For the Wyoming Department of Education

Comparison of the Wyoming Mathematics Standards to the Common Core Standards, High School

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Mathematics Gap Analysis *The Wyoming Standards Compared to the Common Core Standards*		
Wyoming Content Standards	**Alignment Rating with Comment**	**Common Core State Standards**
11.1. NUMBER OPERATIONS AND CONCEPTS: Students use numbers, number sense, and number relationships in a problem-solving situation.		
MA11.1.1 Students represent and apply real numbers in a variety of forms.	Partial alignment (specificity): CC specifies the types and applications of real numbers.	HS.N.RN.3. Understand that sums and products of rational numbers are rational. HS.N.RN.4. Understand that the sum of a rational number and an irrational number is irrational, and that the product of a nonzero rational number and an irrational number is irrational. HS.N.RN.5. Rewrite expressions using the laws of exponents. For example, $(5^{1/2})^3 = 5^{3/2}$ and $1/5 = 5^{-1}$ HS.N.RN.2. Understand that the definition of the meaning of zero, positive rational, and negative exponents follows from extending the laws of exponents to those values, allowing for a notation for radicals in terms of rational exponents. For example, since $(5^{1/3})^3 = 5^{(1/3)\cdot 3} = 5^1 = 5$, $5^{1/3}$ is a cube root of 5. HS.N.RN.1. Understand that the laws of exponents for positive integer exponents follow from an understanding of exponents as indicating repeated multiplication, and from the associative law for multiplication.

MA11.1.2 Students apply the structure and properties of the real number system.	Partial alignment (specificity): CC specifies the properties and applications of the real number system .	HS.N.RN.1. Understand that the laws of exponents for positive integer exponents follow from an understanding of exponents as indicating repeated multiplication, and from the associative law for multiplication.
	Partial alignment (specificity): CC specifies properties and applications of the real number system.	HS.N.RN.2. Understand that the definition of the meaning of zero, positive rational, and negative exponents follows from extending the laws of exponents to those values, allowing for a notation for radicals in terms of rational exponents. For example, since $(5^{1/3})^3 = 5^{(1/3)\cdot 3} = 5^1 = 5$, $5^{1/3}$ is a cube root of 5.
	Partial alignment (specificity): CC specifies the properties and applications of the real number system.	HS.N.RN.3. Understand that sums and products of rational numbers are rational.
	Partial alignment (specificity): CC specifies the properties and applications of the real number system.	HS.N.RN.4. Understand that the sum of a rational number and an irrational number is irrational, and that the product of a nonzero rational number and an irrational number is irrational.
	Partial alignment (specificity): CC specifies the properties and applications of the real number system.	HS.N.RN.5. Rewrite expressions using the laws of exponents. For example, $(5^{1/2})^3 = 5^{3/2}$ and $1/5 = 5^{-1}$
	Weak alignment: CC content is found in 8th grade, and is more specific than WY.	8.NS.1. Understand informally that every number on a number line has a decimal expansion, which can be found for rational numbers using long division. Rational numbers are those with repeating decimal expansions (this includes finite decimals which have an expansion that ends in a sequence of zeros).
	Weak alignment: CC content is found in 8th grade, and is more specific than WY.	8.NS.2. Informally explain why the square root of 2 is irrational.

	Weak alignment: CC content is found in 8th grade, and is more specific than WY.	8.NS.3. Use rational approximations (including those obtained from truncating decimal expansions) to compare the size of irrational numbers, locate them approximately on a number line, and estimate the value of expressions (e.g., π squared). For example, show that the square root of 2 is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.
MA11.1.3 Students explain their choice of estimation and problem solving strategies and justify results of solutions in problem-solving situations involving real numbers.	Partial alignment (specificity): CC specifies analyzing decisions and strategies using probabilities. Partial alignment (specificity): CC specifies evaluating investment strategies.	HS.S.MD.7. Analyze decisions and strategies using probability concepts (e.g. product testing, medical testing, pulling a hockey goalie at the end of a game). HS.S.MD.6. Evaluate and compare two investments or strategies, where one investment or strategy is safer but has lower expected value. Include large and small investments, and situations with serious consequences.
MA11.1.4 Students use proportional reasoning to solve problems.	Partial alignment (specificity): CC specifies using proportional reasoning to determine the arc lengths and areas of sectors of circles. Weak alignment: CC content is in 7th grade and is more specific. CC specifies using proportional reasoning to plot relationships on a coordinate plane. Weak alignment: CC content is in 7th grade and is more specific. CC specifies using proportional reasoning when analyzing graphs, tables, formulas, and diagrams.	HS.G.C.5. Determine the arc lengths and the areas of sectors of circles, using proportions. 7.RP.4. Plot proportional relationships on a coordinate plane where each axis represents one of the two quantities involved, observe that the graph is a straight line through the origin, and find unit rates from a graph. Explain what a point (x, y) means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate. 7.RP.5. Compare tables, graphs, formulas, diagrams, and verbal descriptions that represent or partially represent proportional relationships; explain correspondences among the representations including how the unit rate

		is shown in each
	Weak alignment: CC content is in 8th grade and is more specific. CC specifies understanding proportional relationships between two variable quantities.	8.EE.6. Understand that a proportional relationship between two variable quantities y and x can be represented by the equation y = mx. The constant m is the unit rate, and tells how much of y per unit of x.
	Weak alignment: CC content is in 8th grade and is more specific. CC specifies graphing proportional relationships defined by linear equations.	8.EE.7. Graph proportional relationships and relationships defined by a linear equation; find the slope and interpret the slope in context.
	Weak alignment: CC content is in 8th grade and is more specific. CC specifies comparing two different proportional relationships.	8. Compare two different proportional relationships represented in different ways. *For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.*
	Weak alignment: CC content is in 7th grade and is more specific. CC specifies that proportional reasoning should be used to solve problems that involve frequency of outcomes for situations involving randomness.	7.SP.2. Use proportional reasoning to predict relative frequencies of outcomes for situations involving randomness, but for which a theoretical answer can be determined. For example, when rolling a number cube 600 times, one would predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times. How far off might your prediction be? Use technology to generate multiple samples to approximate a distribution of sample proportions. Repeat the process for smaller sample sizes.

2. <u>GEOMETRY</u>: Students apply geometric concepts, properties, and relationships in a problem-solving situation.		
MA11.2.1 Students use transformations, congruency, symmetry, similarity, perpendicularity, parallelism, and the Pythagorean Theorem to solve problems	Partial alignment (specificity): CC specifies predicting the effect of types of transformations.	HS.G.CO.13. Use two-dimensional representations to transform figures and to predict the effect of dilations.
	Partial alignment (implicit): CC content is similar with some differences in emphasis. The WY content emphasizes the skill while the CC standard emphasizes the concept.	HS.G.SRT.1. Understand that dilating a line produces a line parallel to the original. (In particular, lines passing through the center of the dilation remain unchanged.)
	Weak alignment: Content is similar, but there is a significant difference in the emphasis. Both CC and WY include the concept of transformations, but CC emphasizes definitions of dilation and scale factor, while WY emphasizes using transformations to solve problems.	HS.G.SRT.2. Understand that the dilation of a given segment is parallel to the given segment and longer or shorter in the ratio given by the scale factor. A dilation leaves a segment unchanged if and only if the scale factor is 1.
	Weak alignment: WY content includes multiple concepts beyond parallelism that are not found in the CC benchmark, and while WY addresses the use of parallelism, the CC content specifies which aspects of parallelism students are expected to understand.	HS.G.SRT.5. Understand that a line parallel to one side of a triangle divides the other two proportionally, and conversely.
	Partial alignment (scope): CC content includes using trigonometric functions.	HS.G.SRT.8. Use sine, cosine, tangent, and the Pythagorean Theorem to solve right triangles in applied problems.
	Partial alignment (specificity): CC specifies using similarity to predict the effect of dilating a circle.	HS.G.C.1. Understand that dilations can be used to show that all circles are similar.

	Weak alignment: Content is similar, but there is a significant difference in the emphasis. Both WY and CC include the concept of similarity, but CC emphasizes an understanding of the reasoning behind theorems, while WY emphasizes using similarity to solve problems.	HS.G.SRT.3. Understand that the assumed properties of dilations can be used to establish the AA, SAS, and SSS criteria for similarity of triangles.
	Partial alignment (scope): WY content includes transformations, congruency, symmetry, perpendicularity, and parallelism, and CC includes proofs.	HS.G.SRT.6. Use triangle similarity criteria to solve problems and to prove relationships in geometric figures. Include a proof of the Pythagorean theorem using triangle similarity.
	Partial alignment (specificity): The CC specifies properties of perpendicularity.	HS.G.GPE.1. Understand that two lines with well-defined slopes are perpendicular if and only if the product of their slopes is equal to –1.
	Partial alignment (specificity): The CC specifies relating the Pythagorean Theorem to the equation of a circle.	HS.G.GPE.2. Understand that the equation of a circle can be found using its definition and the Pythagorean Theorem.
	Partial alignment (implicit): CC content is similar with some differences in emphasis. The WY content emphasizes the skill while the CC standard emphasizes the concept.	HS.G.CO.1. Understand that two geometric figures are congruent if there is a sequence of rigid motions (rotations, reflections, translations) that carries one onto the other. This is the principle of superposition.
	Partial alignment (implicit): The WY content emphasizes the skill, while the CC content emphasizes the concept.	HS.G.CO.2. Understand that criteria for triangle congruence are ways to specify enough measures in a triangle to ensure that all triangles drawn with those measures are congruent.
	Partial alignment (specificity): CC specifies predicting the effect of types of transformations.	HS.G.CO.12. Use two-dimensional representations to transform figures and to predict the effect of translations, rotations, and reflections.

	Weak alignment: CC content is in 8th grade and is more specific. CC specifies understanding and analyzing scatter plots to determine patterns of association.	8.SP.1. Understand that scatter plots for bivariate measurement data may reveal patterns of association between two quantities.
MA11.2.2 Students communicate, using mathematical language, to: • Interpret, represent, or create geometric figures; • Draw or build figures from a mathematical description • Analyze properties and determine attributes of 2- and 3- dimensional objects.	Partial alignment (specificity): CC specifies characterizing parallelograms.	HS.G.CO.9. Characterize parallelograms in terms of equality of opposite sides, in terms of equality of opposite angles, and in terms of bisection of diagonals; characterize rectangles as parallelograms with equal diagonals.
	Partial alignment (specificity): CC specifies how to communicate about student's analyses including testing conjectures and identifying logical errors in proofs.	HS.G.CO.4. Understand that geometric diagrams can be used to test conjectures and identify logical errors in fallacious proofs.
	Partial alignment (specificity): CC specifies what mathematical language to know and use.	HS.G.CO.5. Know and use (in reasoning and problem solving) definitions of angles, polygons, parallel, and perpendicular lines, rigid motions, parallelograms and rectangles.
	Partial alignment (implicit): Content is similar, with some difference in phrasing/emphasis. Both WY and CC are about communicating using mathematical language, but the CC emphasis is on proofs about triangles, while the WY emphasis is on communication of reasoning in problem-solving situations.	HS.G.CO.7. Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180°, base angles of isosceles triangles are congruent, the triangle inequality, the longest side of a triangle faces the angle with the greatest measure and vice-versa, the exterior-angle inequality, and the segment joining midpoints of two sides of a triangle parallel to the third side and half the length.
	Partial alignment (implicit): Content is similar, with some difference in phrasing/emphasis. Both WY and CC are about communicating using mathematical language, but the CC emphasis is on proofs about special quadrilaterals, while the WY emphasis is on communication of reasoning in problem-solving situations.	HS.G.CO.8. Use and prove properties of and relationships among special quadrilaterals: parallelogram, rectangle, rhombus, square, trapezoid and kite.

	Partial alignment (specificity): CC specifies the details of the construction process while drawing or building figures.	HS.G.CO.10. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.
	Partial alignment (specificity): CC specifies the construction of specific shapes while drawing or building figures.	HS.G.CO.11. Construct an equilateral triangle, a square and a regular hexagon inscribed in a circle.
	Weak alignment: CC uses the principles of triangle congruence to construct congruent triangles.	HS.G.CO.2. Understand that criteria for triangle congruence are ways to specify enough measures in a triangle to ensure that all triangles drawn with those measures are congruent.
	Partial alignment (implicit): Content is similar, with some difference in phrasing/emphasis. Both WY and CC are about communicating using mathematical language, but the CC emphasis is on proofs of specific theorems, while the WY emphasis is on communication of reasoning in problem-solving situations.	HS.G.CO.6. Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; two lines parallel to a third are parallel to each other; points on a perpendicular bisector of a segment are exactly those equidistant from the segment's endpoints.
	Partial alignment (specificity): CC specifies proving geometric theorems algebraically.	HS.G.GPE.11. Use coordinates to prove simple geometric theorems algebraically. For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point (1, $\sqrt{3}$) lies on the circle centered at the origin and containing the point (0, 2).

	Weak alignment: CC content is in 8th grade and is more specific. CC specifies a focus on constructing triangles.	8.G.10. Draw (freehand, with ruler and protractor, and with technology) geometric shapes from given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the triangle is uniquely defined, ambiguously defined or nonexistent.
	Weak alignment: CC content is in 8th grade and emphasizes the concept, while the WY content emphasizes the skill.	8.G.11. Understand that slicing a three-dimensional figure with a plane produces a two-dimensional figure. Describe plane sections of right rectangular prisms and right rectangular pyramids.
MA11.2.3 Students communicate the reasoning used in identifying geometric relationships in problem-solving situations.	Partial alignment (implicit): Content is similar, with some difference in phrasing/emphasis. Both WY and CC are about communicating reasoning about geometric relationships, but the CC emphasis is on proofs of specific theorems, while the WY emphasis is on communication of reasoning in problem-solving situations.	HS.G.CO.6. Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; two lines parallel to a third are parallel to each other; points on a perpendicular bisector of a segment are exactly those equidistant from the segment's endpoints.
	Partial alignment (implicit): Content is similar, with some difference in phrasing/emphasis. Both WY and CC are about communicating reasoning about geometric relationships, but the CC emphasis is on proofs about triangles, while the WY emphasis is on communication of reasoning in problem-solving situations.	HS.G.CO.7. Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180°, base angles of isosceles triangles are congruent, the triangle inequality, the longest side of a triangle faces the angle with the greatest measure and vice-versa, the exterior-angle inequality, and the segment joining midpoints of two sides of a triangle parallel to the third side and half the length.
	Partial alignment (implicit): Content is similar, with some difference in phrasing/emphasis. Both WY and CC are about communicating reasoning about geometric relationships, but	HS.G.CO.8. Use and prove properties of and relationships among special quadrilaterals: parallelogram, rectangle, rhombus, square, trapezoid and kite.

	the CC emphasis is on proofs about special quadrilaterals, while the WY emphasis is on communication of reasoning in problem-solving situations. Partial alignment (specificity): CC specifies proving geometric theorems algebraically.	HS.G.GPE.11. Use coordinates to prove simple geometric theorems algebraically. For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point (1, $\sqrt{3}$) lies on the circle centered at the origin and containing the point (0, 2).
MA11.2.4 Students solve problems involving the coordinate plane such as the distance between two points, the midpoint, and slope.	Partial alignment (implicit): Content is similar, with some difference in emphasis. Both CC and WY include content regarding solving problems using the coordinate plane, but the types of problems identified are different. . Weak alignment: CC content is found in 8th grade, and is more specific. CC specifies using the Pythagorean Theorem on the coordinate plane. In addition, WY includes solving problems regarding the midpoint. Weak alignment: CC content is found in 8th grade, and there is some difference in emphasis. The WY content emphasizes the skill, while the CC content emphasizes the concept. In addition, WY includes solving problems regarding the midpoint. Weak alignment: CC content is found in 8th grade and is more specific. CC specifies the use of equations when solving problems on the coordinate plane. In addition, WY includes solving problems regarding the midpoint.	HS.G.GPE.11. Use coordinates to prove simple geometric theorems algebraically. For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point (1, $\sqrt{3}$) lies on the circle centered at the origin and containing the point (0, 2). 8.G.9. Use the Pythagorean Theorem to find the distance between two points in a coordinate system 8.EE.3. Understand that the slope of a non-vertical line in the coordinate plane has the same value for any two distinct points used to compute it. This can be seen using similar triangles. 8.EE.12. Solve problems involving lines and their equations. For example, decide whether a point with given coordinates lies on the line with a given equation; construct an equation for a line given two points on the line or one point and the slope; given coordinates for two pairs

		of points, determine whether the line through the first pair of points intersects the line through the second pair.
MA11.2.5 Students connect geometry with other mathematical topics.	Partial alignment (specificity): CC specifies examples of the more general WY concept.	HS.G.GPE.3. Understand that transforming the graph of an equation by reflecting in the axes, translating parallel to the axes, or applying a dilation in one of the coordinate directions corresponds to substitutions in the equation. HS.G.GPE.7. Use the slope criteria for parallel and perpendicular lines to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point). HS.G.GPE.8. Find the point on the segment between two given points that divides the segment in a given ratio.
3. MEASUREMENT: Students use a variety of tools and techniques of measurement in a problem-solving situation.		
MA11.3.1 Students apply estimation and measurement using the appropriate methods and units to solve problems involving length, weight/mass, area, surface area, volume, and angle measure.	Partial alignment (implicit): Content is similar, with some difference in emphasis. The WY content emphasizes the skill, while the CC content emphasizes the concept. In addition, the WY content includes estimation strategies to solve problems.	HS.N.Q.1. Understand that the magnitude of a quantity is independent of the unit used to measure it. For example, the density of a liquid does not change when it is measured in another unit. Rather, its measure changes. The chosen unit "measures" the quantity by giving it a numerical value ("the density of lead is 11.3 times that of water").
MA11.3.1 Students apply estimation and measurement using the appropriate methods and units to solve problems involving length, weight/mass, area, surface area, volume, and angle measure.	Partial alignment (implicit): Content is similar, with some difference in emphasis. The CC content is about using unit analysis to understand problems and guide solutions, while the WY content is about using the appropriate units when solving problems.	HS.N.Q.2. Use units as a way to understand problems and to guide the solution of multi-step problems, involving, e.g., acceleration, currency conversions, derived quantities such as person-hours and heating degree days, social science rates such as per-capita income, and rates in everyday life such as points scored per game.

	Partial alignment (specificity): CC specifies which types of problems should be solved.	HS.G.GMD.7. Apply formulas and solve problems involving volume and surface area of right prisms, right circular cylinders, right pyramids, cones, spheres and composite figures.
	Partial alignment (specificity): CC specifies a method for finding area (dissecting polygons into triangles).	HS.G.GMD.4. Find areas of polygons by dissecting them into triangles.
	Weak alignment: Content is similar, but there is a significant difference in the phrasing or emphasis. Both WY and CC expect students to understand the concepts of length, area, and volume, and the use of formulas. However, the WY content emphasizes the application of the skills to solve problems, while the CC content emphasizes using arguments to understand formulas.	HS.G.GMD.5. Explain why the volume of a cylinder is the area of the base times the height, using informal arguments.
MA11.3.1 Students apply estimation and measurement using the appropriate methods and units to solve problems involving length, weight/mass, area, surface area, volume, and angle measure.	Weak alignment: Content is similar, but there is a significant difference in the phrasing or emphasis. Both WY and CC expect students to understand the concepts of length, area, and volume, and the use of formulas. However, the WY content emphasizes the application of the skills to solve problems, while the CC content emphasizes using arguments to understand formulas.	HS.G.GMD.6. For a pyramid or a cone, give a heuristic argument to show why its volume is one-third of its height times the area of its base.
	Weak alignment: CC content is in 6^{th} grade and is more specific. CC specifies the types of shapes to find surface area, as well as the use of nets.	6.G.4. Find the surface area of cubes, prisms and pyramids (include the use of nets to represent these figures).
MA11.3.2 Students demonstrate an understanding of both metric and U. S. customary systems. Students are able to convert within each system.	Weak alignment: CC content is in 5th grade and content is similar, but there is a significant difference in the emphasis. CC emphasizes conversion between units within a given measurement system, while the WY content emphasizes understanding the metric and U.S. customary systems.	5.MD.3. Convert among different-sized standard measurement units within a given measurement system (e.g., feet to yards, centimeters to meters) and use conversion in solving multi-step word problems.

	Partial alignment (scope): WY content does not include all types of units (e.g., time).	3.MD.2. Understand that a unit of measure can be decomposed into equal-sized parts, whose sizes can be represented as fractions of the unit. Convert measurements in one unit to measurements in a smaller or a larger unit, and solve problems involving such mixed units (e.g., feet and inches, weeks and days).
MA11.3.3 Students identify and apply scale, ratios, and proportions in solving measurement problems.	Weak alignment: CC content narrower in scope, and has a different emphasis than the WY content. WY content includes all ratios and proportions, while the CC content is specifically about understanding ratios related to dilations. Weak alignment: CC content is in 6th grade. In addition, CC content does not include applying the concept to problem solving situations.	HS.G.SRT.2. Understand that the dilation of a given segment is parallel to the given segment and longer or shorter in the ratio given by the scale factor. A dilation leaves a segment unchanged if and only if the scale factor is 1. 6.RP.3. Solve for an unknown quantity in a problem involving two equal ratios.
MA11.3.4 Students solve problems of angle measure including those involving polygons or parallel lines cut by a transversal.	Partial alignment (scope): CC content includes knowing definitions of angles polygons, parallel, and perpendicular lines, rigid motions, parallelograms, and rectangles in order to reason and solve problems. Partial alignment (implicit): Content is similar, with some differences in emphasis. CC content is prerequisite to WY content. Students should be able to characterize parallelograms in order to solve problems related to angle measures.	HS.G.CO.5. Know and use (in reasoning and problem solving) definitions of angles, polygons, parallel, and perpendicular lines, rigid motions, parallelograms and rectangles. HS.G.CO.9. Characterize parallelograms in terms of equality of opposite sides, in terms of equality of opposite angles, and in terms of bisection of diagonals; characterize rectangles as parallelograms with equal diagonals.

	Weak alignment: CC content varies in scope and is more specific than WY content. WY content does not include proving the Pythagorean Theorem using triangle similarity. CC specifies using triangle similarity to solve problems of angle measure.	HS.G.SRT.6. Use triangle similarity criteria to solve problems and to prove relationships in geometric figures. Include a proof of the Pythagorean theorem using triangle similarity.
MA11.3.5 Students solve indirect measurement problems.	Partial alignment (scope): CC content includes proofs. Weak alignment: CC content is in 8th grade and, while it is similar to the WY content, it has a different emphasis. Both WY and CC include the idea of the proportionality of similar figures. However, CC emphasizes the meaning of similarity, while WY emphasizes indirect measurement problems.	HS.G.SRT.6. Use triangle similarity criteria to solve problems and to prove relationships in geometric figures. Include a proof of the Pythagorean theorem using triangle similarity. 8.G.4. Explain using similarity transformations the meaning of similarity for triangles as the equality of all pairs of angles and the proportionality of all pairs of sides.
4. <u>ALGEBRA</u>: Students use algebraic methods to investigate, model, and interpret patterns and functions involving numbers, shapes, data, and graphs in a problem-solving situation.		
MA11.4.1 Students use algebraic concepts, symbols, and skills to represent and solve real world problems.	Partial alignment (specificity): CC specifies which skill to use (rearranging formulas). Partial alignment (specificity): CC specifies the algebraic concepts and skills to be used to solve problems. Partial alignment (specificity): CC content	HS.A.CED.4. Rearrange formulas to highlight a quantity of interest. For example, transform Ohm's law V = IR to highlight resistance R; in motion with constant acceleration, transform $v_{f,x}^2 - v_{i,x}^2 = 2a_x(x_f - x_i)$ to highlight the change in position along the x-axis, $x_f - x_i$.. HS.A.CED.3. Write equations and inequalities that specify an unknown quantity or to express a relationship between two or more quantities. Use the equations and inequalities to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions. HS.A.BF.15. Recognize a quantitative

	specifies identifying if a relationship is linear, exponential, or neither. Partial alignment (specificity): CC specifies which concepts students should use to solve real world problems. Weak alignment: WY and CC lack clarity about the scope. Partial alignment (implicit): Content is similar, with some difference in emphasis. The WY content emphasizes the skill, while the CC content emphasizes the concept. Weak alignment: CC content is found in 7th grade, and is more specific. CC specifies the types of word problems students should solve.	relationship as linear, exponential, or neither from description of a situation. HS.A.REI.8. Understand that equations and inequalities can be viewed as constraints in a problem situation, e.g., inequalities describing nutritional and cost constraints on combinations of different foods. HS.N.Q.5. Use and interpret quantities and units correctly in algebraic formulas. HS.A.CED.2. Understand that equations in two or more variables that represent a relationship between quantities can be built by experimenting with specific numbers in the relationship. 7.EE.3. Choose variables to represent quantities in a word problem, and construct simple equations to solve the problem by reasoning about the quantities. a. Solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are nonnegative rational numbers and the solution is a nonnegative rational number. Fluently solve equations of these forms, e.g., by undoing the operations involved in producing the expression on the left. b. Solve the same word problem arithmetically and algebraically. For example, “J. has 4 packages of balloons and 5 single balloons. In all, he has 21 balloons. How many balloons are in a package?” Solve this problem arithmetically (using a sequence of operations on the given numbers), and also solve it by using a variable to stand

		for the number of balloons in a package, constructing an equation such as 4b + 5 = 21 to describe the situation then solving the equation. Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. For example, P + 0.05P = 1.05P means that "increase by 5%" is the same as "multiply by 1.05."
MA11.4.2 Students write, model, and evaluate expressions, functions, equations, and inequalities	Partial alignment (implicit): CC content is similar with some differences in emphasis. The WY content emphasizes the skill while the CC standard emphasizes the concept. Partial alignment (implicit): CC content is similar with some differences in emphasis. The WY content emphasizes the skill while the CC standard emphasizes the concept. Partial alignment (specificity): CC specifies how to evaluate functions Partial alignment (specificity): CC specifies what type of function should be created. Partial alignment (specificity): CC specifies what type of function should be modeled.	HS.A.BF.4. Understand that linear functions grow by equal differences over equal intervals; exponential functions grow by equal factors over equal intervals. HS.A.BF.8. Understand that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function. HS.A.BF.9. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph. HS.A.BF.10. Construct a function to describe a linear relationship between two quantities. Determine the rate of change and constant term of a linear function from a graph, a description of a relationship, or from two (x, y) values (include reading these from a table). HS.A.BF.11. Use quadratic functions to model problems, e.g., in situations with optimum solutions.

	Partial alignment (specificity): CC specifies what type of function should be created.	HS.A.BF.12. Construct an exponential function in the form f(x) = a(1 + r)x or f(x) = abx to describe a relationship in which one quantity grows with respect to another at a constant percent growth rate or a with a constant growth factor.
	Partial alignment (scope): CC content does not include evaluating functions, equations, and inequalities, and does include sequences.	HS.A.BF.13. Interpret the rate of change and constant term of a linear function or sequence in terms of the situation it models, and in terms of its graph or a table of values.
	Partial alignment (specificity): CC specifies what a part of an exponential function should be calculated.	HS.A.BF.14. Calculate and interpret the growth factor for an exponential function (presented symbolically or as a table) given a fixed interval. Estimate the growth factor from a graph.
	Partial alignment (specificity): CC specifies identifying if a relationship is linear, exponential, or neither.	HS.A.BF.15. Recognize a quantitative relationship as linear, exponential, or neither from description of a situation.
	Partial alignment (specificity): CC specifies factoring, expanding, and completing the square.	HS.A.SSE.4. Factor, expand, and complete the square in quadratic expressions.
	Partial match (specificity): CC specifies which types of equations should be evaluated.	HS.A.REI.10. Solve simple rational and radical equations in one variable, noting and explaining extraneous solutions.
	Partial match (specificity): CC specifies which types of equations should be evaluated.	HS.A.REI.11. Solve linear equations in one variable, including equations with coefficients represented by letters.

	Partial match (specificity): CC specifies which types of equations should be evaluated, and how they should be evaluated.	HS.A.REI.12. Solve quadratic equations in one variable. Include methods such as inspection (e.g. for $x^2 = 49$), square roots, completing the square, the quadratic formula and factoring. Recognize when the quadratic formula gives complex solutions and write them as a ± bi for real numbers a and b.
	Partial match (specificity): CC specifies which types of equations should be evaluated, and how they should be evaluated.	HS.A.REI.13. Solve equations f(x) = g(x) approximately by finding the intersections of the graphs of f(x) and g(x), e.g. using technology to graph the functions. Include cases where f(x) and/or g(x) are linear, polynomial, rational, exponential, and logarithmic functions.
	Partial alignment (specificity): CC specifies the form of the functions to be evaluated and what aspects are to be evaluated.	HS.A.IF.9. Describe the qualitative behavior of functions presented in graphs and tables. Identify: intercepts; intervals where the function is increasing, decreasing, positive or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.
	Partial alignment (specificity): CC specifies rational expressions and which properties should be used to evaluate these expressions.	HS.A.APR.8. Transform simple rational expressions using the commutative, associative, and distributive laws, and the inverse relationship between multiplication and division.
	Partial alignment (specificity): CC specifies the types of functions (linear, rational, quadratic, exponential).	HS.A.CED.3. Write equations and inequalities that specify an unknown quantity or to express a relationship between two or more quantities. Use the equations and inequalities to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.

	Partial alignment (specificity): CC specifies how to evaluate equations.	HS.A.REI.1. Understand that to solve an equation algebraically, one makes logical deductions from the equality asserted by the equation, often in steps that replace it with a simpler equation whose solutions include the solutions of the original one.
	Partial alignment (specificity): CC specifies how to evaluate a quadratic equation.	HS.A.REI.2. Understand that the method of completing the square can transform any quadratic equation in x into an equivalent equation of the form $(x – p)^2 = q$. This leads to the quadratic formula.
	Partial alignment (implicit): Content is similar, with some difference in emphasis. The WY content emphasizes the skill, while the CC content emphasizes the concept.	HS.A.IF.1. Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then f(x) denotes the output of f corresponding to the input x.
	Partial alignment (implicit): Content is similar, with some difference in emphasis. The WY content emphasizes the skill, while the CC content emphasizes the concept.	HS.A.IF.2. Understand that functions of a single variable have key characteristics, including: zeros; extreme values; average rates of change (over intervals); intervals of increasing, decreasing and/or constant behavior; and end behavior.
	Partial alignment (implicit): Content is similar, with some difference in emphasis. The WY content emphasizes the skill, while the CC content emphasizes the concept.	HS.A.IF.3. Understand that a function defined by an expression may be written in different but equivalent forms, which can reveal different properties of the function.
	Partial alignment (specificity): CC specifies what aspects of which functions to model and evaluate. WY content addresses using technology as a note that applies to all benchmarks under content standard 4 (Algebra).	HS.A.IF.10. Use technology to exhibit the effects of parameter changes on the graphs of linear, power, quadratic, square root, cube root, and polynomial functions, and simple rational, exponential, logarithmic, sine, cosine, absolute value, and step functions.

	Partial alignment (specificity): CC specifies the types of functions that students are required to evaluate. Partial alignment (specificity):CC specifies how to evaluate specific functions.	HS.A.BF.6. Solve problems involving linear, quadratic, and exponential functions. HS.A.BF.7. Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology.
	Partial alignment (specificity): CC specifies the type of equation.	HS.A.REI.19. In the context of exponential models, solve equations of the form a b^{ct} = d where a, c, and d are specific numbers and the base b is 2, 10, or e.
	Partial alignment (implicit): Content is similar, with some difference in emphasis. The WY content emphasizes the skill, while the CC content emphasizes the concept.	HS.A.CED.1. Understand that equations in one variable are often created to describe properties of a specific but unknown number.
	Partial alignment (implicit): Content is similar, with some difference in emphasis. The WY content emphasizes the skill, while the CC content emphasizes the concept.	HS.A.CED.2. Understand that equations in two or more variables that represent a relationship between quantities can be built by experimenting with specific numbers in the relationship.
	Partial alignment (specificity): CC specifies solving and graphing the solution set of linear inequalities in one variable.	HS.A.REI.14. Solve linear inequalities in one variable and graph the solution set on a number line.
	Partial alignment (specificity): CC specifies types of modeling situations.	HS.A.REI.18. In modeling situations, represent constraints by systems of equations and/or inequalities, and interpret solutions of these systems as viable or non-viable options in the modeling context.

	Partial alignment (scope): WY includes evaluating expressions, equations, and inequalities.	HS.A.IF.4. Use function notation and evaluate functions for inputs in their domains.
	Partial alignment (scope): WY includes evaluating expressions, equations, and inequalities, and CC specifies a qualitative evaluation.	HS.A.IF.5. Describe qualitatively the functional relationship between two quantities by reading a graph (e.g., where the function is increasing or decreasing, what its long-run behavior appears to be, and whether it appears to be periodic).
	Partial alignment (specificity): CC specifies that the modeling to be done exhibits qualitative features, and that the modeling be of a function.	HS.A.IF.6. Sketch a graph that exhibits the qualitative features of a function that models a relationship between two quantities.
	Partial alignment (specificity): CC specifies that students write and evaluate quadratic functions.	HS.A.IF.11. Transform quadratic polynomials algebraically to reveal different features of the function they define, such as zeros, extreme values, and symmetry of the graph.
	Weak alignment: WY content is similar, but there is a significant difference in the phrasing. The CC standard describes an understanding of different ways that functions can be represented.	HS.A.BF.1. Understand that functions can be described by specifying an explicit expression, a recursive process or steps for calculation.
	Partial alignment (scope): CC content does not include modeling and evaluating expressions, equations, and inequalities.	HS.A.BF.5. Write a function that describes a relationship between two quantities, for example by varying parameters in and combining standard function types (such as linear, quadratic or exponential functions). Use technology to experiment with parameters and to illustrate an explanation of the behavior of the function when parameters vary.

	Partial alignment (implicit): The WY content emphasizes the skill while the CC standard emphasizes the concept.	HS.A.BF.2. Understand that quadratic functions have maximum or minimum values and can be used to model problems with optimum solutions.
	Partial alignment (specificity): CC specifies understanding the characteristics of exponential functions.	HS.A.BF.3. Understand that an exponential function, defined by $f(x) = abx$ or by $f(x) = a(1 + r)x$ for some constants a, $b > 0$ and $r > –1$, models a situation where a quantity grows or decays by a constant factor or a constant percentage change over each unit interval.
	Partial alignment (specificity): CC specifies how to interpret an expression as well as parts of an expression.	HS.A.SSE.3. Interpret an expression that represents a quantity in terms of the context. Include interpreting parts of an expression, such as terms, factors and coefficients.
	Weak Alignment: CC content is in 7^{th} grade and the content is similar, with some difference in emphasis. CC emphasizes the interpretation of numerical expressions for calculation when using a calculator or spreadsheet.	7.EE.1. Interpret numerical expressions at a level necessary to calculate their value using a calculator or spreadsheet. For expressions with variables, use and interpret conventions of algebraic notation, such as y/2 is y ÷ 2 or 1/2 × y; (3 ± y)/5 is (3 ± y) ÷ 5 or 1/5 × (3 ± y); a2 is a × a, a3 is a × a × a, a2b is a × a × b.
	Weak Alignment: CC content is in 7^{th} grade and is more specific. CC specifies using the laws of arithmetic and conventions of algebraic notation to simplify expressions.	7.EE.2. Generate equivalent expressions from a given expression using the laws of arithmetic and conventions of algebraic notation. Include: a. Adding and subtracting linear expressions, as in (2x + 3) + x + (2 – x) = 2x + 5. b. Factoring, as in 4x + 4y = 4(x + y) or 5x + 7x + 10y + 14y = 12x + 24y = 12(x + 2y). Simplifying, as in –2(3x – 5) + 4x = 10 – 2x or x/3 + (x – 2)/4 = 7x/12 – 1/2.

	Weak Alignment: CC content is in 8th grade and is more specific. CC specifies understanding how a function works in terms of domain and range.	8.F.1. Understand that a function from one set (called the domain) to another set (called the range) is a rule that assigns to each element of the domain (an input) exactly one element of the range (the corresponding output). The graph of a function is the set of ordered pairs consisting of an input and the corresponding output. Function notation is not required in Grade 8.
	Weak Alignment: CC content is in 8th grade and is more specific. CC specifies the relationship of expressions to functions for finding inputs that correspond to a given output.	8.F.2. Evaluate expressions that define functions, and solve equations to find the input(s) that correspond to a given output.
	Weak Alignment: CC content is in 8th grade and content is similar, but there is a significant difference in the phrasing or emphasis. CC content emphasizes the comparison of functions rather than modeling or evaluating them.	8.F.3. Compare properties of two functions represented in different ways (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.
	Weak Alignment: CC content is in 8th grade and is more specific. CC specifies how to identify linear functions.	8.F.4. Understand that a function is linear if it can be expressed in the form y = mx + b or if its graph is a straight line. For example, the function y = x2 is not a linear function because its graph contains the points (1,1), (–1,1) and (0,0), which are not on a straight line.
	Weak Alignment: CC content is in 8th grade and emphasizes the skill, while the CC/WY content emphasizes the concept.	8.F.5. Understand that functions can describe situations where one quantity determines another.

	Weak Alignment: CC content is in 8th grade and is more specific.CC specifies that students be able to determine and interpret rates of change and initial values of a function.	8.F.6. Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship; from two (x, y) values, including reading these from a table; or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.
	Weak Alignment: CC content is in 8th grade and is more specific.CC specifies that students describe functions qualitatively and sketch a graph given a set of qualitative features.	8.F.7. Describe qualitatively the functional relationship between two quantities by reading a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.
MA11.4.3 Students graph linear equations and interpret the results in solving algebraic problems.	Partial alignment (scope): The CC content includes quadratic, rational, or exponential functions or inequalities.	HS.A.CED.3. Write equations and inequalities that specify an unknown quantity or to express a relationship between two or more quantities. Use the equations and inequalities to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.
	Partial alignment (implicit): The WY content emphasizes the skill while the CC standard emphasizes the concept.	HS.A.BF.1. Understand that a linear function, defined by f(x) = mx + b for some constants m and b, models a situation in which a quantity changes at a constant rate, m, relative to another.
	Weak Alignment: CC content is in 8th grade and is more specific. CC specifies using slope-intercept.	8.EE.5. Understand that the graph of a linear equation in two variables is a line, the set of pairs of numbers satisfying the equation. If the equation is in the form y = mx + b, the graph can be obtained by shifting the graph of y =mx by b units (upwards if b is positive, downwards if b is negative). The slope of the line is m.
	Weak alignment: CC content is in 8th grade and is more specific. CC specifies the types of	8.EE.12. Solve problems involving lines and their equations. For example, decide whether a

	algebraic problems to be solved.	point with given coordinates lies on the line with a given equation; construct an equation for a line given two points on the line or one point and the slope; given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.
MA11.4.4 Students solve, graph, or interpret systems of linear equations	Partial alignment (specificity): CC specifies one method of solving systems of equations.	HS.A.REI.4. Understand that the graph of an equation in two variables is the set of its solutions plotted in the coordinate plane, often forming a curve or a line.
	Partial alignment (specificity): CC specifies one method of solving systems of equations.	HS.A.REI.5. Understand that solutions to two equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.
	Partial alignment (specificity): CC specifies graphing and solving two variable equations.	HS.A.REI.6. Understand that the solutions to a linear inequality in two variables can be graphed as a half-plane (excluding the boundary in the case of a strict inequality).
	Partial alignment (specificity): CC specifies graphing and solving two variable equations.	HS.A.REI.7. Understand that solutions to several linear inequalities in two variables correspond to points in the intersection of the regions in the plane defined by the solutions to the inequalities.
	Partial alignment (specificity): CC specifies one method of solving systems of equations.	HS.A.REI.3. Understand that given a system of two linear equations in two variables, adding a multiple of one equation to another produces a system with the same solutions. This principle, combined with principles already encountered with equations in one variable, allows for the simplification of systems.

	Partial alignment (specificity): CC specifies solving pairs of linear equations in two variables.	HS.A.REI.15. Solve systems of linear equations algebraically and graphically, focusing on pairs of linear equations in two variables.
	Partial alignment (specificity): CC specifies which two types of equations make up the system of equations to be solved.	HS.A.REI.16. Solve algebraically a simple system consisting of one linear equation and one quadratic equation in two variables; for example, find points of intersection between the line $y = -3x$ and the circle $x^2 + y^2 = 3$.
	Weak alignment: Content is similar, but there is a significant difference in the emphasis. WY content is specific to systems of linear equations, while the CC standard is specific to systems of inequalities.	HS.A.REI.17. Graph the solution set of a system of linear inequalities in two variables.
	Partial alignment (specificity): CC specifies the modeling involved uses qualitative features.	HS.A.REI.18. In modeling situations, represent constraints by systems of equations and/or inequalities, and interpret solutions of these systems as viable or non-viable options in the modeling context.
	Weak alignment: CC content is in 8th grade and emphasizes the concept, while the WY content emphasizes the skill.	8.EE.9. Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.
	Weak alignment: CC content is in 8th grade and includes estimating solutions by graphing equations. CC also species a method to solve systems of equations.	8.EE.10. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. For example, $3x + 2y = 5$ and $3x + 2y = 6$ have no solution because the quantity $3x + 2y$ cannot simultaneously be 5 and 6.
	Weak alignment: CC content is in 8th grade and includes solving word problems related to two linear equations in two variables.	8.EE.11. Solve and explain word problems leading to two linear equations in two variables.

MA11.4.5 Students connect algebra with other mathematical topics.	Partial alignment (specificity): CC specifies that students connect algebra with arithmetic operations using appropriate laws.	HS.A.APR.8. Transform simple rational expressions using the commutative, associative, and distributive laws, and the inverse relationship between multiplication and division.
5. <u>DATA ANALYSIS AND PROBABILITY</u>: Students use data analysis and probability to analyze given situations and the results of experiments.		
MA11.5.1 Students apply knowledge of mean, median, mode, and range to interpret and evaluate information and data.	Partial match (specificity): CC specifies what type of data to interpret and evaluate, and specifies that students develop a margin of error. Partial alignment (specificity): CC specifies which statistical data should be used, how to evaluate the data, and what format the data should be in. Partial alignment (specificity): CC specifies the type of technological tools needed to interpret and evaluate data.	HS.S.IC.6. Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling. HS.S.SI.5. Compare data on two or more count or measurement variables by using plots on the real number line (dot plots, histograms, and box plots). Use statistics appropriate to the shape of the data distribution to summarize center (median, mean) and spread (interquartile range, standard deviation) of the data sets. Interpret changes in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers). HS.S.ES.5. Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets and tables to estimate areas under the normal curve.

	Weak Alignment: CC content is in 7th grade and is more specific. CC specifies that measures of central tendency should be used to analyze data.	7.SP.7. Use measures of center and measures of variability for numerical data from uniform random samples to draw informal comparative inferences about two populations. For example, decide whether the words in a chapter of a seventh-grade book are generally longer than the words in a chapter of a sixth-grade book.
MA11.5.2 Students draw reasonable inferences from statistical data and/or correlation/best fit line to predict outcomes.	Partial alignment (implicit): CC content is similar with some differences in emphasis. The WY content emphasizes the skill while the CC standard emphasizes the concept.	HS.S.SI.3. Understand that patterns of association or relationships between variables may emerge through careful analysis of multi-variable data.
	Partial alignment (specificity): CC specifies which statistical data should be used, how to evaluate the data, and what format the data should be in.	HS.S.SI.5. Compare data on two or more count or measurement variables by using plots on the real number line (dot plots, histograms, and box plots). Use statistics appropriate to the shape of the data distribution to summarize center (median, mean) and spread (interquartile range, standard deviation) of the data sets. Interpret changes in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).
	Strong alignment	HS.S.SI.7. Fit a linear function for scatter plots that suggest a linear association. Informally assess the fit of the model function by plotting and analyzing residuals.
	Strong alignment	HS.S.SI.9. Compute (using technology) and interpret the correlation coefficient for a linear relationship between variables.
	Partial alignment (implicit): CC content is similar with some differences in emphasis. The WY content emphasizes the skill while the CC standard emphasizes the concept.	HS.S.SI.1. Understand that statistical methods take variability into account to support making informed decisions based on data collected to answer specific questions.

	Partial alignment (implicit): CC content is similar with some differences in emphasis. The WY content emphasizes the skill while the CC standard emphasizes the concept.	HS.S.IC.1. Understand that statistics is a process for making inferences about population parameters based on a sample from that population; randomness is the foundation for statistical inference.
	Weak alignment: CC content is in 8th grade and is more specific. CC specifies understanding and analyzing scatter plots to determine patterns of association.	8.SP.1. Understand that scatter plots for bivariate measurement data may reveal patterns of association between two quantities.
	Weak alignment: CC content is in 8th grade and is more specific. CC specifies constructing and interpreting scatter plots to determine patterns of association.	8.SP.2. Construct and interpret scatter plots for bivariate measurement data. Describe patterns such as clustering, outliers, positive or negative association, linear association, nonlinear association.
	Weak alignment: CC content is in 8th grade and emphasizes the concept, while the WY content emphasizes the skill.	8.SP.3. Understand that a straight line is a widely used model for exploring relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.
	Weak alignment: CC content is in 8th grade and emphasizes the concept, while the WY content emphasizes the skill.	8.SP.5. Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?

MA11.5.3 Students communicate about the likelihood of events using concepts from probability. • sample space • evaluate simple probabilities • evaluate experimental vs. theoretical	Strong alignment	HS.S.PM.5. Use a uniform probability model to compute probabilities for a process involving uncertainty, including the random selection of a person from a population and physical situations where symmetry suggests that different individual outcomes are equally likely. a. List the individual outcomes to create a sample space. b. Label the individual outcomes in the sample space to reflect important characteristics or quantities associated with them. c. Determine probabilities of individual outcomes, and determine the probability of a type or category of outcome as the fraction of individual outcomes it includes.
	Strong alignment	HS.S.IC.4. Use probabilistic reasoning to decide if a specified model is consistent with results from a given data-generating process. (For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model?)
	Partial alignment (scope): CC includes randomization.	HS.S.IC.5. Recognize the purposes of and differences among sample surveys, experiments and observational studies; explain how randomization relates to each.
	Partial alignment (specificity): CC specifies using surveys and simulations as probability models.	HS.S.ES.1. Understand that sets of data obtained from surveys, simulations or other means can be used as probability models, by treating the data set itself as a sample space, in which the sample points are the individual pieces of data.

	Partial alignment (implicit): Content is similar, with some difference in the phrasing or emphasis. WY content is about the communication of concepts of probability including experimental probabilities, while the CC content is about comparing simulated to predicted probabilities.	HS.S.ES.4. Compare the results of simulations with predicted probabilities. When there are substantial discrepancies between predicted and observed probabilities, explain them.
	Partial alignment (implicit): The WY content emphasizes the skill, while the CC content emphasizes the concept.	HS.S.PM.1. Understand that in a probability model, individual outcomes have probabilities that sum to 1. When outcomes are categorized, the probability of a given type of outcome is the sum of the probabilities of all the individual outcomes of that type.
	Partial alignment (implicit): The WY content emphasizes the skill, while the CC content emphasizes the concept.	HS.S.PM.2. Understand that uniform probability models are useful models for processes such as (i) the selection of a person from a population; (ii) the selection of a number in a lottery; (iii) any physical situation in which symmetry suggests that different individual outcomes are equally likely
	Partial alignment (implicit): The WY content emphasizes the skill, while the CC content emphasizes the concept.	HS.S.PM.3. Understand that two different empirical probability models for the same process will rarely assign exactly the same probability to a given type of outcome. But if the data sets are large and the methods used to collect the data for the two data sets are consistent, the agreement between the models is likely to be reasonably good.

	Partial alignment (implicit): The WY content emphasizes the skill, while the CC content emphasizes the concept.	HS.S.PM.4. Understand that a (theoretical) uniform probability model may be judged by comparing it to an empirical probability model for the same process. If the theoretical assumptions are appropriate and the data set is large, then the two models should agree approximately. If the agreement is not good, then it may be necessary to modify the assumptions underlying the theoretical model or look for factors that might have affected the data used to create the empirical model.
	Strong alignment	HS.S.PM.7. Compare probabilities from a theoretical model to probabilities from a corresponding empirical model for the same situation. If the agreement is not good, explain possible sources of the discrepancies.
	Weak alignment: Content is similar, but there is a significant difference in the emphasis. WY emphasizes communicating the concepts of probability, while CC emphasizes using the laws of probability.	HS.S.CP.5. Use the laws of probability to compute probabilities.
	Weak alignment: Content is similar, but there is a significant difference in the emphasis WY content is about the communication of concepts of probability including experimental probabilities, while the CC content is about the calculation of experimental probabilities.	HS.S.ES.3. Calculate experimental probabilities by performing simulations or experiments involving a probability model and using relative frequencies of outcomes.
	Partial alignment (specificity): CC specifies analyzing decisions and strategies using probabilities.	HS.S.MD.7. Analyze decisions and strategies using probability concepts (e.g. product testing, medical testing, pulling a hockey goalie at the end of a game).
	Weak alignment: CC content is in 7th grade and emphasizes the concept, while the WY content emphasizes the skill.	7.SP.3. Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a

		sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.
	Weak Alignment: CC content is in 7th grade and content is similar, but there is a significant difference in the emphasis.CC content relates more to drawing inferences about populations given sample data, whereas the WY standard relates more to probability.	7.SP.5. Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.
MA11.5.4 Students determine, collect, organize, and analyze relevant data needed to make conclusions.	Partial alignment (specificity): CC specifies the way that data should be organized.	HS.N.Q.6. Use and interpret quantities and units correctly in graphs and data displays (function graphs, data tables, scatter plots, and other visual displays of quantitative information). Generate graphs and data displays using technology.
	Partial alignment (specificity): CC specifies bivariate quantitative data.	HS.S.SI.6. Represent bivariate quantitative data on a scatter plot and describe how the variables are related.
	Weak alignment: CC content is similar, but there is a significant difference in emphasis. The WY content emphasizes the processes involved in an experiment, while the CC emphasizes the importance of experimental design.	HS.S.IC.2. Understand that the design of an experiment or sample survey is of critical importance to analyzing the data and drawing conclusions.
	Partial alignment (implicit): CC content is similar with some differences in emphasis. The WY content emphasizes the skill while the CC standard emphasizes the concept.	HS.S.SI.2. Understand that visual displays and summary statistics condense the information in data sets into usable knowledge.

	Partial alignment (scope): CC content includes the generation of data.	HS.S.PM.6. Generate data by sampling, repeated experimental trials, and simulations. Record and appropriately label such data, and use them to construct an empirical probability model. Compute probabilities in such models.
	Partial match (specificity): CC specifies what type of data to organize and analyze, and specifies that students develop a margin of error.	HS.S.IC.6. Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.
	Strong alignment	HS.S.IC.8. Evaluate reports based on data.
	Partial alignment (specificity): CC specifies probabilities to make fair decisions (conclusions).	HS.S.MD.4. Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).
	Weak Alignment: CC content is in 7th grade and is more specific. CC content specifies how data should be analyzed and using estimation and prediction as part of the analysis.	7.SP.5. Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.
	Weak Alignment: CC content is in 7th grade and is less specific. CC specifies the type of analysis that should be done.	7.SP.6. Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean average deviation) on either team; on a dot plot, the separation

		between the two distributions of heights is noticeable.