit rate to y = mx. (E) *(Checkpoint 2)*	Proportional Relationships	● Identify an equation of the form y = kx that represents a proportional relationship when given a verbal description, table, or graph in which the constant of proportionality is given or simple to infer. ● Identify a situation that	● Determine whether two quantities are in a proportional relationship. ● Interpret the meaning of "k" in a proportional relationship represented by the equation y = kx as the constant of proportionality which can be found by	● Construct equations from tables, graphs, or verbal descriptions. ● Develop an equation to represent a real-world or mathematical proportional relationship given a table, graph, or verbal description in which the constant of proportionality must be	● Develop two equations that represent a proportional relationship. ● Interpret and analyze equations of proportional relationships to make predictions, evaluate statements, or draw conclusions in context.

		can be modeled by a given equation in the form y = kx.	calculating the unit rate in the relationship. ● Determine the constant of proportionality from a table, graph, or verbal description and use it to identify an equation in the form y = kx. ● Draw graphs of proportional relationships given a table that includes the ordered pair that correlates to the constant of proportionality.	calculated from non-consecutive and/or complex pairs of values, including cases with decimal rates or scaled values. ● Draw graphs to represent proportional relationships, given an equation, table, or verbal description where the constant of proportionality must be calculated.	
8.AF.5 Interpret the equation y = mx + b as defining a linear function whose graph is a straight line; give examples of functions that are not linear. Describe similarities and differences between linear and nonlinear functions from tables, graphs, verbal descriptions, and equations. *(Checkpoint 2)*	Linear Functions	● Determine the slope and y-intercept from a linear equation given in slope-intercept form. ● Identify which graph represents a linear function (straight vs. not straight). ● Identify an equation that represents a linear function when given simple equations in familiar formats.	● Classify given function equations as linear or non-linear. ● Classify a given table of values as representing a linear function or a non-linear function. ● Identify which table of values represents a linear function. ● Identify an accurate justification explaining why a given function is linear or nonlinear when the explanation uses straightforward, less complex language.	● Compare functions in different representations to determine whether each is linear or nonlinear when features are easily observable. ● Generate or identify multiple linear functions in the same representation (tables, equations, or graphs). ● Generate or identify multiple nonlinear functions in the same representation (tables, equations, or graphs). ● Compare similarities and differences between linear and nonlinear functions using properties such as rate of change, shape of the graph,	● Interpret and explain characteristics of linear functions as they apply to real-world situations. ● Describe connections between different representations of the same linear relationship. ● Compare functions in different representations to determine whether each is linear or nonlinear when representations require deeper analysis. ● Generate or identify (when explanation uses more advanced or formal mathematical language) a justification explaining why a given function is linear or nonlinear.

				and/or equation structure.	
8.AF.6 Construct a function to model a linear relationship between two quantities given a verbal description, table of values, or graph. Within the context of a problem, describe the meaning of m (rate of change) and b (y-intercept) in y = mx + b. (E) *(Checkpoint 2)*	Linear Functions	• Determine the rate of change (*m*) or y-intercept (*b*) of a linear function represented by a table, graph, or verbal description when the values of *m* and *b* are provided. • Match an equation to a given verbal description describing the relationship between two quantities in a linear relationship. • Select statements that accurately interpret the starting value and/or rate of change given a table of values. • Select a statement that accurately interprets the meaning of the rate of change when given a linear equation in context.	• Create or identify an equation of a linear function represented by a table or verbal description when the rate of change and initial value are given or only one must be computed. • Calculate the rate of change (*m*) or y-intercept (*b*) of a linear function in context represented by a table, graph, or verbal description. • Match an equation of a linear function to its graphical representation. • Select a table of values that corresponds to a given linear equation. • Select a statement accurately interpreting the meaning of the rate of change and starting value/y-intercept given a linear equation in context.	• Construct a linear equation in the form y = mx + b when given a verbal description, table, or graph where both *m* and *b* must be calculated or inferred from contextual information. • Select a linear equation that corresponds to a given table of values. • Describe the rate of change or y-intercept of a linear function in terms of the situation it models. • Graph a linear equation presented in slope-intercept form. • Create an equation of a linear function represented by a graph.	• Interpret how the values of the two quantities change together within a given linear function in context. • Interpret the rate of change and initial value of a linear function in terms of the situation it models, its graph, or its table of values. • Construct a linear function in slope-intercept form from more complex representations.
8.AF.7 Compare properties of two linear functions given in different forms, such as a table of values, equation, verbal description, and graph (e.g., compare a distance-time graph	Linear Functions	• Compare a single property of two linear functions in different representations when no calculation is required.	• Compare initial values, rates of change, and/or output for a given input of two linear functions given in different forms when all values are whole numbers.	• Compare initial values and rates of change of two linear functions given in different forms when rational numbers are included. • Find the difference in output for the same	• Create a different representation of a linear function that has a greater or lesser slope and y-intercept. • Compare slopes, y-intercepts, and outputs of two linear

to a distance-time equation to determine which of two moving objects has greater speed). *(Checkpoint 2)*				input for two linear functions given in different forms.	functions when one is represented as an equation not in slope-intercept form. ● Compare the input values of two linear functions, given in different forms, that produce the same output.
Concept continues in several Algebra I standards.					
Standard	**Reporting Category: Subdomain**	**Below**	**Approaching**	**At**	**Above**
This concept begins in grade eight.					
8.AF.8 Approximate the solution of a system of equations by graphing and interpreting the reasonableness of the approximation. (E) *(Checkpoint 2)*	Linear Functions	● Identify the solution to a system of equations from a graph, including exact and approximate solutions. ● Determine the number of solutions a system has when given a system of equations represented graphically. ● Determine the solution of a system from a graph when the intersection point is explicitly marked at integer coordinate values. ● Select a statement to justify that a given solution matches a graphed system of equations.	● State the y-value/ y-coordinate or x-value/ x-coordinate of the solution to a system represented graphically. ● State the solution to a system represented graphically when the lines intersect on the x- or y-axis. ● Identify a graph that represents a given system of equations when both equations are provided algebraically in slope-intercept form. ● Determine the solution to a system (with or without context) when the given graph stops short of the intersection	● Represent a system in context graphically when provided the equations in slope-intercept form and interpret the solution in context. ● Graph a system of equations provided in slope-intercept form and determine (or approximate) the solution.	● Determine the number of solutions to a system when given different representations (graph and equation) for each equation in the system or when structural manipulation is needed for comparison. ● Compare or critique solutions to systems represented in mixed forms.

		• Match an ordered pair to the graph of a system when the ordered pair represents the point of intersection. • Select a statement that accurately interprets a solution to a system of equations in context when the solution is provided.	point.		
Concept continues in AI.SEI.2.					

Geometry and Measurement					
Standard	**Reporting Category: Subdomain**	**Below**	**Approaching**	**At**	**Above**
Concept directly aligns back to 5.M.1.					
6.GM.1 Convert between measurement systems (Customary to metric and metric to Customary) given the conversion factors, and use these conversions in solving real-world problems. *(Checkpoint 3)*	Working with Rates and Ratios	• Identify an expression that can be used to find an equivalent measure in a different measurement system.	• Convert between different measurement systems in a mathematical context.	• Solve real-world problems involving converting units between measurement systems.	• Solve complex real world problems involving unit conversions between measurement systems.
7.GM.1 Solve real-world and other mathematical problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing. Create a scale drawing by using proportional reasoning. *(Checkpoint 2)*	Proportional Relationships	• Identify the scale factor of a smaller figure to a larger figure when given scale drawings of geometric figures.	• Solve problems using a scale drawing of a geometric figure given the scale factor.	• Solve problems involving scale drawings of geometric figures, such as computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different	• Solve problems that involve applying multiple scale factors and justify scale drawings using proportional reasoning.

				scale. ● Justify scale drawings using proportional reasoning.	
Concept ends in grade seven.					
Standard	**Reporting Category: Subdomain**	**Below**	**Approaching**	**At**	**Above**
Concept directly aligns back to 5.G.1.					
6.GM.2 Apply the sums of interior angles of triangles and quadrilaterals to solve real-world and mathematical problems. *(Summative Only)*		● Identify that the sum of interior angle measures in a triangle is 180 degrees and the sum of interior angle measures in a quadrilateral is 360 degrees.	● Calculate the missing angle measure in a triangle or quadrilateral when all other angle measures are given in a graphic.	● Solve real-world and mathematical problems involving the sum of interior angle measures in triangles and quadrilaterals.	● Solve real-world and mathematical problems involving the sum of interior angle measures in compound figures that are composed of triangles and quadrilaterals.
Concept ends in grade six.					
Standard	**Reporting Category: Subdomain**	**Below**	**Approaching**	**At**	**Above**
Concept directly aligns back to 5.M.2 and 5.M.3.					
6.GM.3 Find the area of complex shapes composed of polygons by composing or decomposing into simple shapes; apply this technique to solve real-world and other mathematical problems. *(Summative Only)*	Solving Problems	● Calculate the area of a complex shape composed of two simple polygons. ● Calculate the area of one polygon within a complex shape composed of two simple polygons.	● Calculate the area of a complex shape composed of three or more simple polygons. ● Calculate the area of one polygon within a complex shape composed of three or more simple polygons.	● Solve real-world problems by calculating the area of complex shapes composed of polygons by decomposing them into simple shapes.	● Solve real-world problems by constructing complex shapes composed of simple polygons when given the area of the whole shape. ● Decompose a complex figure composed of multiple polygons in order to calculate an

					unknown dimension using the total area of the figure.
7.GM.2 Understand the formulas for area and circumference of a circle and use them to solve real-world and other mathematical problems; give an informal derivation of the relationship between circumference and area of a circle. *(Checkpoint 3)*	Geometry	• Distinguish between radius, diameter, circumference, and area. • Calculate the radius or diameter when given a circumference. • Represent and interpret solutions in terms of pi. • Interpret the formulas for area and circumference of a circle.	• Calculate the measurement of the radius or diameter of a circle given the area. • Calculate the area of a circle given the measurement of the circle's radius or diameter. • Calculate the circumference in terms of pi given the radius or diameter. • Solve simple real-world and mathematical problems involving radius, diameter, area, and circumference of circles.	• Apply area and circumference formula to solve real-world problems. • Calculate the area of a circle when given its circumference. • Calculate the circumference of a circle when given its area, radius, or diameter. • Calculate and compare the circumference or area of two circles. • Apply vocabulary precisely to interpret diagrams. • Apply formulas flexibly using numbers with decimals and pi.	• Apply area and circumference relationships to solve complex real-world problems. • Evaluate the impact that changing a circle's circumference or area has on the other measure. • Calculate a circle's circumference when given its area in context.
Concept ends in grade seven.					
Standard	**Reporting Category: Subdomain**	**Below**	**Approaching**	**At**	**Above**
Concept directly aligns back to 5.M.4 and 5.M.5.					
6.GM.4 Find the volume of a right rectangular prism with fractional edge lengths using unit cubes of the appropriate unit fraction edge lengths (e.g., using technology or concrete materials) and show that the	Solving Problems	• Calculate the volume of a rectangular prism that has one fractional edge length and two whole-number edge lengths.	• Calculate the volume of a rectangular prism packed with unit cubes with fractional edge lengths.	• Calculate the volume of rectangular prisms with more than one fractional edge lengths to solve real-world and mathematical problems.	• Calculate the missing edge length of a rectangular prism given two edge lengths with fractional values and volume. • Calculate the edge

volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas V = lwh and V = Bh to find volumes of right rectangular prisms with fractional edge lengths to solve real-world and other mathematical problems. (E) *(Summative Only)*					lengths (and volume) of a rectangular prism given the number of unit cubes packed in the prism and their fractional edge length.
7.GM.3 Solve real-world and other mathematical problems involving volume of cylinders and three-dimensional objects composed of right rectangular prisms. (E) *(Checkpoint 3)*	Geometry	Calculate the volume of cylinders and three-dimensional objects composed of right rectangular prisms in a mathematical problem.	Calculate the height or radius of a cylinder when given the volume of the cylinder and one other measurement; OR calculate a missing side length of a three-dimensional object composed of right rectangular prisms.	Solve real-world and other mathematical problems involving finding the volume of cylinders and three-dimensional objects composed of right rectangular prisms.	Solve real-world and other mathematical problems involving calculating the height or or radius of a cylinder or calculating a missing side length of a three-dimensional object composed of right rectangular prisms.
8.GM.2 Solve real-world and other mathematical problems involving volume of cones, spheres, and pyramids and surface area of spheres. (E) *(Checkpoint 3)*	Geometry	• tIdentify he volume of a cylinder when given a clearly labeled diagram with radius and height provided. • Determine the volume of a composite figure made of identical rectangular prisms when all necessary dimensions are labeled on a diagram.	• Identify the volume of a cylinder when given its radius or diameter without a diagram. • Calculate the volume of a cylinder when given a diagram with radius and height labeled and when answers require rounding. • Determine possible missing values for the radius, diameter, or height of a cylinder when given the volume and one dimension labeled on a diagram. • Compute the volume of a composite figure	• Solve real-world problems involving the volume of cylinders or composite rectangular prisms without a provided diagram. • Determine the volume of composite figures when some dimensions must be inferred from the diagram or description. • Compare volumes in real-world contexts. • Calculate the volume of cylinders using decimal radii and heights when answers require rounding and no	• Solve for radius, diameter, or height of a cylinder when given the volume with no diagram provided. • Solve complex real-world problems involving comparisons or differences in volume across multiple cylinders or prisms. • Determine missing side lengths of composite rectangular prisms when only volume and partial side lengths are given. • Compute volume in problems involving

			when all dimensions needed for calculation are labeled and identifying the individual prisms within the composite is clear. ● Compare volumes of cylinders and rectangular prisms when provided diagrams with all dimensions labeled.	diagram is provided.	relationships between multiple solids.
Concept continues in G.TS.4.					
Standard	**Reporting Category: Subdomain**	**Below**	**Approaching**	**At**	**Above**
Concept begins in grade eight.					
8.GM.1 Explore dilations, translations, rotations, and reflections on two-dimensional figures in the coordinate plane. (E) *(Checkpoint 3)*	Geometry	● Identify the type of transformation used to create a similar figure on a given coordinate plane.	● Identify the coordinates of a point or the specific transformation of an image after a transformation is performed.	● Perform a single transformation (dilation, translation, rotation, or reflection) on a coordinate plane using given information and determine the coordinates of the new figure.	● Perform a transformation using a combination of two or more dilations, translations, rotations, and reflections on a coordinate plane. ● Analyze the new figure to determine the effects of the transformation on the attributes of the figure.
Concept continues in G.TS.1 and G.TS.2					
Standard	**Reporting Category: Subdomain**	**Below**	**Approaching**	**At**	**Above**
Concept begins in grade eight.					

8.GM.3 Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and other mathematical problems in two dimensions. (E) *(Checkpoint 3)*	Geometry	• Identify or write the Pythagorean Theorem for a given triangle.	• Apply the Pythagorean Theorem to find the hypotenuse of a right triangle in real-world or other mathematical problems in two dimensions.	• Apply the Pythagorean Theorem to determine unknown side lengths of right triangles to solve real-world problems.	• Apply the Pythagorean Theorem to solve real-world and mathematical problems involving two- and three-dimensional shapes composed of at least one right triangle.
Concept continues in G.T.5 and G.T.7.					

Data Analysis, Statistics, and Probability					
Standard	**Reporting Category: Subdomain**	**Below**	**Approaching**	**At**	**Above**
Concept directly aligns back to 5.DA.1.					
6.DS.1 Select, create, and interpret graphical representations of numerical data, including line plots, histograms, and box plots. *(Checkpoint 2)*	Expressions and Data Analysis	• Select an appropriate display (histogram, line plot, or box plot) for numerical data. • Identify a line plot that correctly represents a given data set.	• Create a line plot, histogram, or box plot to represent given data. • Identify a box plot that correctly represents given measures of center and or spread.	• Identify a box plot that correctly represents a given data set. • Interpret a histogram or box plot, including those displaying data in fractions and decimals, to make claims. • Solve a real-world problem by interpreting data from a given histogram, box plot, or line plot.	• Create a claim or a generalization using data represented in histograms, line plots, and box plots and use the data to support the claim or generalization.
7.DSP.3 Make observations about the degree of visual overlap of two numerical data distributions represented in line plots or box plots. Describe how data, particularly outliers, added to a data set may affect	Solving Problems	• Classify the visual overlap of two data sets as full, partial, or no overlap. • Identify sets of data that have the most overlap.	• Analyze and make observations about the degree of visual overlap of two data sets represented as box plots using measures of center (mean and	• Analyze and make observations about the degree of visual overlap of two data sets represented as line plots using measures of center (mean and	• Make, justify, and critique comparative inferences about two populations based on the overlap of two numerical data distributions

the mean and/or median. *(Summative Only)*			median) and spread (range, interquartile range, and mean absolute deviation).	median) and spread (range, interquartile range, and mean absolute deviation). ● Describe how additional data points, including outliers, may affect the mean and/or median of a data set.	represented in line plots or box plots.
Concept ends in grade seven.					
Standard	**Reporting Category: Subdomain**	**Below**	**Approaching**	**At**	**Above**
Concept directly aligns back to 5.DA.1.					
6.DS.2 Formulate statistical questions, collect and organize the data (e.g., using technology), and display and interpret the data with graphical representations (e.g., using technology). (E) *(Summative Only)*	Expressions and Data Analysis	● Define characteristics of a statistical question. ● Distinguish between statistical and non-statistical questions. ● Write statistical questions based on given information.	● Identify appropriate methods for data collection. ● Collect and organize data into tables or frequency charts.	● Determine the best graphical representation for a given data set. ● Analyze graphical representations of data to find trends or patterns in data sets.	● Analyze graphical representations of data to answer statistical questions, draw conclusions, and provide reasoning for solutions.
7.DSP.1 Understand that statistics can be used to gain information about a population by examining a sample of the population. Understand that conclusions and generalizations about a population from a sample are valid only if the sample is representative of that population and that random sampling tends to produce representative samples and support valid inferences. (E)	Solving Problems	● Identify which given sample is most representative of a population in a given simple context. ● Identify an appropriate method for collecting a random sample when the situation is straightforward and the answer choices include obviously biased or inappropriate sampling	● Distinguish between random and non-random sampling methods. ● Determine whether a sampling method is likely to be representative by identifying features that would make the sample unrepresentative of the population.	● Evaluate whether a conclusion or generalization about a population is valid based on the sampling method used. ● Select the best methods to collect random sample data when the situation is complex, including: ○ Distinguishing between selecting a	● Justify whether a conclusion or generalization is valid or invalid based on the sampling method. ● Design a sampling method that is likely to produce a representative sample for a given statistical question. ● Interpret sampling scenarios and

(Summative Only)		methods. ● Identify simple situations in which samples can be used to gain information about a population.		sample and surveying the entire population; ○ Clearly identifying the sampling population; ○ Choosing a valid sampling method. ● Explain why valid conclusions depend on representative samples and appropriate sampling methods.	population inferences in more complex contexts.
Concept ends in grade seven.					
Standard	**Reporting Category: Subdomain**	**Below**	**Approaching**	**At**	**Above**
Concept directly aligns back to 5.DA.2.					
6.DS.3 Summarize numerical data sets in relation to their context in multiple ways, such as: a. Report the number of observations; b. Describe the nature of the attribute under investigation, including how it was measured and its units of measurement; c. Determine quantitative measures of center (mean and/or median) and spread (range and interquartile range); d. Describe any overall pattern and any striking deviations from the	Expressions and Data Analysis	● Determine the mean, median, and range of a set of data when given a simple, ordered data set. ● Determine the best measure of center (mean or median) for a given data set.	● Determine the total number of observations or data points on a line graph or histogram. ● Determine the values between each interval of a histogram. ● Describe the nature of the attribution under investigation, including how it was measured and its units of measurement. ● Determine the best measure of spread (range or interquartile range) for a given data set.	● Determine the mean, median, and range of a set of data when given a complex, unordered data set. ● Analyze a given data set to describe distribution patterns (including clusters, peaks, gaps, and outliers). ● Describe how measures of central tendency are affected by outliers, including in real-world situations. ● Draw conclusions and make predictions based on given data	● Explain how an additional data point will impact a measure of center or measure of spread. ● Create or complete data sets for given attributes and information about spread of data and/or measure of center.

overall pattern with reference to the context in which the data were gathered; and e. Relate the choice of measures of center and spread to the shape of the data distribution and the context in which the data were gathered. (E) *(Checkpoint 2)*				sets.	
7.DSP.2 Find, use, and interpret measures of central tendency (mean and median) and measures of spread (range, interquartile range, and mean absolute deviation) for numerical data from random samples to draw comparative inferences about two populations. (E) *(Summative Only)*	Solving Problems	● Determine an accurate comparative inference about two populations based on given measures of mean, median, and/or range.	● Determine an accurate comparative inference about two populations based on given interquartile range and/or mean absolute deviation. ● Calculate the mean absolute deviation for two random samples of numerical data to make comparisons.	● Compute and interpret mean, median, range, interquartile range, and/or mean absolute deviation to draw informal comparative inferences between two populations when data for each population is presented in a table, box plot, or line plot.	● Make, justify, and critique comparative inferences about two populations based on the comparison and interpretation of measures of central tendency (mean and median) and measures of spread (range, interquartile range, and mean absolute deviation). ● Evaluate comparison claims for accuracy and sufficiency of evidence. ● Reconcile conflicting measures (e.g., higher mean but same median).
Concept ends in grade seven.					
Standard	**Reporting Category: Subdomain**	**Below**	**Approaching**	**At**	**Above**
Concept begins in grade seven.					

7.DSP.4 Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Understand that 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. Understand that a probability of 1 indicates an event certain to occur and a probability of 0 indicates an event impossible to occur. Identify probabilities of events as impossible, unlikely, equally likely, likely, or certain. (E) *(Summative Only)*	Solving Problems	• Classify the likelihood of one event occurring as either impossible, unlikely, equally likely, likely, or certain based on a given probability of 0, 1/2, or 1. • Classify probabilities of events represented as fractions as impossible, unlikely, equally likely, likely, or certain. • Determine likelihood in simple attribute-selection situations. • Identify accurate comparisons of likelihood in simple attribute-selection situations.	• Classify probabilities of multiple events represented as fractions in a given situation as having a likelihood of impossible, unlikely, equally likely, likely, or certain.	• Generate probabilities of events classified as impossible, equally likely, or certain. • Explain how probability values correspond to likelihood categories. • Reason flexibly and fluently with probability values between 0 and 1 expressed in different ways. • State the likelihood of situations where probabilities are not given directly but must be computed from counts. • Interpret real-world events using probability language.	• Determine more than one possible probability of events classified as impossible, unlikely, equally likely, likely, or certain. • Compare the likelihood of events given the probabilities of the events. • Justify or critique probabilistic claims.
8.DSP.4 Define the probability of a compound event, just as with simple events, as the fraction of outcomes in the sample space for which the compound event occurs. Use appropriate terminology to describe independent, dependent, complementary, and mutually exclusive events. (E) *(Summative Only)*	Solving Problems	• Distinguish between simple and compound events. • Define the probability of compound events as a fraction of outcomes in the sample space for which the compound event occurs.	• Determine which given multiplication expressions represent compound event probabilities for independent or dependent events using provided sample spaces or count tables when dependency is explicit. • Identify zero probability cases.	• Calculate the probability of a compound event given a description or table of the sample space. • Develop multiplication expressions representing compound event probabilities for independent or dependent events using provided sample spaces or count tables when dependency is explicit. • Explain how to calculate the probability of compound dependent events.	• Infer whether an event is independent, dependent, complementary, or mutually exclusive based on the context of the situation. • Analyze an error made when calculating the probability of a compound event when given a verbal description. • Compare the probability of two or more events when given a verbal description.

				• Determine whether an event is independent, dependent, complementary, or mutually exclusive in straightforward situations. • Apply given fractional probabilities of each simple event to find the probability of a compound, dependent event.	
Concept continues in AII.MDS.3.					
Standard	**Reporting Category: Subdomain**	**Below**	**Approaching**	**At**	**Above**
Concept begins in grade seven.					
7.DSP.5 Develop probability models that include the sample space and probabilities of outcomes to represent simple events with equally likely outcomes. Predict the approximate relative frequency of the event based on the model. Compare probabilities from the model to observed frequencies, evaluate the level of agreement, and explain possible sources of discrepancy. (E) *(Summative Only)*	Solving Problems	• Represent the probability of an event in a sample space where n events are equally likely as 1/n. • Create a sample space for a simple experiment. • Represent simple probabilities as the ratio of the number of desired outcomes to the number of total outcomes in the sample space from given probability tables or simple sample spaces.	• Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. • Represent the probability of an event as the ratio of the number of desired outcomes to the number of total outcomes in the sample space, given a description of the sample space. • Create a probability model when given the	• Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency. • Develop a probability model by observing frequencies in data generated from a chance process. • Compare probabilities from a model to observed frequencies and identify possible sources of discrepancy.	• Compare model-based probabilities to observed frequencies, evaluate the agreement between them, and explain reasonable causes for discrepancies.

			sample space or a description of the sample space and use the model to predict the approximate relative frequency of an event.		
8.DSP.3 Represent sample spaces and find probabilities of compound events (independent and dependent) using organized lists, tables, and tree diagrams. (E) *(Summative Only)*		• Identify an outcome missing from a sample space of a given compound event.	• Determine which given outcomes are possible for a given compound event. • Apply given fractional probabilities of each simple event to find the probability of a compound, independent event.	• Generate or select an organized list that accurately represents the sample space for a given compound event. • Determine the probability of a compound, independent event using simple-event probabilities derived from a visual diagram or description.	• Determine the probability of a compound, dependent event using simple-event probabilities derived from a visual diagram or description. • Generate or identify the probability of a compound event when the simple-event probabilities are provided in decimal format.
8.DSP.5 For events with a large number of outcomes, understand the use of the multiplication counting principle. Develop the multiplication counting principle and apply it to situations with a large number of outcomes. *(Summative Only)*		• Identify the number of choices in each part of a multi-stage situation where the multiplication counting principle could be applied. • Explain how combining multiple stages results in an increased number of total outcomes, using supported representations (lists, tables, or tree diagrams).	• Generate or identify expressions that apply the multiplication counting principle to small-scale situations. • Select the number of outcomes in small-scale situations when counts are provided.	• Generate the number of outcomes for both small-scale situations and situations with a large number of outcomes. • Identify expressions that apply the multiplication counting principle to situations with a large number of outcomes or those constraints on order or repetition.	• Solve problems that include constraints on order or repetition by applying the multiplication counting principle. • Represent total outcomes using algebraic expressions involving variables.
Concept continues.in AII.MQ.1.					
Standard	**Reporting**	**Below**	**Approaching**	**At**	**Above**

	Category: Subdomain				
Concept begins in grade eight.					
8.DSP.1 Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantitative variables. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association. (*Checkpoint 3)*	Functions	• Identify one or two patterns of association in a given scatterplot when patterns are visually distinct. • Identify a scatterplot that represents specific given patterns of association. • Determine the presence, location, and frequency of clusters or outliers in a scatterplot. • Construct scatterplots from data when provided grids with labeled axes, matching scales, and clear intervals.	• Select two patterns of association in a given scatterplot when patterns require more discernment to ascertain. • Match scatterplots with combinations of characteristics across more than one graph. • Construct scatterplots from data when provided grids with labeled axes.	• Analyze a given scatterplot with patterns that require interpretation to determine three patterns of association. • Construct a scatterplot for bivariate data by choosing appropriate axis labels and numerical scales based on the variables provided and then plotting the corresponding ordered pairs. • Interpret patterns in a scatterplot by describing multiple features of association using correct terminology.	• Analyze patterns of association between two quantities and use data to critique responses. • Create a scatterplot to represent given descriptors.
Concepts continue in AI.DS.3 and AI.DS.4.					
Standard	**Reporting Category: Subdomain**	**Below**	**Approaching**	**At**	**Above**
Concept begins in grade eight.					
8.DSP.2 Write and use equations that model linear relationships to make predictions, including interpolation and extrapolation,	Functions	• Informally fit a straight line and identify the slope and y-intercept for a given scatterplot with a suggested linear	• Find an expected value for a given input when provided a scatterplot and corresponding linear equation	• Describe the slope of a line of best fit when given a linear equation modeling a real world situation involving	• Adjust *m* and/or *b* in an equation modeling a linear relationship involving bivariate measurement data to

in real-world situations involving bivariate measurement data. Interpret the slope and y-intercept in context. (E) *(Checkpoint 3)*		association.	modeling a real-world situation involving bivariate measurement data. ● Find the output for a given input when provided a linear equation of the form $y = mx + b$, where both *m* and *b* are positive, modeling a real-world situation involving bivariate measurement data. ● Find the input for a given output when provided a linear equation where both *m* and *b* are positive, modeling a real-world situation involving bivariate measurement data. ● Explain the meaning of the y-intercept for a line of best fit on a given scatterplot.	bivariate measurement data. ● Find the output for a given input when provided a linear equation of the form $y = mx + b$ modeling a real world situation.	reflect context shifts and explain changes. ● Justify the reasonableness of the predictions in the context of the bivariate measurement data.
Concepts continue in AI.DS.3 and AI.DS.4.					