Kentucky Department of Education
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Counting and Cardinality

Cluster: Know number names and the count sequence.

CCSS: **CC.K.CC.1 Count to 100 by ones and by tens.**

Grade: K DM: 3 = Excellent match between the two documents

Strand: Counting and Cardinality Notes:

MG: K-3 GD: 0 to -3 KY.K-3.A.EU.2 Students will understand that numerical patterns can be written as rules that generate the pattern.

MG: K-3 GD: 0 to -3 KY.K-3.N.SC.1 Number Sense: Students will read, write, count and model whole numbers 0-10,000, developing an understanding of place value for ones, tens, hundreds, thousands and ten thousands

Cluster: Know number names and the count sequence.

CCSS: **CC.K.CC.2 Count forward beginning from a given number within the known sequence (instead of having to begin at 1).**

Grade: K DM: 3 = Excellent match between the two documents

Strand: Counting and Cardinality Notes:

MG: K-3 GD: 0 to -3 KY.K-3.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships between numbers and number systems are means of representing real-world quantities.

MG: K-3 GD: 0 to -3 KY.K-3.N.SC.1 Number Sense: Students will read, write, count and model whole numbers 0-10,000, developing an understanding of place value for ones, tens, hundreds, thousands and ten thousands

Cluster: Know number names and the count sequence.

CCSS: **CC.K.CC.3 Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).**

Grade: K DM: 3 = Excellent match between the two documents

Strand: Counting and Cardinality Notes:

MG: K-3 GD: 0 to -3 KY.K-3.A.SC.2 Patterns, Relations and Functions: Students will reproduce and extend patterns using manipulatives

MG: K-3 GD: 0 to -3 KY.K-3.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships between numbers and number systems are means of representing real-world quantities.

MG: K-3 GD: 0 to -3 KY.K-3.N.SC.1 Number Sense: Students will read, write, count and model whole numbers 0-10,000, developing an understanding of place value for ones, tens, hundreds, thousands and ten thousands

Cluster: Count to tell the number of objects.

CCSS: **CC.K.CC.4 Understand the relationship between numbers and quantities; connect counting to cardinality.**

Grade: K DM: 3 = Excellent match between the two documents

Strand: Counting and Cardinality Notes:

MG: K-3 GD: 0 to -3 KY.K-3.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships between numbers and number systems are means of representing real-world quantities.

MG: K-3 GD: 0 to -3 KY.K-3.N.SC.1 Number Sense: Students will read, write, count and model whole numbers 0-10,000, developing an understanding of place value for ones, tens, hundreds, thousands and ten thousands

MG: K-3 GD: 0 to -3 KY.K-3.N.SC.3 Number Sense: Students will order groups of objects according to quantity

Counting and Cardinality

Cluster: Count to tell the number of objects.

CCSS: **CC.K.CC.4a When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object.**

Grade: K DM: 3 = Excellent match between the two documents

Strand: Counting and Cardinality Notes:

MG: K-3 GD: 0 to -3 KY.K-3.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships between numbers and number systems are means of representing real-world quantities.

MG: K-3 GD: 0 to -3 KY.K-3.N.SC.1 Number Sense: Students will read, write, count and model whole numbers 0-10,000, developing an understanding of place value for ones, tens, hundreds, thousands and ten thousands

MG: K-3 GD: 0 to -3 KY.K-3.N.SC.3 Number Sense: Students will order groups of objects according to quantity

Cluster: Count to tell the number of objects.

CCSS: **CC.K.CC.4b Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted.**

Grade: K DM: 3 = Excellent match between the two documents

Strand: Counting and Cardinality Notes:

MG: K-3 GD: 0 to -3 KY.K-3.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships between numbers and number systems are means of representing real-world quantities.

Cluster: Count to tell the number of objects.

CCSS: **CC.K.CC.4c Understand that each successive number name refers to a quantity that is one larger.**

Grade: K DM: 3 = Excellent match between the two documents

Strand: Counting and Cardinality Notes:

MG: K-3 GD: 0 to -3 KY.K-3.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships between numbers and number systems are means of representing real-world quantities.

Cluster: Count to tell the number of objects.

CCSS: **CC.K.CC.5 Count to answer "how many?" questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1-20, count out that many objects.**

Grade: K DM: 3 = Excellent match between the two documents

Strand: Counting and Cardinality Notes:

MG: K-3 GD: 0 to -3 KY.K-3.A.EU.4 Students will understand that real-world situations can be represented using mathematical models to analyze quantitative relationships.

MG: K-3 GD: 0 to -3 KY.K-3.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships between numbers and number systems are means of representing real-world quantities.

MG: K-3 GD: 0 to -3 KY.K-3.N.SC.1 Number Sense: Students will read, write, count and model whole numbers 0-10,000, developing an understanding of place value for ones, tens, hundreds, thousands and ten thousands

Counting and Cardinality

Cluster: Compare numbers

CCSS: **CC.K.CC.6 Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies. (Include groups with up to ten objects.)**

Grade: K DM: 3 = Excellent match between the two documents

Strand: Counting and Cardinality Notes:

MG: K-3 GD: 0 to -3 KY.K-3.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships between numbers and number systems are means of representing real-world quantities.

MG: K-3 GD: 0 to -3 KY.K-3.N.SC.3 Number Sense: Students will order groups of objects according to quantity

Cluster: Compare numbers

CCSS: **CC.K.CC.7 Compare two numbers between 1 and 10 presented as written numerals.**

Grade: K DM: 3 = Excellent match between the two documents

Strand: Counting and Cardinality Notes:

MG: K-3 GD: 0 to -3 KY.K-3.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships between numbers and number systems are means of representing real-world quantities.

MG: K-3 GD: 0 to -3 KY.K-3.N.SC.4 Number Sense: Students will order, compare and understand the relative magnitude of numbers from 0-10,000, using the symbols <, >, =, including the use of physical and visual models for smaller numbers

Cluster: Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres).

CCSS: **CC.K.G.1 Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as above, below, beside, in front of, behind, and next to.**

Grade: K DM: 3 = Excellent match between the two documents

Strand: Geometry Notes:

MG: K-3 GD: 0 to -3 KY.K-3.G.EU.1 Students will understand that characteristics and properties of two-dimensional figures and three-dimensional objects describe the world and are used to develop mathematical arguments about geometric relationships and to evaluate the arguments of others.

MG: K-3 GD: 0 to -3 KY.K-3.G.EU.4 Students will understand that visualization, spatial reasoning and geometric relationships model real-world situations.

MG: K-3 GD: 0 to -3 KY.K-3.G.SC.1 Shapes and Relationships: Students will identify, describe, model, draw, compare and classify two-dimensional figures and three-dimensional objects using elements, attributes and properties

Cluster: Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres).

CCSS: **CC.K.G.2 Correctly name shapes regardless of their orientations or overall size.**

Grade: K DM: 3 = Excellent match between the two documents

Strand: Geometry Notes:

MG: K-3 GD: 0 to -3 KY.K-3.G.EU.1 Students will understand that characteristics and properties of two-dimensional figures and three-dimensional objects describe the world and are used to develop mathematical arguments about geometric relationships and to evaluate the arguments of others.

MG: K-3 GD: 0 to -3 KY.K-3.G.SC.1 Shapes and Relationships: Students will identify, describe, model, draw, compare and classify two-dimensional figures and three-dimensional objects using elements, attributes and properties

Cluster: Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres).

CCSS: **CC.K.G.3 Identify shapes as two-dimensional (lying in a plane, “flat”) or three-dimensional (“solid”).**

Grade: K DM: 3 = Excellent match between the two documents

Strand: Geometry Notes:

MG: K-3 GD: 0 to -3 KY.K-3.G.EU.1 Students will understand that characteristics and properties of two-dimensional figures and three-dimensional objects describe the world and are used to develop mathematical arguments about geometric relationships and to evaluate the arguments of others.

MG: K-3 GD: 0 to -3 KY.K-3.G.SC.1 Shapes and Relationships: Students will identify, describe, model, draw, compare and classify two-dimensional figures and three-dimensional objects using elements, attributes and properties

Cluster: Analyze, compare, create, and compose shapes.

CCSS: **CC.K.G.4 Analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, parts (e.g., number of sides and vertices/“corners”) and other attributes (e.g., having sides of equal length).**

Grade: K DM: 3 = Excellent match between the two documents

Strand: Geometry Notes:

MG: K-3 GD: 0 to -3 KY.K-3.G.SC.1 Shapes and Relationships: Students will identify, describe, model, draw, compare and classify two-dimensional figures and three-dimensional objects using elements, attributes and properties

MG: K-3 GD: 0 to -3 KY.K-3.G.SC.2 Shapes and Relationships: Students will explore the relationships among two-dimensional figures and three-dimensional objects (e.g., using virtual manipulatives)

Cluster: Analyze, compare, create, and compose shapes.

CCSS: **CC.K.G.5 Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.**

Grade: K DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Geometry Notes:

MG: K-3	GD: 0 to -3	KY.K-3.G.EU.1 Students will understand that characteristics and properties of two-dimensional figures and three-dimensional objects describe the world and are used to develop mathematical arguments about geometric relationships and to evaluate the arguments of others.
MG: K-3	GD: 0 to -3	KY.K-3.G.EU.4 Students will understand that visualization, spatial reasoning and geometric relationships model real-world situations.
MG: K-3	GD: 0 to -3	KY.K-3.G.SC.1 Shapes and Relationships: Students will identify, describe, model, draw, compare and classify two-dimensional figures and three-dimensional objects using elements, attributes and properties
MG: K-3	GD: 0 to -3	KY.K-3.G.SC.4 Shapes and Relationships: Students will investigate and solve real-world problems using the elements, attributes and properties of basic two-dimensional figures and three-dimensional objects

Cluster: Analyze, compare, create, and compose shapes.

CCSS: **CC.K.G.6 Compose simple shapes to form larger shapes. For example, "can you join these two triangles with full sides touching to make a rectangle?"**

Grade: K DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Geometry Notes:

MG: K-3	GD: 0 to -3	KY.K-3.G.EU.1 Students will understand that characteristics and properties of two-dimensional figures and three-dimensional objects describe the world and are used to develop mathematical arguments about geometric relationships and to evaluate the arguments of others.
MG: K-3	GD: 0 to -3	KY.K-3.G.EU.4 Students will understand that visualization, spatial reasoning and geometric relationships model real-world situations.
MG: K-3	GD: 0 to -3	KY.K-3.G.SC.1 Shapes and Relationships: Students will identify, describe, model, draw, compare and classify two-dimensional figures and three-dimensional objects using elements, attributes and properties
MG: K-3	GD: 0 to -3	KY.K-3.G.SC.4 Shapes and Relationships: Students will investigate and solve real-world problems using the elements, attributes and properties of basic two-dimensional figures and three-dimensional objects

Measurement and Data

Cluster: Describe and compare measurable attributes.

CCSS: **CC.K.MD.1 Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.**

Grade: K DM: 3 = Excellent match between the two documents

Strand: Measurement and Data Notes:

MG: K-3 GD: 0 to -3 KY.K-3.M.EU.1 Students will understand that measurable attributes of objects and the units, systems and processes of measurement are powerful tools for making sense of the world around them.

MG: K-3 GD: 0 to -3 KY.K-3.M.SC.5 Measuring Physical Attributes: Students will sort/classify or compare and order objects by shape, size and color (e.g., attribute blocks)

Cluster: Describe and compare measurable attributes.

CCSS: **CC.K.MD.2 Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. For example, directly compare the heights of two children and describe one child as taller/shorter.**

Grade: K DM: 3 = Excellent match between the two documents

Strand: Measurement and Data Notes:

MG: K-3 GD: 0 to -3 KY.K-3.M.EU.1 Students will understand that measurable attributes of objects and the units, systems and processes of measurement are powerful tools for making sense of the world around them.

MG: K-3 GD: 0 to -3 KY.K-3.M.SC.5 Measuring Physical Attributes: Students will sort/classify or compare and order objects by shape, size and color (e.g., attribute blocks)

Cluster: Classify objects and count the number of objects in each category.

CCSS: **CC.K.MD.3 Classify objects into given categories; count the numbers of objects in each category and sort the categories by count. (Limit category counts to be less than or equal to 10.)**

Grade: K DM: 3 = Excellent match between the two documents

Strand: Measurement and Data Notes:

MG: K-3 GD: 0 to -3 KY.K-3.M.EU.1 Students will understand that measurable attributes of objects and the units, systems and processes of measurement are powerful tools for making sense of the world around them.

MG: K-3 GD: 0 to -3 KY.K-3.M.SC.5 Measuring Physical Attributes: Students will sort/classify or compare and order objects by shape, size and color (e.g., attribute blocks)

MG: K-3 GD: 0 to -3 KY.K-3.N.SC.3 Number Sense: Students will order groups of objects according to quantity

Number & Operations in Base Ten

Cluster: Work with numbers 11-19 to gain foundations for place value.

CCSS: **CC.K.NBT.1 Compose and decompose numbers from 11 to 19 into ten ones and some further ones, e.g., by using objects or drawings, and record each composition or decomposition by a drawing or equation (such as 18 = 10 + 8); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.**

Grade: K

DM: 3 = Excellent match between the two documents

Strand: Number & Operations in Base Ten

Notes:

MG: K-3 GD: 0 to -3 KY.K-3.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships between numbers and number systems are means of representing real-world quantities.

MG: K-3 GD: 0 to -3 KY.K-3.N.SC.1 Number Sense: Students will read, write, count and model whole numbers 0-10,000, developing an understanding of place value for ones, tens, hundreds, thousands and ten thousands

Operations and Algebraic Thinking

Cluster: Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.

CCSS: **CC.K.OA.1 Represent addition and subtraction with objects, fingers, mental images, drawings (drawings need not show details, but should show the mathematics in the problem), sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.**

Grade: K DM: 3 = Excellent match between the two documents

Strand: Operations and Algebraic Thinking Notes:

MG: K-3 GD: 0 to -3 KY.K-3.A.SC.3 Patterns, Relations and Functions: Students will use pictures or words to create, reproduce, extend and explain patterns of shapes, objects, movements, sounds and numbers

MG: K-3 GD: 0 to -3 KY.K-3.N.EU.2 Students will understand that meanings of and relationships among operations provide tools necessary to solve realistic problems encountered in everyday life.

MG: K-3 GD: 0 to -3 KY.K-3.N.SC.10 Number Operations: Students will develop an understanding of the concepts of addition and subtraction using physical objects and concrete materials

Cluster: Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.

CCSS: **CC.K.OA.2 Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.**

Grade: K DM: 3 = Excellent match between the two documents

Strand: Operations and Algebraic Thinking Notes:

MG: K-3 GD: 0 to -3 KY.K-3.N.EU.2 Students will understand that meanings of and relationships among operations provide tools necessary to solve realistic problems encountered in everyday life.

MG: K-3 GD: 0 to -3 KY.K-3.N.SC.10 Number Operations: Students will develop an understanding of the concepts of addition and subtraction using physical objects and concrete materials

Cluster: Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.

CCSS: **CC.K.OA.3 Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., 5 = 2 + 3 and 5 = 4 + 1).**

Grade: K DM: 3 = Excellent match between the two documents

Strand: Operations and Algebraic Thinking Notes:

MG: K-3 GD: 0 to -3 KY.K-3.N.EU.2 Students will understand that meanings of and relationships among operations provide tools necessary to solve realistic problems encountered in everyday life.

MG: K-3 GD: 0 to -3 KY.K-3.N.SC.10 Number Operations: Students will develop an understanding of the concepts of addition and subtraction using physical objects and concrete materials

MG: K-3 GD: 0 to -3 KY.K-3.N.SC.12 Number Operations: Students will develop part-whole relations using numbers (e.g., 3+2=5, 1+4=5)

Operations and Algebraic Thinking

Cluster: Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.

CCSS: **CC.K.OA.4 For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation.**

Grade: K DM: 3 = Excellent match between the two documents

Strand: Operations and Algebraic Thinking Notes:

MG: K-3 GD: 0 to -3 KY.K-3.N.EU.2 Students will understand that meanings of and relationships among operations provide tools necessary to solve realistic problems encountered in everyday life.

MG: K-3 GD: 0 to -3 KY.K-3.N.SC.10 Number Operations: Students will develop an understanding of the concepts of addition and subtraction using physical objects and concrete materials

MG: K-3 GD: 0 to -3 KY.K-3.N.SC.12 Number Operations: Students will develop part-whole relations using numbers (e.g., 3+2=5, 1+4=5)

Cluster: Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.

CCSS: **CC.K.OA.5 Fluently add and subtract within 5.**

Grade: K DM: 3 = Excellent match between the two documents

Strand: Operations and Algebraic Thinking Notes:

MG: K-3 GD: 0 to -3 KY.K-3.N.EU.2 Students will understand that meanings of and relationships among operations provide tools necessary to solve realistic problems encountered in everyday life.

MG: K-3 GD: 0 to -3 KY.K-3.N.EU.3 Students will understand that computing fluently and making reasonable estimates increases the ability to solve realistic problems encountered in everyday life.

MG: K-3 GD: 0 to -3 KY.K-3.N.SC.20 Number Operations: Students will use mental math, pencil-and-paper methods, calculators and/or computers to explore mathematical concepts and to assist with computation in problem solving situations

Geometry

Cluster: Reason with shapes and their attributes.

CCSS: **CC.1.G.1 Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); for a wide variety of shapes; build and draw shapes to possess defining attributes.**

Grade: 1 DM: 3 = Excellent match between the two documents

Strand: Geometry Notes:

MG: K-3 GD: 1 to -2 KY.K-3.G.EU.1 Students will understand that characteristics and properties of two-dimensional figures and three-dimensional objects describe the world and are used to develop mathematical arguments about geometric relationships and to evaluate the arguments of others.

MG: K-3 GD: 1 to -2 KY.K-3.G.SC.1 Shapes and Relationships: Students will identify, describe, model, draw, compare and classify two-dimensional figures and three-dimensional objects using elements, attributes and properties

Cluster: Reason with shapes and their attributes.

CCSS: **CC.1.G.2 Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape. (Students do not need to learn formal names such as "right rectangular prism.")**

Grade: 1 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Geometry Notes:

MG: K-3 GD: 1 to -2 KY.K-3.G.EU.1 Students will understand that characteristics and properties of two-dimensional figures and three-dimensional objects describe the world and are used to develop mathematical arguments about geometric relationships and to evaluate the arguments of others.

MG: K-3 GD: 1 to -2 KY.K-3.G.SC.1 Shapes and Relationships: Students will identify, describe, model, draw, compare and classify two-dimensional figures and three-dimensional objects using elements, attributes and properties

MG: K-3 GD: 1 to -2 KY.K-3.G.SC.2 Shapes and Relationships: Students will explore the relationships among two-dimensional figures and three-dimensional objects (e.g., using virtual manipulatives)

Cluster: Reason with shapes and their attributes.

CCSS: **CC.1.G.3 Partition circles and rectangles into two and four equal shares, describe the shares using the words halves, fourths, and quarters, and use the phrases half of, fourth of, and quarter of. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares.**

Grade: 1 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Geometry Notes:

MG: K-3 GD: 1 to -2 KY.K-3.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships between numbers and number systems are means of representing real-world quantities.

MG: K-3 GD: 1 to -2 KY.K-3.N.SC.5 Number Sense: Students will develop beginning fractional concepts (e.g., dividing an object into equal parts and naming the equal parts [e.g., halves, thirds, fourths])

Cluster: Measure lengths indirectly and by iterating length units.

CCSS: **CC.1.MD.1 Order three objects by length; compare the lengths of two objects indirectly by using a third object.**

Grade: 1 DM: 3 = Excellent match between the two documents

Strand: Measurement and Data Notes:

MG: K-3 GD: 1 to -2 KY.K-3.M.EU.1 Students will understand that measurable attributes of objects and the units, systems and processes of measurement are powerful tools for making sense of the world around them.

MG: K-3 GD: 1 to -2 KY.K-3.M.EU.2 Students will understand that measurements are determined by using appropriate techniques, tools and formulas.

MG: K-3 GD: 1 to -2 KY.K-3.M.SC.2 Measuring Physical Attributes: Students will use nonstandard units to measure and compare the length, weight, area or volume of familiar objects

MG: K-3 GD: 1 to -2 KY.K-3.M.SC.5 Measuring Physical Attributes: Students will sort/classify or compare and order objects by shape, size and color (e.g., attribute blocks)

Cluster: Measure lengths indirectly and by iterating length units.

CCSS: **CC.1.MD.2 Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.**

Grade: 1 DM: 3 = Excellent match between the two documents

Strand: Measurement and Data Notes:

MG: K-3 GD: 1 to -2 KY.K-3.M.EU.1 Students will understand that measurable attributes of objects and the units, systems and processes of measurement are powerful tools for making sense of the world around them.

MG: K-3 GD: 1 to -2 KY.K-3.M.EU.2 Students will understand that measurements are determined by using appropriate techniques, tools and formulas.

MG: K-3 GD: 1 to -2 KY.K-3.M.EU.3 Students will understand that for each situation, there is an appropriate degree of accuracy in measurement.

MG: K-3 GD: 1 to -2 KY.K-3.M.SC.2 Measuring Physical Attributes: Students will use nonstandard units to measure and compare the length, weight, area or volume of familiar objects

Cluster: Tell and write time.

CCSS: **CC.1.MD.3 Tell and write time in hours and half-hours using analog and digital clocks.**

Grade: 1 DM: 3 = Excellent match between the two documents

Strand: Measurement and Data Notes:

MG: K-3 GD: 1 to -2 KY.K-3.M.EU.1 Students will understand that measurable attributes of objects and the units, systems and processes of measurement are powerful tools for making sense of the world around them.

MG: K-3 GD: 1 to -2 KY.K-3.M.SC.1 Measuring Physical Attributes: Students will apply standard units to measure length (inches and centimeters), weight (pounds), time (hours, half-hours, quarter-hours, five- and one-minute intervals), money (coins and bills) and temperature (Fahrenheit and Celsius)

MG: K-3 GD: 1 to -2 KY.K-3.M.SC.10 Measuring Physical Attributes: Students will relate time to daily activities, tell time to the hour, half-hour, quarter-hour, five minutes and one minute and determine elapsed time

Cluster: Represent and interpret data.

CCSS: **CC.1.MD.4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.**

Grade: 1 DM: 3 = Excellent match between the two documents

Strand: Measurement and Data Notes:

MG: K-3 GD: 1 to -2 KY.K-3.D.EU.1 Students will understand that quantitative literacy is a necessary tool to be an intelligent consumer and citizen.

MG: K-3 GD: 1 to -2 KY.K-3.D.EU.2 Students will understand that the collection, organization, interpretation and display of data can be used to answer questions.

MG: K-3 GD: 1 to -2 KY.K-3.D.SC.1 Data Representations: Students will make a graph using concrete manipulatives and read data displayed on a concrete graph

MG: K-3 GD: 1 to -2 KY.K-3.D.SC.2 Data Representations: Students will display, read and compare data on student-invented graphs

MG: K-3 GD: 1 to -2 KY.K-3.D.SC.3 Data Representations: Students will read, display, compare and interpret student-collected data

Number & Operations in Base Ten

Cluster: Extend the counting sequence.

CCSS: **CC.1.NBT.1 Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.**

Grade: 1 DM: 3 = Excellent match between the two documents

Strand: Number & Operations in Base Ten Notes:

MG: K-3 GD: 1 to -2 KY.K-3.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships between numbers and number systems are means of representing real-world quantities.

MG: K-3 GD: 1 to -2 KY.K-3.N.SC.1 Number Sense: Students will read, write, count and model whole numbers 0-10,000, developing an understanding of place value for ones, tens, hundreds, thousands and ten thousands

Cluster: Understand place value.

CCSS: **CC.1.NBT.2 Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases: -- a. 10 can be thought of as a bundle of ten ones — called a "ten." -- b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones. -- c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).**

Grade: 1 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Number & Operations in Base Ten Notes:

MG: K-3 GD: 1 to -2 KY.K-3.A.EU.2 Students will understand that numerical patterns can be written as rules that generate the pattern.

MG: K-3 GD: 1 to -2 KY.K-3.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships between numbers and number systems are means of representing real-world quantities.

MG: K-3 GD: 1 to -2 KY.K-3.N.SC.1 Number Sense: Students will read, write, count and model whole numbers 0-10,000, developing an understanding of place value for ones, tens, hundreds, thousands and ten thousands

Cluster: Understand place value.

CCSS: **CC.1.NBT.3 Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.**

Grade: 1 DM: 3 = Excellent match between the two documents

Strand: Number & Operations in Base Ten Notes:

MG: K-3 GD: 1 to -2 KY.K-3.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships between numbers and number systems are means of representing real-world quantities.

MG: K-3 GD: 1 to -2 KY.K-3.N.SC.4 Number Sense: Students will order, compare and understand the relative magnitude of numbers from 0-10,000, using the symbols <, >, =, including the use of physical and visual models for smaller numbers

Cluster: Use place value understanding and properties of operations to add and subtract.

CCSS: **CC.1.NBT.4 Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.**

Grade: 1 DM: 3 = Excellent match between the two documents

Strand: Number & Operations in Base Ten Notes:

MG: 4 GD: -3 KY.4.N.SC.8 Number Sense: Students will explain how the base 10 number system relates to place value

Number & Operations in Base Ten

MG: K-3 GD: 1 to -2 KY.K-3.N.EU.2 Students will understand that meanings of and relationships among operations provide tools necessary to solve realistic problems encountered in everyday life.

MG: K-3 GD: 1 to -2 KY.K-3.N.SC.17 Number Operations: Students will solve multi-digit addition and subtraction problems that contain numerals and symbols

MG: K-3 GD: 1 to -2 KY.K-3.N.SC.20 Number Operations: Students will use mental math, pencil-and-paper methods, calculators and/or computers to explore mathematical concepts and to assist with computation in problem solving situations

MG: K-3 GD: 1 to -2 KY.K-3.N.SC.21 Properties of Numbers and Operations: Students will explore, develop and use the concepts of multiples

MG: K-3 GD: 1 to -2 KY.K-3.N.SC.24 Properties of Numbers and Operations: Students will explore and use of properties of numbers for written and mental computation (e.g., 4+7+6 could be mentally regrouped as 4+6+7 using the commutative property of addition)

Cluster: Use place value understanding and properties of operations to add and subtract.

CCSS: **CC.1.NBT.5 Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.**

Grade: 1 DM: 3 = Excellent match between the two documents

Strand: Number & Operations in Base Ten Notes:

MG: K-3 GD: 1 to -2 KY.K-3.N.EU.2 Students will understand that meanings of and relationships among operations provide tools necessary to solve realistic problems encountered in everyday life.

MG: K-3 GD: 1 to -2 KY.K-3.N.SC.17 Number Operations: Students will solve multi-digit addition and subtraction problems that contain numerals and symbols

MG: K-3 GD: 1 to -2 KY.K-3.N.SC.20 Number Operations: Students will use mental math, pencil-and-paper methods, calculators and/or computers to explore mathematical concepts and to assist with computation in problem solving situations

MG: K-3 GD: 1 to -2 KY.K-3.N.SC.21 Properties of Numbers and Operations: Students will explore, develop and use the concepts of multiples

MG: K-3 GD: 1 to -2 KY.K-3.N.SC.24 Properties of Numbers and Operations: Students will explore and use of properties of numbers for written and mental computation (e.g., 4+7+6 could be mentally regrouped as 4+6+7 using the commutative property of addition)

Cluster: Use place value understanding and properties of operations to add and subtract.

CCSS: **CC.1.NBT.6 Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.**

Grade: 1 DM: 3 = Excellent match between the two documents

Strand: Number & Operations in Base Ten Notes:

MG: K-3 GD: 1 to -2 KY.K-3.N.EU.2 Students will understand that meanings of and relationships among operations provide tools necessary to solve realistic problems encountered in everyday life.

MG: K-3 GD: 1 to -2 KY.K-3.N.SC.17 Number Operations: Students will solve multi-digit addition and subtraction problems that contain numerals and symbols

MG: K-3 GD: 1 to -2 KY.K-3.N.SC.20 Number Operations: Students will use mental math, pencil-and-paper methods, calculators and/or computers to explore mathematical concepts and to assist with computation in problem solving situations

MG: K-3 GD: 1 to -2 KY.K-3.N.SC.21 Properties of Numbers and Operations: Students will explore, develop and use the concepts of multiples

MG: K-3 GD: 1 to -2 KY.K-3.N.SC.24 Properties of Numbers and Operations: Students will explore and use of properties of numbers for written and mental computation (e.g., 4+7+6 could be mentally regrouped as 4+6+7 using the commutative property of addition)

Operations and Algebraic Thinking

Cluster: Represent and solve problems involving addition and subtraction.

CCSS: **CC.1.OA.1 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.**

Grade: 1 DM: 3 = Excellent match between the two documents

Strand: Operations and Algebraic Thinking Notes:

MG: K-3 GD: 1 to -2 KY.K-3.N.EU.2 Students will understand that meanings of and relationships among operations provide tools necessary to solve realistic problems encountered in everyday life.

MG: K-3 GD: 1 to -2 KY.K-3.N.SC.10 Number Operations: Students will develop an understanding of the concepts of addition and subtraction using physical objects and concrete materials

Cluster: Represent and solve problems involving addition and subtraction.

CCSS: **CC.1.OA.2 Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.**

Grade: 1 DM: 3 = Excellent match between the two documents

Strand: Operations and Algebraic Thinking Notes:

MG: K-3 GD: 1 to -2 KY.K-3.N.EU.2 Students will understand that meanings of and relationships among operations provide tools necessary to solve realistic problems encountered in everyday life.

MG: K-3 GD: 1 to -2 KY.K-3.N.SC.10 Number Operations: Students will develop an understanding of the concepts of addition and subtraction using physical objects and concrete materials

Cluster: Understand and apply properties of operations and the relationship between addition and subtraction.

CCSS: **CC.1.OA.3 Apply properties of operations as strategies to add and subtract. Examples: If 8 + 3 = 11 is known, then 3 + 8 = 11 is also known. (Commutative property of addition.) To add 2 + 6 + 4, the second two numbers can be added to make a ten, so 2 + 6 + 4 = 2 + 10 = 12. (Associative property of addition.) (Students need not use formal terms for these properties.)**

Grade: 1 DM: 3 = Excellent match between the two documents

Strand: Operations and Algebraic Thinking Notes:

MG: K-3 GD: 1 to -2 KY.K-3.N.EU.2 Students will understand that meanings of and relationships among operations provide tools necessary to solve realistic problems encountered in everyday life.

MG: K-3 GD: 1 to -2 KY.K-3.N.SC.24 Properties of Numbers and Operations: Students will explore and use of properties of numbers for written and mental computation (e.g., 4+7+6 could be mentally regrouped as 4+6+7 using the commutative property of addition)

Cluster: Understand and apply properties of operations and the relationship between addition and subtraction.

CCSS: **CC.1.OA.4 Understand subtraction as an unknown-addend problem. For example, subtract 10 – 8 by finding the number that makes 10 when added to 8.**

Grade: 1 DM: 3 = Excellent match between the two documents

Strand: Operations and Algebraic Thinking Notes:

MG: K-3 GD: 1 to -2 KY.K-3.A.SC.9 Equations and Inequalities: Students will solve simple equations (e.g., 1 + 1 = [ ]; [ ] - 2 = 7)

MG: K-3 GD: 1 to -2 KY.K-3.N.EU.2 Students will understand that meanings of and relationships among operations provide tools necessary to solve realistic problems encountered in everyday life.

Operations and Algebraic Thinking

MG: K-3 GD: 1 to -2 KY.K-3.N.SC.24 Properties of Numbers and Operations: Students will explore and use of properties of numbers for written and mental computation (e.g., 4+7+6 could be mentally regrouped as 4+6+7 using the commutative property of addition)

Cluster: Add and subtract within 20.

CCSS: **CC.1.OA.5 Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).**

Grade: 1 DM: 3 = Excellent match between the two documents

Strand: Operations and Algebraic Thinking Notes:

MG: K-3 GD: 1 to -2 KY.K-3.N.EU.2 Students will understand that meanings of and relationships among operations provide tools necessary to solve realistic problems encountered in everyday life.

MG: K-3 GD: 1 to -2 KY.K-3.N.SC.17 Number Operations: Students will solve multi-digit addition and subtraction problems that contain numerals and symbols

MG: K-3 GD: 1 to -2 KY.K-3.N.SC.20 Number Operations: Students will use mental math, pencil-and-paper methods, calculators and/or computers to explore mathematical concepts and to assist with computation in problem solving situations

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Cluster: Add and subtract within 20.

CCSS: **CC.1.OA.6 Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten (e.g., 8 + 6 = 8 + 2 + 4 = 10 + 4 = 14); decomposing a number leading to a ten (e.g., 13 – 4 = 13 – 3 – 1 = 10 – 1 = 9); using the relationship between addition and subtraction (e.g., knowing that 8 + 4 = 12, one knows 12 – 8 = 4); and creating equivalent but easier or known sums (e.g., adding 6 + 7 by creating the known equivalent 6 + 6 + 1 = 12 + 1 = 13).**

Grade: 1 DM: 3 = Excellent match between the two documents

Strand: Operations and Algebraic Thinking Notes:

MG: K-3 GD: 1 to -2 KY.K-3.N.EU.2 Students will understand that meanings of and relationships among operations provide tools necessary to solve realistic problems encountered in everyday life.

MG: K-3 GD: 1 to -2 KY.K-3.N.EU.3 Students will understand that computing fluently and making reasonable estimates increases the ability to solve realistic problems encountered in everyday life.

MG: K-3 GD: 1 to -2 KY.K-3.N.SC.17 Number Operations: Students will solve multi-digit addition and subtraction problems that contain numerals and symbols

MG: K-3 GD: 1 to -2 KY.K-3.N.SC.20 Number Operations: Students will use mental math, pencil-and-paper methods, calculators and/or computers to explore mathematical concepts and to assist with computation in problem solving situations

MG: K-3 GD: 1 to -2 KY.K-3.N.SC.24 Properties of Numbers and Operations: Students will explore and use of properties of numbers for written and mental computation (e.g., 4+7+6 could be mentally regrouped as 4+6+7 using the commutative property of addition)

Cluster: Work with addition and subtraction equations.

CCSS: **CC.1.OA.7 Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. For example, which of the following equations are true and which are false? 6 = 6, 7 = 8 – 1, 5 + 2 = 2 + 5, 4 + 1 = 5 + 2.**

Grade: 1 DM: 3 = Excellent match between the two documents

Strand: Operations and Algebraic Thinking Notes:

MG: K-3 GD: 1 to -2 KY.K-3.N.EU.2 Students will understand that meanings of and relationships among operations provide tools necessary to solve realistic problems encountered in everyday life.

Cluster: Work with addition and subtraction equations.

CCSS: **CC.1.OA.8 Determine the unknown whole number in an addition or subtraction equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations 8 + ? = 11, 5 = __ – 3, 6 + 6 = __.**

Grade: 1 DM: 3 = Excellent match between the two documents

Strand: Operations and Algebraic Thinking Notes:

MG: K-3	GD: 1 to -2	KY.K-3.A.SC.11 Equations and Inequalities: Students will solve for unknowns in simple open sentences
MG: K-3	GD: 1 to -2	KY.K-3.A.SC.9 Equations and Inequalities: Students will solve simple equations (e.g., 1 + 1 = [ ]; [ ] - 2 = 7)
MG: K-3	GD: 1 to -2	KY.K-3.N.EU.2 Students will understand that meanings of and relationships among operations provide tools necessary to solve realistic problems encountered in everyday life.
MG: K-3	GD: 1 to -2	KY.K-3.N.SC.17 Number Operations: Students will solve multi-digit addition and subtraction problems that contain numerals and symbols
MG: K-3	GD: 1 to -2	KY.K-3.N.SC.20 Number Operations: Students will use mental math, pencil-and-paper methods, calculators and/or computers to explore mathematical concepts and to assist with computation in problem solving situations

Cluster: Reason with shapes and their attributes.

CCSS: **CC.2.G.1 Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes. (Sizes are compared directly or visually, not compared by measuring.)**

Grade: 2 DM: 3 = Excellent match between the two documents

Strand: Geometry Notes:

MG: K-3 GD: 2 to -1 KY.K-3.G.EU.1 Students will understand that characteristics and properties of two-dimensional figures and three-dimensional objects describe the world and are used to develop mathematical arguments about geometric relationships and to evaluate the arguments of others.

MG: K-3 GD: 2 to -1 KY.K-3.G.SC.1 Shapes and Relationships: Students will identify, describe, model, draw, compare and classify two-dimensional figures and three-dimensional objects using elements, attributes and properties

Cluster: Reason with shapes and their attributes.

CCSS: **CC.2.G.2 Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.**

Grade: 2 DM: 3 = Excellent match between the two documents

Strand: Geometry Notes:

MG: K-3 GD: 2 to -1 KY.K-3.M.SC.7 Measuring Physical Attributes: Students will explore concepts of perimeter and area of rectangles using manipulatives

MG: K-3 GD: 2 to -1 KY.K-3.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships between numbers and number systems are means of representing real-world quantities.

MG: K-3 GD: 2 to -1 KY.K-3.N.SC.11 Number Operations: Students will explore and develop an understanding of the concepts of multiplication and division using physical models

MG: K-3 GD: 2 to -1 KY.K-3.N.SC.14 Number Operations: Students will explore and develop factor-factor-product (e.g., 2x3=6) using manipulatives. (e.g., hundreds charts, base-10 blocks, arrays)

Cluster: Reason with shapes and their attributes.

CCSS: **CC.2.G.3 Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words halves, thirds, half of, a third of, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.**

Grade: 2 DM: 3 = Excellent match between the two documents

Strand: Geometry Notes:

MG: K-3 GD: 2 to -1 KY.K-3.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships between numbers and number systems are means of representing real-world quantities.

MG: K-3 GD: 2 to -1 KY.K-3.N.SC.5 Number Sense: Students will develop beginning fractional concepts (e.g., dividing an object into equal parts and naming the equal parts [e.g., halves, thirds, fourths])

Cluster: Measure and estimate lengths in standard units.

CCSS: **CC.2.MD.1 Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.**

Grade: 2 DM: 3 = Excellent match between the two documents

Strand: Measurement and Data Notes:

MG: K-3 GD: 2 to -1 KY.K-3.M.EU.1 Students will understand that measurable attributes of objects and the units, systems and processes of measurement are powerful tools for making sense of the world around them.

MG: K-3 GD: 2 to -1 KY.K-3.M.EU.2 Students will understand that measurements are determined by using appropriate techniques, tools and formulas.

MG: K-3 GD: 2 to -1 KY.K-3.M.SC.1 Measuring Physical Attributes: Students will apply standard units to measure length (inches and centimeters), weight (pounds), time (hours, half-hours, quarter-hours, five- and one-minute intervals), money (coins and bills) and temperature (Fahrenheit and Celsius)

MG: K-3 GD: 2 to -1 KY.K-3.M.SC.4 Measuring Physical Attributes: Students will choose and use appropriate tools for specific measurement tasks

MG: K-3 GD: 2 to -1 KY.K-3.M.SC.6 Measuring Physical Attributes: Students will estimate weight, length, perimeter, area, angle and time using appropriate units of measurement

Cluster: Measure and estimate lengths in standard units.

CCSS: **CC.2.MD.2 Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.**

Grade: 2 DM: 3 = Excellent match between the two documents

Strand: Measurement and Data Notes:

MG: K-3 GD: 2 to -1 KY.K-3.M.EU.1 Students will understand that measurable attributes of objects and the units, systems and processes of measurement are powerful tools for making sense of the world around them.

MG: K-3 GD: 2 to -1 KY.K-3.M.EU.2 Students will understand that measurements are determined by using appropriate techniques, tools and formulas.

MG: K-3 GD: 2 to -1 KY.K-3.M.EU.3 Students will understand that for each situation, there is an appropriate degree of accuracy in measurement.

MG: K-3 GD: 2 to -1 KY.K-3.M.SC.1 Measuring Physical Attributes: Students will apply standard units to measure length (inches and centimeters), weight (pounds), time (hours, half-hours, quarter-hours, five- and one-minute intervals), money (coins and bills) and temperature (Fahrenheit and Celsius)

MG: K-3 GD: 2 to -1 KY.K-3.M.SC.3 Measuring Physical Attributes: Students will use standard units of measurement to identify, describe and compare measurable attributes of objects (e.g., length, weight, volume) and make estimates using appropriate units of measurement

Cluster: Measure and estimate lengths in standard units.

CCSS: **CC.2.MD.3 Estimate lengths using units of inches, feet, centimeters, and meters.**

Grade: 2 DM: 3 = Excellent match between the two documents

Strand: Measurement and Data Notes:

MG: K-3 GD: 2 to -1 KY.K-3.M.EU.1 Students will understand that measurable attributes of objects and the units, systems and processes of measurement are powerful tools for making sense of the world around them.

MG: K-3 GD: 2 to -1 KY.K-3.M.SC.6 Measuring Physical Attributes: Students will estimate weight, length, perimeter, area, angle and time using appropriate units of measurement

Measurement and Data

Cluster: Measure and estimate lengths in standard units.

CCSS: **CC.2.MD.4 Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.**

Grade: 2 DM: 3 = Excellent match between the two documents

Strand: Measurement and Data Notes:

MG: K-3 GD: 2 to -1 KY.K-3.M.EU.1 Students will understand that measurable attributes of objects and the units, systems and processes of measurement are powerful tools for making sense of the world around them.

MG: K-3 GD: 2 to -1 KY.K-3.M.SC.1 Measuring Physical Attributes: Students will apply standard units to measure length (inches and centimeters), weight (pounds), time (hours, half-hours, quarter-hours, five- and one-minute intervals), money (coins and bills) and temperature (Fahrenheit and Celsius)

MG: K-3 GD: 2 to -1 KY.K-3.M.SC.3 Measuring Physical Attributes: Students will use standard units of measurement to identify, describe and compare measurable attributes of objects (e.g., length, weight, volume) and make estimates using appropriate units of measurement

Cluster: Relate addition and subtraction to length.

CCSS: **CC.2.MD.5 Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.**

Grade: 2 DM: 3 = Excellent match between the two documents

Strand: Measurement and Data Notes:

MG: K-3 GD: 2 to -1 KY.K-3.A.SC.11 Equations and Inequalities: Students will solve for unknowns in simple open sentences

MG: K-3 GD: 2 to -1 KY.K-3.M.EU.1 Students will understand that measurable attributes of objects and the units, systems and processes of measurement are powerful tools for making sense of the world around them.

MG: K-3 GD: 2 to -1 KY.K-3.M.SC.12 Systems of Measurement: Students will describe, define, give examples of and use to solve real-world and/or mathematical problems both nonstandard and standard (U.S. Customary, metric) units of measurement to include length, time, money, temperature (Fahrenheit and Celsius) and weight

MG: K-3 GD: 2 to -1 KY.K-3.N.EU.2 Students will understand that meanings of and relationships among operations provide tools necessary to solve realistic problems encountered in everyday life.

Cluster: Relate addition and subtraction to length.

CCSS: **CC.2.MD.6 Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, … , and represent whole-number sums and differences within 100 on a number line diagram.**

Grade: 2 DM: 3 = Excellent match between the two documents

Strand: Measurement and Data Notes:

MG: K-3 GD: 2 to -1 KY.K-3.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships between numbers and number systems are means of representing real-world quantities.

MG: K-3 GD: 2 to -1 KY.K-3.N.SC.2 Number Sense: Students will apply multiple representations (e.g., drawings, manipulatives, base-10 blocks, number lines, expanded form, symbols) to describe and compare whole numbers and fractions (e.g., halves, thirds, fourths) in mathematical and real-world problems

Cluster: Work with time and money.

CCSS: **CC.2.MD.7 Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.**

Grade: 2 DM: 3 = Excellent match between the two documents

Strand: Measurement and Data Notes:

MG: K-3 GD: 2 to -1 KY.K-3.M.EU.1 Students will understand that measurable attributes of objects and the units, systems and processes of measurement are powerful tools for making sense of the world around them.

MG: K-3 GD: 2 to -1 KY.K-3.M.SC.1 Measuring Physical Attributes: Students will apply standard units to measure length (inches and centimeters), weight (pounds), time (hours, half-hours, quarter-hours, five- and one-minute intervals), money (coins and bills) and temperature (Fahrenheit and Celsius)

MG: K-3 GD: 2 to -1 KY.K-3.M.SC.10 Measuring Physical Attributes: Students will relate time to daily activities, tell time to the hour, half-hour, quarter-hour, five minutes and one minute and determine elapsed time

MG: K-3 GD: 2 to -1 KY.K-3.M.SC.6 Measuring Physical Attributes: Students will estimate weight, length, perimeter, area, angle and time using appropriate units of measurement

Cluster: Work with time and money.

CCSS: **CC.2.MD.8 Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using $ (dollars) and ¢ (cents) symbols appropriately. Example: If you have 2 dimes and 3 pennies, how many cents do you have?**

Grade: 2 DM: 3 = Excellent match between the two documents

Strand: Measurement and Data Notes:

MG: K-3 GD: 2 to -1 KY.K-3.M.EU.1 Students will understand that measurable attributes of objects and the units, systems and processes of measurement are powerful tools for making sense of the world around them.

MG: K-3 GD: 2 to -1 KY.K-3.M.SC.1 Measuring Physical Attributes: Students will apply standard units to measure length (inches and centimeters), weight (pounds), time (hours, half-hours, quarter-hours, five- and one-minute intervals), money (coins and bills) and temperature (Fahrenheit and Celsius)

MG: K-3 GD: 2 to -1 KY.K-3.M.SC.12 Systems of Measurement: Students will describe, define, give examples of and use to solve real-world and/or mathematical problems both nonstandard and standard (U.S. Customary, metric) units of measurement to include length, time, money, temperature (Fahrenheit and Celsius) and weight

MG: K-3 GD: 2 to -1 KY.K-3.M.SC.9 Measuring Physical Attributes: Students will combine coins and bills to make a given amount and make change up to a dollar

MG: K-3 GD: 2 to -1 KY.K-3.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships between numbers and number systems are means of representing real-world quantities.

MG: K-3 GD: 2 to -1 KY.K-3.N.SC.7 Number Sense: Students will be introduced to and use decimals to represent money

Cluster: Represent and interpret data.

CCSS: **CC.2.MD.9 Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.**

Grade: 2 DM: 3 = Excellent match between the two documents

Strand: Measurement and Data Notes:

MG: K-3 GD: 2 to -1 KY.K-3.D.EU.2 Students will understand that the collection, organization, interpretation and display of data can be used to answer questions.

MG: K-3 GD: 2 to -1 KY.K-3.D.SC.3 Data Representations: Students will read, display, compare and interpret student-collected data

Measurement and Data

MG: K-3 GD: 2 to -1 KY.K-3.D.SC.5 Data Representations: Students will display data in line plots

MG: K-3 GD: 2 to -1 KY.K-3.M.EU.1 Students will understand that measurable attributes of objects and the units, systems and processes of measurement are powerful tools for making sense of the world around them.

MG: K-3 GD: 2 to -1 KY.K-3.M.SC.1 Measuring Physical Attributes: Students will apply standard units to measure length (inches and centimeters), weight (pounds), time (hours, half-hours, quarter-hours, five- and one-minute intervals), money (coins and bills) and temperature (Fahrenheit and Celsius)

Cluster: Represent and interpret data.

CCSS: **CC.2.MD.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph.**

Grade: 2 DM: 3 = Excellent match between the two documents

Strand: Measurement and Data Notes:

MG: K-3 GD: 2 to -1 KY.K-3.D.EU.2 Students will understand that the collection, organization, interpretation and display of data can be used to answer questions.

MG: K-3 GD: 2 to -1 KY.K-3.D.SC.2 Data Representations: Students will display, read and compare data on student-invented graphs

MG: K-3 GD: 2 to -1 KY.K-3.D.SC.4 Data Representations: Students will display, read and compare data on a pictograph and bar graph

Number & Operations in Base Ten

Cluster: Understand place value.

CCSS: **CC.2.NBT.1 Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases: -- a. 100 can be thought of as a bundle of ten tens — called a "hundred." -- b. The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).**

Grade: 2 DM: 3 = Excellent match between the two documents

Strand: Number & Operations in Base Ten Notes:

MG: K-3 GD: 2 to -1 KY.K-3.A.SC.4 Patterns, Relations and Functions: Students will recognize and extend simple number patterns

MG: K-3 GD: 2 to -1 KY.K-3.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships between numbers and number systems are means of representing real-world quantities.

MG: K-3 GD: 2 to -1 KY.K-3.N.SC.1 Number Sense: Students will read, write, count and model whole numbers 0-10CC.2.NBT.1 Understand that the three digits of a three-digit for ones, tens, hundreds, thousands and ten thousands

Cluster: Understand place value.

CCSS: **CC.2.NBT.2 Count within 1000; skip-count by 5s, 10s, and 100s.**

Grade: 2 DM: 3 = Excellent match between the two documents

Strand: Number & Operations in Base Ten Notes:

MG: K-3 GD: 2 to -1 KY.K-3.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships between numbers and number systems are means of representing real-world quantities.

MG: K-3 GD: 2 to -1 KY.K-3.N.SC.1 Number Sense: Students will read, write, count and model whole numbers 0-10,000, developing an understanding of place value for ones, tens, hundreds, thousands and ten thousands

MG: K-3 GD: 2 to -1 KY.K-3.N.SC.22 Properties of Numbers and Operations: Students will skip-count forwards and backwards by 2s, 5s, 10s and 100s, using manipulatives, mental math and written and electronic means to communicate understanding

Cluster: Understand place value.

CCSS: **CC.2.NBT.3 Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.**

Grade: 2 DM: 3 = Excellent match between the two documents

Strand: Number & Operations in Base Ten Notes:

MG: K-3 GD: 2 to -1 KY.K-3.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships between numbers and number systems are means of representing real-world quantities.

MG: K-3 GD: 2 to -1 KY.K-3.N.SC.1 Number Sense: Students will read, write, count and model whole numbers 0-10,000, developing an understanding of place value for ones, tens, hundreds, thousands and ten thousands

MG: K-3 GD: 2 to -1 KY.K-3.N.SC.2 Number Sense: Students will apply multiple representations (e.g., drawings, manipulatives, base-10 blocks, number lines, expanded form, symbols) to describe and compare whole numbers and fractions (e.g., halves, thirds, fourths) in mathematical and real-world problems

Number & Operations in Base Ten

Cluster: Understand place value.

CCSS: **CC.2.NBT.4 Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.**

Grade: 2 DM: 3 = Excellent match between the two documents

Strand: Number & Operations in Base Ten Notes:

MG: K-3 GD: 2 to -1 KY.K-3.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships between numbers and number systems are means of representing real-world quantities.

MG: K-3 GD: 2 to -1 KY.K-3.N.SC.1 Number Sense: Students will read, write, count and model whole numbers 0-10,000, developing an understanding of place value for ones, tens, hundreds, thousands and ten thousands

MG: K-3 GD: 2 to -1 KY.K-3.N.SC.4 Number Sense: Students will order, compare and understand the relative magnitude of numbers from 0-10,000, using the symbols <, >, =, including the use of physical and visual models for smaller numbers

Cluster: Use place value understanding and properties of operations to add and subtract.

CCSS: **CC.2.NBT.5 Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.**

Grade: 2 DM: 3 = Excellent match between the two documents

Strand: Number & Operations in Base Ten Notes:

MG: K-3 GD: 2 to -1 KY.K-3.N.EU.2 Students will understand that meanings of and relationships among operations provide tools necessary to solve realistic problems encountered in everyday life.

MG: K-3 GD: 2 to -1 KY.K-3.N.SC.17 Number Operations: Students will solve multi-digit addition and subtraction problems that contain numerals and symbols

MG: K-3 GD: 2 to -1 KY.K-3.N.SC.24 Properties of Numbers and Operations: Students will explore and use of properties of numbers for written and mental computation (e.g., 4+7+6 could be mentally regrouped as 4+6+7 using the commutative property of addition)

Cluster: Use place value understanding and properties of operations to add and subtract.

CCSS: **CC.2.NBT.6 Add up to four two-digit numbers using strategies based on place value and properties of operations.**

Grade: 2 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Number & Operations in Base Ten Notes:

MG: K-3 GD: 2 to -1 KY.K-3.N.EU.2 Students will understand that meanings of and relationships among operations provide tools necessary to solve realistic problems encountered in everyday life.

MG: K-3 GD: 2 to -1 KY.K-3.N.SC.17 Number Operations: Students will solve multi-digit addition and subtraction problems that contain numerals and symbols

MG: K-3 GD: 2 to -1 KY.K-3.N.SC.24 Properties of Numbers and Operations: Students will explore and use of properties of numbers for written and mental computation (e.g., 4+7+6 could be mentally regrouped as 4+6+7 using the commutative property of addition)

Number & Operations in Base Ten

Cluster: Use place value understanding and properties of operations to add and subtract.

CCSS: **CC.2.NBT.7 Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.**

Grade: 2 DM: 3 = Excellent match between the two documents

Strand: Number & Operations in Base Ten Notes: POS not as specific

MG: K-3 GD: 2 to -1 KY.K-3.N.EU.2 Students will understand that meanings of and relationships among operations provide tools necessary to solve realistic problems encountered in everyday life.

MG: K-3 GD: 2 to -1 KY.K-3.N.SC.17 Number Operations: Students will solve multi-digit addition and subtraction problems that contain numerals and symbols

MG: K-3 GD: 2 to -1 KY.K-3.N.SC.24 Properties of Numbers and Operations: Students will explore and use of properties of numbers for written and mental computation (e.g., 4+7+6 could be mentally regrouped as 4+6+7 using the commutative property of addition)

Cluster: Use place value understanding and properties of operations to add and subtract.

CCSS: **CC.2.NBT.8 Mentally add 10 or 100 to a given number 100-900, and mentally subtract 10 or 100 from a given number 100-900.**

Grade: 2 DM: 3 = Excellent match between the two documents

Strand: Number & Operations in Base Ten Notes:

MG: K-3 GD: 2 to -1 KY.K-3.N.EU.2 Students will understand that meanings of and relationships among operations provide tools necessary to solve realistic problems encountered in everyday life.

MG: K-3 GD: 2 to -1 KY.K-3.N.SC.17 Number Operations: Students will solve multi-digit addition and subtraction problems that contain numerals and symbols

MG: K-3 GD: 2 to -1 KY.K-3.N.SC.21 Properties of Numbers and Operations: Students will explore, develop and use the concepts of multiples

MG: K-3 GD: 2 to -1 KY.K-3.N.SC.24 Properties of Numbers and Operations: Students will explore and use of properties of numbers for written and mental computation (e.g., 4+7+6 could be mentally regrouped as 4+6+7 using the commutative property of addition)

Cluster: Use place value understanding and properties of operations to add and subtract.

CCSS: **CC.2.NBT.9 Explain why addition and subtraction strategies work, using place value and the properties of operations. (Explanations may be supported by drawings or objects.)**

Grade: 2 DM: 3 = Excellent match between the two documents

Strand: Number & Operations in Base Ten Notes:

MG: 4 GD: -2 KY.4.N.SC.8 Number Sense: Students will explain how the base 10 number system relates to place value

MG: K-3 GD: 2 to -1 KY.K-3.N.EU.2 Students will understand that meanings of and relationships among operations provide tools necessary to solve realistic problems encountered in everyday life.

MG: K-3 GD: 2 to -1 KY.K-3.N.SC.17 Number Operations: Students will solve multi-digit addition and subtraction problems that contain numerals and symbols

MG: K-3 GD: 2 to -1 KY.K-3.N.SC.24 Properties of Numbers and Operations: Students will explore and use of properties of numbers for written and mental computation (e.g., 4+7+6 could be mentally regrouped as 4+6+7 using the commutative property of addition)

Operations and Algebraic Thinking

Cluster: Represent and solve problems involving addition and subtraction.

CCSS: **CC.2.OA.1 Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.**

Grade: 2 DM: 3 = Excellent match between the two documents

Strand: Operations and Algebraic Thinking Notes:

MG: K-3 GD: 2 to -1 KY.K-3.A.SC.13 Equations and Inequalities: Students will use manipulatives, numbers and/or symbols to model real-world situations with simple number sentences

MG: K-3 GD: 2 to -1 KY.K-3.N.EU.2 Students will understand that meanings of and relationships among operations provide tools necessary to solve realistic problems encountered in everyday life.

MG: K-3 GD: 2 to -1 KY.K-3.N.SC.17 Number Operations: Students will solve multi-digit addition and subtraction problems that contain numerals and symbols

Cluster: Add and subtract within 20.

CCSS: **CC.2.OA.2 Fluently add and subtract within 20 using mental strategies. By end of Grade 2, know from memory all sums of two one-digit numbers.**

Grade: 2 DM: 3 = Excellent match between the two documents

Strand: Operations and Algebraic Thinking Notes:

MG: K-3 GD: 2 to -1 KY.K-3.N.EU.2 Students will understand that meanings of and relationships among operations provide tools necessary to solve realistic problems encountered in everyday life.

MG: K-3 GD: 2 to -1 KY.K-3.N.EU.3 Students will understand that computing fluently and making reasonable estimates increases the ability to solve realistic problems encountered in everyday life.

MG: K-3 GD: 2 to -1 KY.K-3.N.SC.17 Number Operations: Students will solve multi-digit addition and subtraction problems that contain numerals and symbols

MG: K-3 GD: 2 to -1 KY.K-3.N.SC.20 Number Operations: Students will use mental math, pencil-and-paper methods, calculators and/or computers to explore mathematical concepts and to assist with computation in problem solving situations

Cluster: Work with equal groups of objects to gain foundations for multiplication.

CCSS: **CC.2.OA.3 Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.**

Grade: 2 DM: 3 = Excellent match between the two documents

Strand: Operations and Algebraic Thinking Notes:

MG: K-3 GD: 2 to -1 KY.K-3.A.EU.5 Students will understand that functions are used to analyze change in various contexts and model real-world phenomena.

MG: K-3 GD: 2 to -1 KY.K-3.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships between numbers and number systems are means of representing real-world quantities.

MG: K-3 GD: 2 to -1 KY.K-3.N.SC.11 Number Operations: Students will explore and develop an understanding of the concepts of multiplication and division using physical models

MG: K-3 GD: 2 to -1 KY.K-3.N.SC.23 Properties of Numbers and Operations: Students will explore, develop and use the concepts of odd and even numbers

Operations and Algebraic Thinking

Cluster: Work with equal groups of objects to gain foundations for multiplication.

CCSS: **CC.2.OA.4 Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.**

Grade: 2 DM: 3 = Excellent match between the two documents

Strand: Operations and Algebraic Thinking Notes:

MG: K-3	GD: 2 to -1	KY.K-3.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships between numbers and number systems are means of representing real-world quantities.
MG: K-3	GD: 2 to -1	KY.K-3.N.SC.11 Number Operations: Students will explore and develop an understanding of the concepts of multiplication and division using physical models
MG: K-3	GD: 2 to -1	KY.K-3.N.SC.14 Number Operations: Students will explore and develop factor-factor-product (e.g., 2x3=6) using manipulatives. (e.g., hundreds charts, base-10 blocks, arrays)
MG: K-3	GD: 2 to -1	KY.K-3.N.SC.2 Number Sense: Students will apply multiple representations (e.g., drawings, manipulatives, base-10 blocks, number lines, expanded form, symbols) to describe and compare whole numbers and fractions (e.g., halves, thirds, fourths) in mathematical and real-world problems

Cluster: Reason with shapes and their attributes.

CCSS: **CC.3.G.1 Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.**

Grade: 3 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Geometry Notes:

MG: 4 GD: -1 KY.4.G.SC.3 Shapes and Relationships: Students will analyze attributes of two-dimensional figures (e.g., circle, triangles, squares, rectangles, trapezoids, rhombuses, pentagons, hexagons, octagons) and apply these attributes to solve real-world problems

Cluster: Reason with shapes and their attributes.

CCSS: **CC.3.G.2 Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part is 1/4 of the area of the shape.**

Grade: 3 DM: 3 = Excellent match between the two documents

Strand: Geometry Notes:

MG: K-3 GD: 3 KY.K-3.N.SC.2 Number Sense: Students will apply multiple representations (e.g., drawings, manipulatives, base-10 blocks, number lines, expanded form, symbols) to describe and compare whole numbers and fractions (e.g., halves, thirds, fourths) in mathematical and real-world problems

MG: K-3 GD: 3 KY.K-3.N.SC.5 Number Sense: Students will develop beginning fractional concepts (e.g., dividing an object into equal parts and naming the equal parts [e.g., halves, thirds, fourths])

Measurement and Data

Cluster: Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.

CCSS: **CC.3.MD.1 Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.**

Grade: 3 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Measurement and Data Notes:

MG: K-3	GD: 3	KY.K-3.M.EU.1 Students will understand that measurable attributes of objects and the units, systems and processes of measurement are powerful tools for making sense of the world around them.
MG: K-3	GD: 3	KY.K-3.M.SC.1 Measuring Physical Attributes: Students will apply standard units to measure length (inches and centimeters), weight (pounds), time (hours, half-hours, quarter-hours, five- and one-minute intervals), money (coins and bills) and temperature (Fahrenheit and Celsius)
MG: K-3	GD: 3	KY.K-3.M.SC.10 Measuring Physical Attributes: Students will relate time to daily activities, tell time to the hour, half-hour, quarter-hour, five minutes and one minute and determine elapsed time

Cluster: Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.

CCSS: **CC.3.MD.2 Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). (Excludes compound units such as cm^3 and finding the geometric volume of a container.) Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. (Excludes multiplicative comparison problems (problems involving notions of "times as much.")**

Grade: 3 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Measurement and Data Notes:

MG: 5	GD: -2	KY.5.M.SC.3 Measuring Physical Attributes: Students will apply standard units of measure to length, weight, temperature and liquid capacity
MG: K-3	GD: 3	KY.K-3.M.EU.1 Students will understand that measurable attributes of objects and the units, systems and processes of measurement are powerful tools for making sense of the world around them.
MG: K-3	GD: 3	KY.K-3.M.EU.2 Students will understand that measurements are determined by using appropriate techniques, tools and formulas.
MG: K-3	GD: 3	KY.K-3.M.SC.1 Measuring Physical Attributes: Students will apply standard units to measure length (inches and centimeters), weight (pounds), time (hours, half-hours, quarter-hours, five- and one-minute intervals), money (coins and bills) and temperature (Fahrenheit and Celsius)
MG: K-3	GD: 3	KY.K-3.M.SC.12 Systems of Measurement: Students will describe, define, give examples of and use to solve real-world and/or mathematical problems both nonstandard and standard (U.S. Customary, metric) units of measurement to include length, time, money, temperature (Fahrenheit and Celsius) and weight
MG: K-3	GD: 3	KY.K-3.M.SC.6 Measuring Physical Attributes: Students will estimate weight, length, perimeter, area, angle and time using appropriate units of measurement

Cluster: Represent and interpret data.

CCSS: **CC.3.MD.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. For example, draw a bar graph in which each square in the bar graph might represent 5 pets.**

Grade: 3 DM: 3 = Excellent match between the two documents

Strand: Measurement and Data Notes:

MG: K-3	GD: 3	KY.K-3.D.EU.2 Students will understand that the collection, organization, interpretation and display of data can be used to answer questions.
MG: K-3	GD: 3	KY.K-3.D.SC.2 Data Representations: Students will display, read and compare data on student-invented graphs

Measurement and Data

MG: K-3 GD: 3 KY.K-3.D.SC.4 Data Representations: Students will display, read and compare data on a pictograph and bar graph

Cluster: Represent and interpret data.

CCSS: **CC.3.MD.4 Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters.**

Grade: 3 DM: 3 = Excellent match between the two documents

Strand: Measurement and Data Notes:

MG: K-3 GD: 3 KY.K-3.D.EU.2 Students will understand that the collection, organization, interpretation and display of data can be used to answer questions.

MG: K-3 GD: 3 KY.K-3.D.SC.3 Data Representations: Students will read, display, compare and interpret student-collected data

MG: K-3 GD: 3 KY.K-3.D.SC.5 Data Representations: Students will display data in line plots

MG: K-3 GD: 3 KY.K-3.M.EU.1 Students will understand that measurable attributes of objects and the units, systems and processes of measurement are powerful tools for making sense of the world around them.

MG: K-3 GD: 3 KY.K-3.M.EU.3 Students will understand that for each situation, there is an appropriate degree of accuracy in measurement.

MG: K-3 GD: 3 KY.K-3.M.SC.1 Measuring Physical Attributes: Students will apply standard units to measure length (inches and centimeters), weight (pounds), time (hours, half-hours, quarter-hours, five- and one-minute intervals), money (coins and bills) and temperature (Fahrenheit and Celsius)

Cluster: Geometric measurement: understand concepts of area and relate area to multiplication and to addition.

CCSS: **CC.3.MD.5 Recognize area as an attribute of plane figures and understand concepts of area measurement. -- a. A square with side length 1 unit, called "a unit square," is said to have "one square unit" of area, and can be used to measure area. -- b. A plane figure which can be covered without gaps or overlaps by n unit squares is said to have an area of n square units.**

Grade: 3 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Measurement and Data Notes: POS too vague

MG: K-3 GD: 3 KY.K-3.M.EU.1 Students will understand that measurable attributes of objects and the units, systems and processes of measurement are powerful tools for making sense of the world around them.

Cluster: Geometric measurement: understand concepts of area and relate area to multiplication and to addition.

CCSS: **CC.3.MD.6 Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).**

Grade: 3 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Measurement and Data Notes: POS too vague

MG: K-3 GD: 3 KY.K-3.M.SC.2 Measuring Physical Attributes: Students will use nonstandard units to measure and compare the length, weight, area or volume of familiar objects

Cluster: Geometric measurement: understand concepts of area and relate area to multiplication and to addition.

CCSS: **CC.3.MD.7 Geometric measurement: understand concepts of area and relate area to multiplication and to addition. Relate area to the operations of multiplication and addition.**

Grade: 3 DM: 3 = Excellent match between the two documents

Strand: Measurement and Data Notes:

MG: 4 GD: -1 KY.4.M.SC.5 Measuring Physical Attributes: Students will measure and determine area and perimeter of a rectangle

Cluster: Geometric measurement: understand concepts of area and relate area to multiplication and to addition.

CCSS: **CC.3.MD.7a Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.**

Grade: 3 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Measurement and Data Notes:

MG: 4 GD: -1 KY.4.M.SC.5 Measuring Physical Attributes: Students will measure and determine area and perimeter of a rectangle

Cluster: Geometric measurement: understand concepts of area and relate area to multiplication and to addition.

CCSS: **CC.3.MD.7b Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.**

Grade: 3 DM: 3 = Excellent match between the two documents

Strand: Measurement and Data Notes:

MG: 4 GD: -1 KY.4.M.SC.5 Measuring Physical Attributes: Students will measure and determine area and perimeter of a rectangle

MG: 5 GD: -2 KY.5.M.SC.6 Measuring Physical Attributes: Students will use standard units to determine area and perimeter of triangles and rectangles and volume of rectangular prisms and apply these skills to solve real-world and mathematical problems

Cluster: Geometric measurement: understand concepts of area and relate area to multiplication and to addition.

CCSS: **CC.3.MD.7c Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and b + c is the sum of a × b and a × c. Use area models to represent the distributive property in mathematical reasoning.**

Grade: 3 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Measurement and Data Notes:

MG: 4 GD: -1 KY.4.A.SC.9 Equations and Inequalities: Students will model real-world situations with simple number sentences using manipulatives, numbers and/or symbols

Cluster: Geometric measurement: understand concepts of area and relate area to multiplication and to addition.

CCSS: **CC.3.MD.7d Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.**

Grade: 3 DM: 3 = Excellent match between the two documents

Strand: Measurement and Data Notes:

MG: 5 GD: -2 KY.5.M.SC.6 Measuring Physical Attributes: Students will use standard units to determine area and perimeter of triangles and rectangles and volume of rectangular prisms and apply these skills to solve real-world and mathematical problems

MG: 6 GD: -3 KY.6.M.SC.3 Measuring Physical Attributes: Students will find area of plane figures composed of triangles, squares and rectangles by subdividing and measuring; use square units appropriately

Cluster: Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.

CCSS: **CC.3.MD.8 Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different area or with the same area and different perimeter.**

Grade: 3 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Measurement and Data Notes:

MG: 4	GD: -1	KY.4.M.SC.5 Measuring Physical Attributes: Students will measure and determine area and perimeter of a rectangle
MG: 4	GD: -1	KY.4.M.SC.6 Measuring Physical Attributes: Students will measure and determine perimeter of regular/irregular shapes
MG: 6	GD: -3	KY.6.M.SC.6 Measuring Physical Attributes: Students will explain how measurements and measurement formulas are related or different (e.g., compare the perimeter with the area of a rectangle)
MG: K-3	GD: 3	KY.K-3.M.SC.7 Measuring Physical Attributes: Students will explore concepts of perimeter and area of rectangles using manipulatives

Number & Operations in Base Ten

Cluster: Use place value understanding and properties of operations to perform multi-digit arithmetic.

CCSS: **CC.3.NBT.1 Use place value understanding to round whole numbers to the nearest 10 or 100.**

Grade: 3 DM: 3 = Excellent match between the two documents

Strand: Number & Operations in Base Ten Notes:

MG: K-3 GD: 3 KY.K-3.N.SC.1 Number Sense: Students will read, write, count and model whole numbers 0-10,000, developing an understanding of place value for ones, tens, hundreds, thousands and ten thousands

Cluster: Use place value understanding and properties of operations to perform multi-digit arithmetic.

CCSS: **CC.3.NBT.2 Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction. (A range of algorithms may be used.)**

Grade: 3 DM: 3 = Excellent match between the two documents

Strand: Number & Operations in Base Ten Notes:

MG: K-3 GD: 3 KY.K-3.N.EU.2 Students will understand that meanings of and relationships among operations provide tools necessary to solve realistic problems encountered in everyday life.

MG: K-3 GD: 3 KY.K-3.N.EU.3 Students will understand that computing fluently and making reasonable estimates increases the ability to solve realistic problems encountered in everyday life.

MG: K-3 GD: 3 KY.K-3.N.SC.17 Number Operations: Students will solve multi-digit addition and subtraction problems that contain numerals and symbols

MG: K-3 GD: 3 KY.K-3.N.SC.20 Number Operations: Students will use mental math, pencil-and-paper methods, calculators and/or computers to explore mathematical concepts and to assist with computation in problem solving situations

MG: K-3 GD: 3 KY.K-3.N.SC.24 Properties of Numbers and Operations: Students will explore and use of properties of numbers for written and mental computation (e.g., 4+7+6 could be mentally regrouped as 4+6+7 using the commutative property of addition)

Cluster: Use place value understanding and properties of operations to perform multi-digit arithmetic.

CCSS: **CC.3.NBT.3 Multiply one-digit whole numbers by multiples of 10 in the range 10-90 (e.g., 9 × 80, 5 × 60) using strategies based on place value and properties of operations. (A range of algorithms may be used.)**

Grade: 3 DM: 3 = Excellent match between the two documents

Strand: Number & Operations in Base Ten Notes:

MG: 4 GD: -1 KY.4.N.SC.8 Number Sense: Students will explain how the base 10 number system relates to place value

MG: K-3 GD: 3 KY.K-3.N.EU.2 Students will understand that meanings of and relationships among operations provide tools necessary to solve realistic problems encountered in everyday life.

MG: K-3 GD: 3 KY.K-3.N.SC.21 Properties of Numbers and Operations: Students will explore, develop and use the concepts of multiples

Number and Operations—Fractions

Cluster: Develop understanding of fractions as numbers.

CCSS: **CC.3.NF.1 Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a parts of size 1/b. (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.)**

Grade: 3 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Number and Operations—Fractions Notes:

MG: K-3	GD: 3	KY.K-3.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships between numbers and number systems are means of representing real-world quantities.
MG: K-3	GD: 3	KY.K-3.N.SC.5 Number Sense: Students will develop beginning fractional concepts (e.g., dividing an object into equal parts and naming the equal parts [e.g., halves, thirds, fourths])
MG: K-3	GD: 3	KY.K-3.N.SC.6 Number Sense: Students will expand fraction concepts (e.g., whole to part and part to whole; one-half is larger than one-fourth)

Cluster: Develop understanding of fractions as numbers.

CCSS: **CC.3.NF.2 Understand a fraction as a number on the number line; represent fractions on a number line diagram. (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.)**

Grade: 3 DM: 3 = Excellent match between the two documents

Strand: Number and Operations—Fractions Notes:

MG: K-3	GD: 3	KY.K-3.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships between numbers and number systems are means of representing real-world quantities.
MG: K-3	GD: 3	KY.K-3.N.SC.2 Number Sense: Students will apply multiple representations (e.g., drawings, manipulatives, base-10 blocks, number lines, expanded form, symbols) to describe and compare whole numbers and fractions (e.g., halves, thirds, fourths) in mathematical and real-world problems

Cluster: Develop understanding of fractions as numbers.

CCSS: **CC.3.NF.2a Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line. (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.)**

Grade: 3 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Number and Operations—Fractions Notes:

MG: 4	GD: -1	KY.4.N.SC.4 Number Sense: Students will investigate and apply multiple representations of commonly used and equivalent fractions through twelfths (e.g., 1/2=3/6) and decimals through thousandths with manipulatives (e.g., drawings, manipulatives, base-10 blocks, number lines, expanded form, symbols)
MG: K-3	GD: 3	KY.K-3.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships between numbers and number systems are means of representing real-world quantities.
MG: K-3	GD: 3	KY.K-3.N.SC.2 Number Sense: Students will apply multiple representations (e.g., drawings, manipulatives, base-10 blocks, number lines, expanded form, symbols) to describe and compare whole numbers and fractions (e.g., halves, thirds, fourths) in mathematical and real-world problems
MG: K-3	GD: 3	KY.K-3.N.SC.6 Number Sense: Students will expand fraction concepts (e.g., whole to part and part to whole; one-half is larger than one-fourth)

Cluster: Develop understanding of fractions as numbers.

CCSS: **CC.3.NF.2b Represent a fraction a/b on a number line diagram by marking off a lengths 1/b from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line. (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.)**

Grade: 3 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Number and Operations—Fractions Notes:

MG: 4 GD: -1 KY.4.N.SC.4 Number Sense: Students will investigate and apply multiple representations of commonly used and equivalent fractions through twelfths (e.g., 1/2=3/6) and decimals through thousandths with manipulatives (e.g., drawings, manipulatives, base-10 blocks, number lines, expanded form, symbols)

MG: K-3 GD: 3 KY.K-3.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships between numbers and number systems are means of representing real-world quantities.

MG: K-3 GD: 3 KY.K-3.N.SC.2 Number Sense: Students will apply multiple representations (e.g., drawings, manipulatives, base-10 blocks, number lines, expanded form, symbols) to describe and compare whole numbers and fractions (e.g., halves, thirds, fourths) in mathematical and real-world problems

Cluster: Develop understanding of fractions as numbers.

CCSS: **CC.3.NF.3 Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.)**

Grade: 3 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Number and Operations—Fractions Notes:

MG: 4 GD: -1 KY.4.N.SC.4 Number Sense: Students will investigate and apply multiple representations of commonly used and equivalent fractions through twelfths (e.g., 1/2=3/6) and decimals through thousandths with manipulatives (e.g., drawings, manipulatives, base-10 blocks, number lines, expanded form, symbols)

MG: K-3 GD: 3 KY.K-3.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships between numbers and number systems are means of representing real-world quantities.

Cluster: Develop understanding of fractions as numbers.

CCSS: **CC.3.NF.3a Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line. (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.)**

Grade: 3 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Number and Operations—Fractions Notes:

MG: 4 GD: -1 KY.4.N.SC.4 Number Sense: Students will investigate and apply multiple representations of commonly used and equivalent fractions through twelfths (e.g., 1/2=3/6) and decimals through thousandths with manipulatives (e.g., drawings, manipulatives, base-10 blocks, number lines, expanded form, symbols)

MG: K-3 GD: 3 KY.K-3.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships between numbers and number systems are means of representing real-world quantities.

Number and Operations—Fractions

Cluster: Develop understanding of fractions as numbers.

CCSS: **CC.3.NF.3b Recognize and generate simple equivalent fractions (e.g., 1/2 = 2/4, 4/6 = 2/3), Explain why the fractions are equivalent, e.g., by using a visual fraction model. (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.)**

Grade: 3 DM: 3 = Excellent match between the two documents

Strand: Number and Operations—Fractions Notes:

MG: 4	GD: -1	KY.4.N.SC.4 Number Sense: Students will investigate and apply multiple representations of commonly used and equivalent fractions through twelfths (e.g., 1/2=3/6) and decimals through thousandths with manipulatives (e.g., drawings, manipulatives, base-10 blocks, number lines, expanded form, symbols)
MG: K-3	GD: 3	KY.K-3.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships between numbers and number systems are means of representing real-world quantities.

Cluster: Develop understanding of fractions as numbers.

CCSS: **CC.3.NF.3c Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram. (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.)**

Grade: 3 DM: 3 = Excellent match between the two documents

Strand: Number and Operations—Fractions Notes:

MG: 4	GD: -1	KY.4.N.SC.10 Number Sense: Students will graph a whole number, commonly used fraction or decimal on a number line
MG: 4	GD: -1	KY.4.N.SC.4 Number Sense: Students will investigate and apply multiple representations of commonly used and equivalent fractions through twelfths (e.g., 1/2=3/6) and decimals through thousandths with manipulatives (e.g., drawings, manipulatives, base-10 blocks, number lines, expanded form, symbols)
MG: K-3	GD: 3	KY.K-3.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships between numbers and number systems are means of representing real-world quantities.

Cluster: Develop understanding of fractions as numbers.

CCSS: **CC.3.NF.3d Compare two fractions with the same numerator or the same denominator, by reasoning about their size, Recognize that valid comparisons rely on the two fractions referring to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model. (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.)**

Grade: 3 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Number and Operations—Fractions Notes:

MG: K-3	GD: 3	KY.K-3.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships between numbers and number systems are means of representing real-world quantities.
MG: K-3	GD: 3	KY.K-3.N.SC.2 Number Sense: Students will apply multiple representations (e.g., drawings, manipulatives, base-10 blocks, number lines, expanded form, symbols) to describe and compare whole numbers and fractions (e.g., halves, thirds, fourths) in mathematical and real-world problems

Operations and Algebraic Thinking

Cluster: Represent and solve problems involving multiplication and division.

CCSS: **CC.3.OA.1 Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as 5 × 7.**

Grade: 3 DM: 3 = Excellent match between the two documents

Strand: Operations and Algebraic Thinking Notes:

MG: 4	GD: -1	KY.4.N.SC.13 Number Operations: Students will develop and apply computational procedures to add, subtract, multiply and divide whole numbers
MG: K-3	GD: 3	KY.K-3.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships between numbers and number systems are means of representing real-world quantities.
MG: K-3	GD: 3	KY.K-3.N.SC.11 Number Operations: Students will explore and develop an understanding of the concepts of multiplication and division using physical models
MG: K-3	GD: 3	KY.K-3.N.SC.15 Number Operations: Students will multiply whole numbers through 10 x 10

Cluster: Represent and solve problems involving multiplication and division.

CCSS: **CC.3.OA.2 Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8.**

Grade: 3 DM: 3 = Excellent match between the two documents

Strand: Operations and Algebraic Thinking Notes:

MG: 4	GD: -1	KY.4.N.SC.13 Number Operations: Students will develop and apply computational procedures to add, subtract, multiply and divide whole numbers
MG: K-3	GD: 3	KY.K-3.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships between numbers and number systems are means of representing real-world quantities.
MG: K-3	GD: 3	KY.K-3.N.SC.11 Number Operations: Students will explore and develop an understanding of the concepts of multiplication and division using physical models
MG: K-3	GD: 3	KY.K-3.N.SC.16 Number Operations: Students will relate division facts to multiplication facts (e.g., using factor-factor-product)

Cluster: Represent and solve problems involving multiplication and division.

CCSS: **CC.3.OA.3 Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.**

Grade: 3 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Operations and Algebraic Thinking Notes:

MG: K-3	GD: 3	KY.K-3.N.EU.2 Students will understand that meanings of and relationships among operations provide tools necessary to solve realistic problems encountered in everyday life.
MG: K-3	GD: 3	KY.K-3.N.SC.15 Number Operations: Students will multiply whole numbers through 10 x 10
MG: K-3	GD: 3	KY.K-3.N.SC.16 Number Operations: Students will relate division facts to multiplication facts (e.g., using factor-factor-product)

Operations and Algebraic Thinking

Cluster: Represent and solve problems involving multiplication and division.

CCSS: **CC.3.OA.4 Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations 8 × ? = 48, 5 = __÷ 3, 6 × 6 = ?.**

Grade: 3 DM: 3 = Excellent match between the two documents

Strand: Operations and Algebraic Thinking Notes:

MG: K-3	GD: 3	KY.K-3.A.SC.11 Equations and Inequalities: Students will solve for unknowns in simple open sentences
MG: K-3	GD: 3	KY.K-3.A.SC.7 Variables, Expressions and Operations: Students will explore unknowns and open sentences to express relationships
MG: K-3	GD: 3	KY.K-3.N.EU.2 Students will understand that meanings of and relationships among operations provide tools necessary to solve realistic problems encountered in everyday life.
MG: K-3	GD: 3	KY.K-3.N.SC.16 Number Operations: Students will relate division facts to multiplication facts (e.g., using factor-factor-product)

Cluster: Understand properties of multiplication and the relationship between multiplication and division.

CCSS: **CC.3.OA.5 Apply properties of operations as strategies to multiply and divide. Examples: If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. (Commutative property of multiplication.) 3 × 5 × 2 can be found by 3 × 5 = 15 then 15 × 2 = 30, or by 5 × 2 = 10 then 3 × 10 = 30. (Associative property of multiplication.) Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56. (Distributive property.) (Students need not use formal terms for these properties.)**

Grade: 3 DM: 3 = Excellent match between the two documents

Strand: Operations and Algebraic Thinking Notes:

MG: 4	GD: -1	KY.4.N.SC.13 Number Operations: Students will develop and apply computational procedures to add, subtract, multiply and divide whole numbers
MG: 5	GD: -2	KY.5.N.SC.17 Properties of Numbers and Operations: Students will use properties of numbers for written and mental computation (e.g., combine commutative and associative properties to rearrange multiplication exercises such as 4x(7x5) which can be rearranged as (4x5)x7 to simplify the multiplication)
MG: K-3	GD: 3	KY.K-3.N.EU.2 Students will understand that meanings of and relationships among operations provide tools necessary to solve realistic problems encountered in everyday life.
MG: K-3	GD: 3	KY.K-3.N.SC.15 Number Operations: Students will multiply whole numbers through 10 x 10
MG: K-3	GD: 3	KY.K-3.N.SC.16 Number Operations: Students will relate division facts to multiplication facts (e.g., using factor-factor-product)

Cluster: Understand properties of multiplication and the relationship between multiplication and division.

CCSS: **CC.3.OA.6 Understand division as an unknown-factor problem. For example, divide 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.**

Grade: 3 DM: 3 = Excellent match between the two documents

Strand: Operations and Algebraic Thinking Notes:

MG: 4	GD: -1	KY.4.N.SC.13 Number Operations: Students will develop and apply computational procedures to add, subtract, multiply and divide whole numbers
MG: 5	GD: -2	KY.5.N.SC.17 Properties of Numbers and Operations: Students will use properties of numbers for written and mental computation (e.g., combine commutative and associative properties to rearrange multiplication exercises such as 4x(7x5) which can be rearranged as (4x5)x7 to simplify the multiplication)
MG: K-3	GD: 3	KY.K-3.N.EU.2 Students will understand that meanings of and relationships among operations provide tools necessary to solve realistic problems encountered in everyday life.

Operations and Algebraic Thinking

MG: K-3 GD: 3 KY.K-3.N.SC.15 Number Operations: Students will multiply whole numbers through 10 x 10

MG: K-3 GD: 3 KY.K-3.N.SC.16 Number Operations: Students will relate division facts to multiplication facts (e.g., using factor-factor-product)

Cluster: Multiply and divide within 100.

CCSS: **CC.3.OA.7 Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of one-digit numbers.**

Grade: 3 DM: 3 = Excellent match between the two documents

Strand: Operations and Algebraic Thinking Notes:

MG: K-3 GD: 3 KY.K-3.N.EU.2 Students will understand that meanings of and relationships among operations provide tools necessary to solve realistic problems encountered in everyday life.

MG: K-3 GD: 3 KY.K-3.N.EU.3 Students will understand that computing fluently and making reasonable estimates increases the ability to solve realistic problems encountered in everyday life.

MG: K-3 GD: 3 KY.K-3.N.SC.15 Number Operations: Students will multiply whole numbers through 10 x 10

Cluster: Solve problems involving the four operations, and identify and explain patterns in arithmetic.

CCSS: **CC.3.OA.8 Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. (This standard is limited to problems posed with whole numbers and having whole-number answers; students should know how to perform operations in the conventional order when there are no parentheses to specify a particular order (Order of Operations).)**

Grade: 3 DM: 3 = Excellent match between the two documents

Strand: Operations and Algebraic Thinking Notes:

MG: 4 GD: -1 KY.4.N.SC.13 Number Operations: Students will develop and apply computational procedures to add, subtract, multiply and divide whole numbers

MG: K-3 GD: 3 KY.K-3.A.EU.1 Students will understand that patterns, relations and functions are tools that help explain or predict real-world phenomena.

MG: K-3 GD: 3 KY.K-3.A.EU.3 Students will understand that algebra represents mathematical situations and structures for analysis and problem solving (e.g., finding the missing value in open sentences).

MG: K-3 GD: 3 KY.K-3.A.SC.4 Patterns, Relations and Functions: Students will recognize and extend simple number patterns

MG: K-3 GD: 3 KY.K-3.A.SC.7 Variables, Expressions and Operations: Students will explore unknowns and open sentences to express relationships

MG: K-3 GD: 3 KY.K-3.N.EU.2 Students will understand that meanings of and relationships among operations provide tools necessary to solve realistic problems encountered in everyday life.

MG: K-3 GD: 3 KY.K-3.N.EU.3 Students will understand that computing fluently and making reasonable estimates increases the ability to solve realistic problems encountered in everyday life.

MG: K-3 GD: 3 KY.K-3.N.SC.20 Number Operations: Students will use mental math, pencil-and-paper methods, calculators and/or computers to explore mathematical concepts and to assist with computation in problem solving situations

MG: K-3 GD: 3 KY.K-3.N.SC.9 Estimation: Students will apply and describe appropriate strategies for estimating quantities of objects and computational results

Operations and Algebraic Thinking

Cluster: Solve problems involving the four operations, and identify and explain patterns in arithmetic.

CCSS: **CC.3.OA.9 Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.**

Grade: 3 DM: 3 = Excellent match between the two documents

Strand: Operations and Algebraic Thinking Notes:

MG: 4	GD: -1	KY.4.N.SC.13 Number Operations: Students will develop and apply computational procedures to add, subtract, multiply and divide whole numbers
MG: 5	GD: -2	KY.5.N.SC.13 Number Operations: Students will explore the effects of operations on numbers
MG: 5	GD: -2	KY.5.N.SC.17 Properties of Numbers and Operations: Students will use properties of numbers for written and mental computation (e.g., combine commutative and associative properties to rearrange multiplication exercises such as 4x(7x5) which can be rearranged as (4x5)x7 to simplify the multiplication)
MG: K-3	GD: 3	KY.K-3.A.EU.1 Students will understand that patterns, relations and functions are tools that help explain or predict real-world phenomena.
MG: K-3	GD: 3	KY.K-3.A.SC.1 Patterns, Relations and Functions: Students will identify and describe patterns in real life and in numerical and geometric situations
MG: K-3	GD: 3	KY.K-3.N.EU.2 Students will understand that meanings of and relationships among operations provide tools necessary to solve realistic problems encountered in everyday life.

Cluster: Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

CCSS: **CC.4.G.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.**

Grade: 4 DM: 3 = Excellent match between the two documents

Strand: Geometry Notes:

MG: 4	GD: 0	KY.4.G.SC.1 Shapes and Relationships: Students will analyze structures of geometric figures (e.g., points, rays, lines, segments, perpendicular lines, parallel lines, intersecting lines, angles)
MG: 5	GD: -1	KY.5.G.SC.2 Shapes and Relationships: Students will classify angles as acute, right, or obtuse
MG: 6	GD: -2	KY.6.G.SC.3 Shapes and Relationships: Students will identify, describe and provide examples of the basic geometric elements (points, rays, lines, segments, angles [acute, right, obtuse], planes, radius, diameter, circumference)

Cluster: Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

CCSS: **CC.4.G.2 Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.**

Grade: 4 DM: 3 = Excellent match between the two documents

Strand: Geometry Notes:

MG: 4	GD: 0	KY.4.G.SC.3 Shapes and Relationships: Students will analyze attributes of two-dimensional figures (e.g., circle, triangles, squares, rectangles, trapezoids, rhombuses, pentagons, hexagons, octagons) and apply these attributes to solve real-world problems
MG: 5	GD: -1	KY.5.G.SC.2 Shapes and Relationships: Students will classify angles as acute, right, or obtuse
MG: 6	GD: -2	KY.6.G.SC.4 Shapes and Relationships: Students will identify, describe and provide examples and properties of two-dimensional figures (circles, triangles [acute, right, obtuse, scalene, isosceles, equilateral], quadrilaterals, regular polygons); apply these properties and figures to solve real-world problems
MG: 7	GD: -3	KY.7.G.SC.3 Shapes and Relationships: Students will identify properties for classifying, describe, provide examples of and identify elements (e.g., sides, vertices, angles, congruent parts) of two-dimensional figures (circles, triangles [acute, right, obtuse, scalene, isosceles, equilateral], quadrilaterals [square, rectangle, rhombus, parallelogram, trapezoid], regular and irregular polygons); apply properties of these figures to solve real-world problems

Cluster: Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

CCSS: **CC.4.G.3 Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.**

Grade: 4 DM: 3 = Excellent match between the two documents

Strand: Geometry Notes:

MG: 4	GD: 0	KY.4.G.EU.3 Students will understand that transformations and symmetry are used to analyze real-world situations (e.g., art, nature, construction and scientific exploration).
MG: 4	GD: 0	KY.4.G.SC.5 Transformations of Shapes: Students will describe and provide examples of line symmetry in real-world situations; apply one or two lines of symmetry to construct a simple geometric design

Measurement and Data

Cluster: Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.

CCSS: **CC.4.MD.1 Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. For example: Know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ….**

Grade: 4 DM: 3 = Excellent match between the two documents

Strand: Measurement and Data Notes:

MG: 4	GD: 0	KY.4.M.EU.1 Students will understand that there are two major measurement systems (U.S. Customary and metric) and either may be used to solve problems.
MG: 4	GD: 0	KY.4.M.SC.10 Systems of Measurement: Students will convert units (e.g., linear, weight, money, time) within a measurement system (e.g., 2 feet = 24 inches)
MG: 4	GD: 0	KY.4.M.SC.11 Systems of Measurement: Students will describe, define, give examples of and use to solve real-world and/or mathematical problems both nonstandard and standard (U.S. Customary, metric) units of measurement to include length, weight, time, money and temperature (°F and °C)

Cluster: Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.

CCSS: **CC.4.MD.2 Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.**

Grade: 4 DM: 3 = Excellent match between the two documents

Strand: Measurement and Data Notes:

MG: 4	GD: 0	KY.4.A.EU.4 Students will understand that real-world situations can be represented using mathematical models to analyze quantitative relationships.
MG: 4	GD: 0	KY.4.M.SC.11 Systems of Measurement: Students will describe, define, give examples of and use to solve real-world and/or mathematical problems both nonstandard and standard (U.S. Customary, metric) units of measurement to include length, weight, time, money and temperature (°F and °C)
MG: 4	GD: 0	KY.4.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships between numbers and number systems are means of representing real-world quantities.
MG: 4	GD: 0	KY.4.N.SC.7 Number Sense: Students will apply whole numbers, commonly used fractions and decimals to represent real-world problems

Cluster: Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.

CCSS: **CC.4.MD.3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems. For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.**

Grade: 4 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Measurement and Data Notes:

MG: 4	GD: 0	KY.4.G.SC.3 Shapes and Relationships: Students will analyze attributes of two-dimensional figures (e.g., circle, triangles, squares, rectangles, trapezoids, rhombuses, pentagons, hexagons, octagons) and apply these attributes to solve real-world problems
MG: 4	GD: 0	KY.4.M.SC.5 Measuring Physical Attributes: Students will measure and determine area and perimeter of a rectangle
MG: 6	GD: -2	KY.6.M.SC.1 Measuring Physical Attributes: Students will find perimeter of regular and irregular polygons in metric and U.S. customary units

Measurement and Data

Cluster: Represent and interpret data

CCSS: **CC.4.MD.4 Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots. For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.**

Grade: 4 DM: 3 = Excellent match between the two documents

Strand: Measurement and Data Notes:

MG: 4	GD: 0	KY.4.N.SC.10 Number Sense: Students will graph a whole number, commonly used fraction or decimal on a number line
MG: 4	GD: 0	KY.4.N.SC.4 Number Sense: Students will investigate and apply multiple representations of commonly used and equivalent fractions through twelfths (e.g., 1/2=3/6) and decimals through thousandths with manipulatives (e.g., drawings, manipulatives, base-10 blocks, number lines, expanded form, symbols)
MG: 6	GD: -2	KY.6.N.SC.5 Number Sense: Students will compare, order and convert between whole numbers, fractions, decimals and percents using concrete materials, drawings or pictures and mathematical symbols (e.g., $<$, $\leq$, $>$, $\geq$, $=$, $\neq$, order on a number line)

Cluster: Geometric measurement: understand concepts of angle and measure angles.

CCSS: **CC.4.MD.5 Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement: -- a. An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a "one-degree angle," and can be used to measure angles. -- b. An angle that turns through n one-degree angles is said to have an angle measure of n degrees.**

Grade: 4 DM: 3 = Excellent match between the two documents

Strand: Measurement and Data Notes:

MG: 4	GD: 0	KY.4.G.SC.1 Shapes and Relationships: Students will analyze structures of geometric figures (e.g., points, rays, lines, segments, perpendicular lines, parallel lines, intersecting lines, angles)
MG: 4	GD: 0	KY.4.M.SC.1 Measuring Physical Attributes: Students will explore and compare non-standard and standard units for measuring angles

Cluster: Geometric measurement: understand concepts of angle and measure angles.

CCSS: **CC.4.MD.6 Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.**

Grade: 4 DM: 3 = Excellent match between the two documents

Strand: Measurement and Data Notes:

MG: 4	GD: 0	KY.4.M.SC.9 Measuring Physical Attributes: Students will estimate weight, length, perimeter, area, angle measure and time using appropriate units of measurement
MG: 5	GD: -1	KY.5.M.SC.1 Measuring Physical Attributes: Students will measure and construct angles to the nearest degree
MG: 5	GD: -1	KY.5.M.SC.4 Measuring Physical Attributes: Students will choose and use appropriate tools (e.g., protractor, angle ruler, meter stick, ruler) for measurement tasks

Cluster: Geometric measurement: understand concepts of angle and measure angles.

CCSS: **CC.4.MD.7 Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.**

Grade: 4 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Measurement and Data Notes:

MG: 4	GD: 0	KY.4.M.SC.9 Measuring Physical Attributes: Students will estimate weight, length, perimeter, area, angle measure and time using appropriate units of measurement
MG: 5	GD: -1	KY.5.G.SC.3 Shapes and Relationships: Students will describe and provide examples of basic geometric elements and terms and apply these elements to solve real-world problems
MG: 6	GD: -2	KY.6.M.SC.4 Measuring Physical Attributes: Students will estimate and find angle measures and segment measures

Number & Operations in Base Ten

Cluster: Generalize place value understanding for multi-digit whole numbers.

CCSS: **CC.4.NBT.1 Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division. (Grade 4 expectations in this domain are limited to whole numbers less than or equal to 1,000,000.)**

Grade: 4 DM: 3 = Excellent match between the two documents

Strand: Number & Operations in Base Ten Notes:

MG: 4 GD: 0 KY.4.N.SC.8 Number Sense: Students will explain how the base 10 number system relates to place value

Cluster: Generalize place value understanding for multi-digit whole numbers.

CCSS: **CC.4.NBT.2 Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons. (Grade 4 expectations in this domain are limited to whole numbers less than or equal to 1,000,000.)**

Grade: 4 DM: 3 = Excellent match between the two documents

Strand: Number & Operations in Base Ten Notes:

MG: 4 GD: 0 KY.4.N.SC.2 Number Sense: Students will read, write and model whole numbers from 0 to 1,000,000, developing place value for hundred thousands and millions

MG: 4 GD: 0 KY.4.N.SC.3 Number Sense: Students will order and compare numbers to 1,000,000 and understand their relative magnitude

MG: K-3 GD: 4 to 1 KY.K-3.N.SC.4 Number Sense: Students will order, compare and understand the relative magnitude of numbers from 0-10,000, using the symbols <, >, =, including the use of physical and visual models for smaller numbers

Cluster: Generalize place value understanding for multi-digit whole numbers.

CCSS: **CC.4.NBT.3 Use place value understanding to round multi-digit whole numbers to any place. (Grade 4 expectations in this domain are limited to whole numbers less than or equal to 1,000,000.)**

Grade: 4 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Number & Operations in Base Ten Notes: POS does not explicitly include rounding of multi-digit whole numbers.

MG: 4 GD: 0 KY.4.N.SC.2 Number Sense: Students will read, write and model whole numbers from 0 to 1,000,000, developing place value for hundred thousands and millions

Cluster: Use place value understanding and properties of operations to perform multi-digit arithmetic.

CCSS: **CC.4.NBT.4 Use place value understanding and properties of operations to perform multi-digit arithmetic. Fluently add and subtract multi-digit whole numbers using the standard algorithm. (Grade 4 expectations in this domain are limited to whole numbers less than or equal to 1,000,000. A range of algorithms may be used.)**

Grade: 4 DM: 3 = Excellent match between the two documents

Strand: Number & Operations in Base Ten Notes:

MG: 4 GD: 0 KY.4.N.SC.13 Number Operations: Students will develop and apply computational procedures to add, subtract, multiply and divide whole numbers

Number & Operations in Base Ten

Cluster: Use place value understanding and properties of operations to perform multi-digit arithmetic.

CCSS: **CC.4.NBT.5 Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. (Grade 4 expectations in this domain are limited to whole numbers less than or equal to 1,000,000. A range of algorithms may be used.)**

Grade: 4 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Number & Operations in Base Ten Notes:

MG: 4 GD: 0 KY.4.N.SC.13 Number Operations: Students will develop and apply computational procedures to add, subtract, multiply and divide whole numbers

Cluster: Use place value understanding and properties of operations to perform multi-digit arithmetic.

CCSS: **CC.4.NBT.6 Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. (Grade 4 expectations in this domain are limited to whole numbers less than or equal to 1,000,000. A range of algorithms may be used.)**

Grade: 4 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Number & Operations in Base Ten Notes:

MG: 4 GD: 0 KY.4.N.SC.13 Number Operations: Students will develop and apply computational procedures to add, subtract, multiply and divide whole numbers

Number and Operations—Fractions

Cluster: Extend understanding of fraction equivalence and ordering.

CCSS: **CC.4.NF.1 Explain why a fraction a/b is equivalent to a fraction (n × a)/(n × b) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions. (Grade 4 expectations in this domain are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.)**

Grade: 4 DM: 3 = Excellent match between the two documents

Strand: Number and Operations—Fractions Notes:

MG: 4 GD: 0 KY.4.N.SC.4 Number Sense: Students will investigate and apply multiple representations of commonly used and equivalent fractions through twelfths (e.g., 1/2=3/6) and decimals through thousandths with manipulatives (e.g., drawings, manipulatives, base-10 blocks, number lines, expanded form, symbols)

Cluster: Extend understanding of fraction equivalence and ordering.

CCSS: **CC.4.NF.2 Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model. (Grade 4 expectations in this domain are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.)**

Grade: 4 DM: 3 = Excellent match between the two documents

Strand: Number and Operations—Fractions Notes:

MG: 4 GD: 0 KY.4.N.SC.9 Number Sense: Students will develop equivalent relationships between commonly used fractions, decimals and whole numbers (e.g., 1/2=0.5, 4/2=2, 2=2.0)

MG: 5 GD: -1 KY.5.N.SC.3 Number Sense: Students will investigate multiple representations of equivalent fractions (e.g., 1/2 = 3/6, 1 1/2 = 3/2) with manipulatives, drawings and fractional notation

MG: 6 GD: -2 KY.6.N.SC.5 Number Sense: Students will compare, order and convert between whole numbers, fractions, decimals and percents using concrete materials, drawings or pictures and mathematical symbols (e.g., < , ≤, >, ≥, =, ≠, order on a number line)

Cluster: Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

CCSS: **CC.4.NF.3 Understand a fraction a/b with a > 1 as a sum of fractions 1/b. (Grade 4 expectations in this domain are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.)**

Grade: 4 DM: 3 = Excellent match between the two documents

Strand: Number and Operations—Fractions Notes:

MG: 4 GD: 0 KY.4.N.SC.14 Number Operations: Students will use manipulatives and/or diagrams to add and subtract fractions with a common denominator

MG: 5 GD: -1 KY.5.N.SC.10 Number Operations: Students will add and subtract fractions with common denominators using manipulatives or symbolic notation

Cluster: Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

CCSS: **CC.4.NF.3a Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.**

Grade: 4 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Number and Operations—Fractions Notes:

MG: 4 GD: 0 KY.4.N.SC.14 Number Operations: Students will use manipulatives and/or diagrams to add and subtract fractions with a common denominator

Number and Operations—Fractions

Cluster: Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

CCSS: **CC.4.NF.3b Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. Examples: 3/8 = 1/8 + 1/8 + 1/8 ; 3/8 = 1/8 + 2/8 ; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8.**

Grade: 4 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Number and Operations—Fractions Notes:

MG: 4	GD: 0	KY.4.N.SC.14 Number Operations: Students will use manipulatives and/or diagrams to add and subtract fractions with a common denominator
MG: 5	GD: -1	KY.5.N.SC.10 Number Operations: Students will add and subtract fractions with common denominators using manipulatives or symbolic notation

Cluster: Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

CCSS: **CC.4.NF.3c Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.**

Grade: 4 DM: 3 = Excellent match between the two documents

Strand: Number and Operations—Fractions Notes:

MG: 5	GD: -1	KY.5.N.SC.10 Number Operations: Students will add and subtract fractions with common denominators using manipulatives or symbolic notation
MG: 6	GD: -2	KY.6.N.SC.2 Number Sense: Students will extend applications of operations (+,-,×,÷) to include fractions and decimals

Cluster: Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

CCSS: **CC.4.NF.3d Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.**

Grade: 4 DM: 3 = Excellent match between the two documents

Strand: Number and Operations—Fractions Notes:

MG: 4	GD: 0	KY.4.N.SC.14 Number Operations: Students will use manipulatives and/or diagrams to add and subtract fractions with a common denominator

Cluster: Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

CCSS: **CC.4.NF.4 Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. (Grade 4 expectations in this domain are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.)**

Grade: 4 DM: 3 = Excellent match between the two documents

Strand: Number and Operations—Fractions Notes:

MG: 6	GD: -2	KY.6.N.SC.2 Number Sense: Students will extend applications of operations (+,-,×,÷) to include fractions and decimals
MG: 6	GD: -2	KY.6.N.SC.9 Number Operations: Students will add, subtract, multiply, divide and apply order of operations with whole numbers, fractions and decimals to solve real-world problems

Number and Operations—Fractions

Cluster: Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

CCSS: **CC.4.NF.4a Understand a fraction a/b as a multiple of 1/b. For example, use a visual fraction model to represent 5/4 as the product 5 × (1/4), recording the conclusion by the equation 5/4 = 5 × (1/4).**

Grade: 4 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Number and Operations—Fractions Notes: POS not specific

MG: 5 GD: -1 KY.5.N.SC.2 Number Sense: Students will compare and apply the relative sizes of common and mixed fractions

Cluster: Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

CCSS: **CC.4.NF.4b Understand a multiple of a/b as a multiple of 1/b, and use this understanding to multiply a fraction by a whole number. For example, use a visual fraction model to express 3 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.)**

Grade: 4 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Number and Operations—Fractions Notes:

MG: 5 GD: -1 KY.5.N.SC.5 Number Sense: Students will explore, investigate, compare, relate and apply relationships among whole numbers, fractions, decimals and percents

MG: 6 GD: -2 KY.6.N.SC.1 Number Sense: Students will continue to develop number sense using fractions, decimals and percents, including percents greater than 100% and improper fractions

Cluster: Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

CCSS: **CC.4.NF.4c Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. For example, if each person at a party will eat 3/8 of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?**

Grade: 4 DM: 3 = Excellent match between the two documents

Strand: Number and Operations—Fractions Notes:

MG: 6 GD: -2 KY.6.N.SC.9 Number Operations: Students will add, subtract, multiply, divide and apply order of operations with whole numbers, fractions and decimals to solve real-world problems

Cluster: Understand decimal notation for fractions, and compare decimal fractions.

CCSS: **CC.4.NF.5 Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100. For example, express 3/10 as 30/100 and add 3/10 + 4/100 = 34/100. (Students who can generate equivalent fractions can develop strategies for adding fractions with unlike denominators in general. But addition and subtraction with unlike denominators in general is not a requirement at this grade.) (Grade 4 expectations in this domain are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.)**

Grade: 4 DM: 3 = Excellent match between the two documents

Strand: Number and Operations—Fractions Notes:

MG: 4 GD: 0 KY.4.N.SC.14 Number Operations: Students will use manipulatives and/or diagrams to add and subtract fractions with a common denominator

MG: 4 GD: 0 KY.4.N.SC.4 Number Sense: Students will investigate and apply multiple representations of commonly used and equivalent fractions through twelfths (e.g., 1/2=3/6) and decimals through thousandths with manipulatives (e.g., drawings, manipulatives, base-10 blocks, number lines, expanded form, symbols)

MG: 5 GD: -1 KY.5.N.SC.2 Number Sense: Students will compare and apply the relative sizes of common and mixed fractions

Number and Operations—Fractions

MG: 5 GD: -1 KY.5.N.SC.3 Number Sense: Students will investigate multiple representations of equivalent fractions (e.g., 1/2 = 3/6, 1 1/2 = 3/2) with manipulatives, drawings and fractional notation

Cluster: Understand decimal notation for fractions, and compare decimal fractions.

CCSS: **CC.4.NF.6 Use decimal notation for fractions with denominators 10 or 100. For example, rewrite 0.62 as 62/100 ; describe a length as 0.62 meters; locate 0.62 on a number line diagram. (Grade 4 expectations in this domain are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.)**

Grade: 4 DM: 3 = Excellent match between the two documents

Strand: Number and Operations—Fractions Notes:

MG: 4 GD: 0 KY.4.N.SC.4 Number Sense: Students will investigate and apply multiple representations of commonly used and equivalent fractions through twelfths (e.g., 1/2=3/6) and decimals through thousandths with manipulatives (e.g., drawings, manipulatives, base-10 blocks, number lines, expanded form, symbols)

MG: 4 GD: 0 KY.4.N.SC.9 Number Sense: Students will develop equivalent relationships between commonly used fractions, decimals and whole numbers (e.g., 1/2=0.5, 4/2=2, 2=2.0)

Cluster: Understand decimal notation for fractions, and compare decimal fractions.

CCSS: **CC.4.NF.7 Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons comparisons are valid only when two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model. (Grade 4 expectations in this domain are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.)**

Grade: 4 DM: 3 = Excellent match between the two documents

Strand: Number and Operations—Fractions Notes:

MG: 4 GD: 0 KY.4.A.SC.9 Equations and Inequalities: Students will model real-world situations with simple number sentences using manipulatives, numbers and/or symbols

MG: 4 GD: 0 KY.4.N.SC.4 Number Sense: Students will investigate and apply multiple representations of commonly used and equivalent fractions through twelfths (e.g., 1/2=3/6) and decimals through thousandths with manipulatives (e.g., drawings, manipulatives, base-10 blocks, number lines, expanded form, symbols)

MG: 6 GD: -2 KY.6.N.SC.5 Number Sense: Students will compare, order and convert between whole numbers, fractions, decimals and percents using concrete materials, drawings or pictures and mathematical symbols (e.g., $<$, $\leq$, $>$, $\geq$, $=$, $\neq$, order on a number line)

Operations and Algebraic Thinking

Cluster: Use the four operations with whole numbers to solve problems.

CCSS: **CC.4.OA.1 Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 x 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.**

Grade: 4 DM: 3 = Excellent match between the two documents

Strand: Operations and Algebraic Thinking Notes:

MG: 4 GD: 0 KY.4.N.SC.13 Number Operations: Students will develop and apply computational procedures to add, subtract, multiply and divide whole numbers

MG: K-3 GD: 4 to 1 KY.K-3.N.SC.11 Number Operations: Students will explore and develop an understanding of the concepts of multiplication and division using physical models

Cluster: Use the four operations with whole numbers to solve problems.

CCSS: **CC.4.OA.2 Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.**

Grade: 4 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Operations and Algebraic Thinking Notes:

MG: 4 GD: 0 KY.4.A.SC.3 Variables, Expressions and Operations: Students will explore unknowns and open sentences to express relationships

MG: K-3 GD: 4 to 1 KY.K-3.A.SC.11 Equations and Inequalities: Students will solve for unknowns in simple open sentences

Cluster: Use the four operations with whole numbers to solve problems.

CCSS: **CC.4.OA.3 Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.**

Grade: 4 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Operations and Algebraic Thinking Notes:

MG: 4 GD: 0 KY.4.N.SC.13 Number Operations: Students will develop and apply computational procedures to add, subtract, multiply and divide whole numbers

MG: 4 GD: 0 KY.4.N.SC.7 Number Sense: Students will apply whole numbers, commonly used fractions and decimals to represent real-world problems

Cluster: Gain familiarity with factors and multiples.

CCSS: **CC.4.OA.4 Find all factor pairs for a whole number in the range 1-100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1-100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1-100 is prime or composite.**

Grade: 4 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Operations and Algebraic Thinking Notes:

MG: 4 GD: 0 KY.4.N.SC.16 Properties of Numbers and Operations: Students will determine factors/multiples of a whole number

MG: 5 GD: -1 KY.5.N.SC.14 Properties of Numbers and Operations: Students will use factors to determine prime and composite numbers

MG: K-3 GD: 4 to 1 KY.K-3.N.SC.16 Number Operations: Students will relate division facts to multiplication facts (e.g., using factor-factor-product)

Operations and Algebraic Thinking

Cluster: Generate and analyze patterns.

CCSS: **CC.4.OA.5 Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.**

Grade: 4 DM: 3 = Excellent match between the two documents

Strand: Operations and Algebraic Thinking Notes:

MG: 4 GD: 0 KY.4.A.EU.2 Students will understand that numerical patterns can be written as rules that generate the pattern.

Cluster: Graph points on the coordinate plane to solve real-world and mathematical problems.

CCSS: **CC.5.G.1 Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).**

Grade: 5 DM: 3 = Excellent match between the two documents

Strand: Geometry Notes:

MG: 5	GD: 0	KY.5.G.SC.10 Coordinate Geometry: Students will apply graphing in the coordinate system to solve real-world problems
MG: 6	GD: -1	KY.6.G.SC.10 Coordinate Geometry: Students will identify and graph ordered pairs on a positive coordinate system, identifying the origin, axes and ordered pairs

Cluster: Graph points on the coordinate plane to solve real-world and mathematical problems.

CCSS: **CC.5.G.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.**

Grade: 5 DM: 3 = Excellent match between the two documents

Strand: Geometry Notes:

MG: 5	GD: 0	KY.5.G.SC.10 Coordinate Geometry: Students will apply graphing in the coordinate system to solve real-world problems
MG: 5	GD: 0	KY.5.G.SC.8 Coordinate Geometry: Students will identify and graph ordered pairs on a positive coordinate system

Cluster: Classify two-dimensional figures into categories based on their properties.

CCSS: **CC.5.G.3 Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.**

Grade: 5 DM: 3 = Excellent match between the two documents

Strand: Geometry Notes:

MG: 7	GD: -2	KY.7.G.SC.3 Shapes and Relationships: Students will identify properties for classifying, describe, provide examples of and identify elements (e.g., sides, vertices, angles, congruent parts) of two-dimensional figures (circles, triangles [acute, right, obtuse, scalene, isosceles, equilateral], quadrilaterals [square, rectangle, rhombus, parallelogram, trapezoid], regular and irregular polygons); apply properties of these figures to solve real-world problems

Cluster: Classify two-dimensional figures into categories based on their properties.

CCSS: **CC.5.G.4 Classify two-dimensional figures in a hierarchy based on properties.**

Grade: 5 DM: 3 = Excellent match between the two documents

Strand: Geometry Notes:

MG: 7	GD: -2	KY.7.G.SC.3 Shapes and Relationships: Students will identify properties for classifying, describe, provide examples of and identify elements (e.g., sides, vertices, angles, congruent parts) of two-dimensional figures (circles, triangles [acute, right, obtuse, scalene, isosceles, equilateral], quadrilaterals [square, rectangle, rhombus, parallelogram, trapezoid], regular and irregular polygons); apply properties of these figures to solve real-world problems

Measurement and Data

Cluster: Convert like measurement units within a given measurement system.

CCSS: **CC.5.MD.1 Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step real world problems.**

Grade: 5 DM: 3 = Excellent match between the two documents

Strand: Measurement and Data Notes:

MG: 5	GD: 0	KY.5.M.SC.10 Systems of Measurement: Students will convert units within the U.S. monetary system
MG: 5	GD: 0	KY.5.M.SC.11 Systems of Measurement: Students will describe, define, give examples of and use to solve real-world and/or mathematical problems both nonstandard and standard (U.S. Customary, metric) units of measurement to include length, time, money, temperature (°F and °C) and weight
MG: 5	GD: 0	KY.5.M.SC.9 Systems of Measurement: Students will relate and convert units (e.g., linear, volume, weight) within a measurement system (e.g., 125 cm = 1m 25 cm)

Cluster: Represent and interpret data.

CCSS: **CC.5.MD.2 Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.**

Grade: 5 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Measurement and Data Notes: POS does not require students to use operations on fractions to solve problems using the line plots.

MG: 5	GD: 0	KY.5.D.SC.2 Data Representations: Students will explore line graphs to show change over time
MG: 5	GD: 0	KY.5.D.SC.5 Data Representations: Students will use a variety of tools (e.g., graph paper, manipulatives, models, computer) to construct data displays (e.g., pictographs, bar graphs, line plots, line graphs, Venn diagrams, tables)

Cluster: Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.

CCSS: **CC.5.MD.3 Recognize volume as an attribute of solid figures and understand concepts of volume measurement. -- a. A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume. -- b. A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.**

Grade: 5 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Measurement and Data Notes:

MG: 5	GD: 0	KY.5.M.SC.6 Measuring Physical Attributes: Students will use standard units to determine area and perimeter of triangles and rectangles and volume of rectangular prisms and apply these skills to solve real-world and mathematical problems

Cluster: Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.

CCSS: **CC.5.MD.4 Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.**

Grade: 5 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Measurement and Data Notes:

MG: 5	GD: 0	KY.5.M.SC.6 Measuring Physical Attributes: Students will use standard units to determine area and perimeter of triangles and rectangles and volume of rectangular prisms and apply these skills to solve real-world and mathematical problems

Measurement and Data

Cluster: Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.

CCSS: **CC.5.MD.5 Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.**

Grade: 5 DM: 3 = Excellent match between the two documents

Strand: Measurement and Data Notes:

MG: 5	GD: 0	KY.5.M.SC.6 Measuring Physical Attributes: Students will use standard units to determine area and perimeter of triangles and rectangles and volume of rectangular prisms and apply these skills to solve real-world and mathematical problems

Cluster: Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.

CCSS: **CC.5.MD.5a Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent three-fold whole-number products as volumes, e.g., to represent the associative property of multiplication.**

Grade: 5 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Measurement and Data Notes: POS not as specific as CCSS

MG: 5	GD: 0	KY.5.M.SC.6 Measuring Physical Attributes: Students will use standard units to determine area and perimeter of triangles and rectangles and volume of rectangular prisms and apply these skills to solve real-world and mathematical problems
MG: 8	GD: -3	KY.8.M.SC.7 Measuring Physical Attributes: Students will develop and apply formulas for volume and surface area of cubes, cylinders and right rectangular prisms; investigate relationships between and among them
MG: K-3	GD: 5 to 2	KY.K-3.M.SC.2 Measuring Physical Attributes: Students will use nonstandard units to measure and compare the length, weight, area or volume of familiar objects
MG: K-3	GD: 5 to 2	KY.K-3.M.SC.3 Measuring Physical Attributes: Students will use standard units of measurement to identify, describe and compare measurable attributes of objects (e.g., length, weight, volume) and make estimates using appropriate units of measurement

Cluster: Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.

CCSS: **CC.5.MD.5b Apply the formulas V =(l)(w)(h) and V = (b)(h) for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems.**

Grade: 5 DM: 3 = Excellent match between the two documents

Strand: Measurement and Data Notes:

MG: 5	GD: 0	KY.5.M.EU.3 Students will understand that appropriate techniques, tools and formulas are used to determine measurements.
MG: 5	GD: 0	KY.5.M.SC.6 Measuring Physical Attributes: Students will use standard units to determine area and perimeter of triangles and rectangles and volume of rectangular prisms and apply these skills to solve real-world and mathematical problems

Cluster: Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.

CCSS: **CC.5.MD.5c Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.**

Grade: 5 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Measurement and Data Notes:

MG: 5	GD: 0	KY.5.M.SC.6 Measuring Physical Attributes: Students will use standard units to determine area and perimeter of triangles and rectangles and volume of rectangular prisms and apply these skills to solve real-world and mathematical problems

Number & Operations in Base Ten

Cluster: Understand the place value system.

CCSS: **CC.5.NBT.1 Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.**

Grade: 5 DM: 3 = Excellent match between the two documents

Strand: Number & Operations in Base Ten Notes:

MG: 4 GD: 1 KY.4.N.SC.8 Number Sense: Students will explain how the base 10 number system relates to place value

MG: 6 GD: -1 KY.6.N.SC.3 Number Sense: Students will develop place value of large and small numbers, including decimals

Cluster: Understand the place value system.

CCSS: **CC.5.NBT.2 Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole number exponents to denote powers of 10.**

Grade: 5 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Number & Operations in Base Ten Notes:

MG: 4 GD: 1 KY.4.N.SC.8 Number Sense: Students will explain how the base 10 number system relates to place value

MG: 7 GD: -2 KY.7.N.SC.4 Number Sense: Students will use whole number exponents to represent/express numbers

Cluster: Understand the place value system.

CCSS: **CC.5.NBT.3 Read, write, and compare decimals to thousandths.**

Grade: 5 DM: 3 = Excellent match between the two documents

Strand: Number & Operations in Base Ten Notes:

MG: 5 GD: 0 KY.5.N.SC.6 Number Sense: Students will read, write, identify and compare decimals through ten-thousandths

Cluster: Understand the place value system.

CCSS: **CC.5.NBT.3a Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., 347.392 = 3 × 100 + 4 × 10 + 7 × 1 + 3 × (1/10) + 9 × (1/100) + 2 × (1/1000).**

Grade: 5 DM: 3 = Excellent match between the two documents

Strand: Number & Operations in Base Ten Notes:

MG: 4 GD: 1 KY.4.N.SC.4 Number Sense: Students will investigate and apply multiple representations of commonly used and equivalent fractions through twelfths (e.g., 1/2=3/6) and decimals through thousandths with manipulatives (e.g., drawings, manipulatives, base-10 blocks, number lines, expanded form, symbols)

MG: 5 GD: 0 KY.5.N.SC.5 Number Sense: Students will explore, investigate, compare, relate and apply relationships among whole numbers, fractions, decimals and percents

MG: 5 GD: 0 KY.5.N.SC.6 Number Sense: Students will read, write, identify and compare decimals through ten-thousandths

Number & Operations in Base Ten

Cluster: Understand the place value system.

CCSS: **CC.5.NBT.3b Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.**

Grade: 5 DM: 3 = Excellent match between the two documents

Strand: Number & Operations in Base Ten Notes:

MG: 5 GD: 0 KY.5.N.SC.6 Number Sense: Students will read, write, identify and compare decimals through ten-thousandths

MG: 6 GD: -1 KY.6.N.SC.5 Number Sense: Students will compare, order and convert between whole numbers, fractions, decimals and percents using concrete materials, drawings or pictures and mathematical symbols (e.g., < , ≤, >, ≥, =, ≠, order on a number line)

Cluster: Understand the place value system.

CCSS: **CC.5.NBT.4 Use place value understanding to round decimals to any place.**

Grade: 5 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Number & Operations in Base Ten Notes:

MG: 5 GD: 0 KY.5.N.SC.6 Number Sense: Students will read, write, identify and compare decimals through ten-thousandths

Cluster: Perform operations with multi-digit whole numbers and with decimals to hundredths.

CCSS: **CC.5.NBT.5 Fluently multiply multi-digit whole numbers using the standard algorithm.**

Grade: 5 DM: 3 = Excellent match between the two documents

Strand: Number & Operations in Base Ten Notes:

MG: 5 GD: 0 KY.5.N.SC.12 Number Operations: Students will extend multiplication to include one decimal place

MG: 5 GD: 0 KY.5.N.SC.9 Number Operations: Students will develop and apply computational procedures to add, subtract, multiply and divide whole numbers using basic facts and technology as appropriate

MG: 6 GD: -1 KY.6.N.SC.9 Number Operations: Students will add, subtract, multiply, divide and apply order of operations with whole numbers, fractions and decimals to solve real-world problems

Cluster: Perform operations with multi-digit whole numbers and with decimals to hundredths.

CCSS: **CC.5.NBT.6 Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.**

Grade: 5 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Number & Operations in Base Ten Notes:

MG: 5 GD: 0 KY.5.N.SC.9 Number Operations: Students will develop and apply computational procedures to add, subtract, multiply and divide whole numbers using basic facts and technology as appropriate

Cluster: Perform operations with multi-digit whole numbers and with decimals to hundredths.

CCSS: **CC.5.NBT.7 Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.**

Grade: 5 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Number & Operations in Base Ten Notes:

MG: 5	GD: 0	KY.5.N.SC.11 Number Operations: Students will add and subtract decimals through one-thousandths using manipulatives or symbolic notation
MG: 5	GD: 0	KY.5.N.SC.12 Number Operations: Students will extend multiplication to include one decimal place
MG: 6	GD: -1	KY.6.N.SC.9 Number Operations: Students will add, subtract, multiply, divide and apply order of operations with whole numbers, fractions and decimals to solve real-world problems

Number and Operations—Fractions

Cluster: Use equivalent fractions as a strategy to add and subtract fractions.

CCSS: **CC.5.NF.1 Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)**

Grade: 5 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Number and Operations—Fractions Notes:

MG: 6 GD: -1 KY.6.N.SC.2 Number Sense: Students will extend applications of operations (+,-,×,÷) to include fractions and decimals

Cluster: Use equivalent fractions as a strategy to add and subtract fractions.

CCSS: **CC.5.NF.2 Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. For example, recognize an incorrect result 2/5 + 1/2 = 3/7 by observing that 3/7 < 1/2.**

Grade: 5 DM: 3 = Excellent match between the two documents

Strand: Number and Operations—Fractions Notes:

MG: 6 GD: -1 KY.6.N.EU.3 Students will understand that computing fluently and making reasonable estimates with fractions, decimals and whole numbers increases the ability to solve realistic problems encountered in everyday life.

MG: 6 GD: -1 KY.6.N.SC.2 Number Sense: Students will extend applications of operations (+,-,×,÷) to include fractions and decimals

MG: 6 GD: -1 KY.6.N.SC.9 Number Operations: Students will add, subtract, multiply, divide and apply order of operations with whole numbers, fractions and decimals to solve real-world problems

Cluster: Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

CCSS: **CC.5.NF.3 Interpret a fraction as division of the numerator by the denominator (a/b = a ÷ b). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. For example, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3 and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?**

Grade: 5 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Number and Operations—Fractions Notes:

MG: 6 GD: -1 KY.6.N.EU.3 Students will understand that computing fluently and making reasonable estimates with fractions, decimals and whole numbers increases the ability to solve realistic problems encountered in everyday life.

MG: 6 GD: -1 KY.6.N.SC.2 Number Sense: Students will extend applications of operations (+,-,×,÷) to include fractions and decimals

MG: 7 GD: -2 KY.7.N.SC.6 Number Sense: Students will provide examples of and use models, diagrams and symbols (e.g., number lines, 10 by 10 grids, rectangular arrays, number sentences) to describe and write equivalent forms of integers, fractions, decimals, percents, square roots and ∏

Cluster: Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

CCSS: **CC.5.NF.4 Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.**

Grade: 5 DM: 3 = Excellent match between the two documents

Strand: Number and Operations—Fractions Notes:

MG: 6 GD: -1 KY.6.N.SC.2 Number Sense: Students will extend applications of operations (+,-,×,÷) to include fractions and decimals

Number and Operations—Fractions

Cluster: Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

CCSS: **CC.5.NF.4a Interpret the product (a/b) × q as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations a × q ÷ b. For example, use a visual fraction model to show (2/3) × 4 = 8/3, and create a story context for this equation. Do the same with (2/3) × (4/5) = 8/15. (In general, (a/b) × (c/d) = ac/bd.)**

Grade: 5 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Number and Operations—Fractions Notes:

MG: 5	GD: 0	KY.5.N.SC.2 Number Sense: Students will compare and apply the relative sizes of common and mixed fractions
MG: 5	GD: 0	KY.5.N.SC.5 Number Sense: Students will explore, investigate, compare, relate and apply relationships among whole numbers, fractions, decimals and percents
MG: 6	GD: -1	KY.6.N.SC.1 Number Sense: Students will continue to develop number sense using fractions, decimals and percents, including percents greater than 100% and improper fractions
MG: 7	GD: -2	KY.7.N.SC.6 Number Sense: Students will provide examples of and use models, diagrams and symbols (e.g., number lines, 10 by 10 grids, rectangular arrays, number sentences) to describe and write equivalent forms of integers, fractions, decimals, percents, square roots and ∏

Cluster: Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

CCSS: **CC.5.NF.4b Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.**

Grade: 5 DM: 3 = Excellent match between the two documents

Strand: Number and Operations—Fractions Notes:

MG: 5	GD: 0	KY.5.M.SC.6 Measuring Physical Attributes: Students will use standard units to determine area and perimeter of triangles and rectangles and volume of rectangular prisms and apply these skills to solve real-world and mathematical problems
MG: 7	GD: -2	KY.7.M.SC.5 Measuring Physical Attributes: Students will determine the length of sides (to the nearest eighth of an inch or nearest centimeter), area and perimeter of triangles, quadrilaterals (rectangles, squares, trapezoids) and other polygons. (Using the Pythagorean theorem will not be required as a strategy)

Cluster: Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

CCSS: **CC.5.NF.5 Interpret multiplication as scaling (resizing) by:**

-- a. Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.

-- b. Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence a/b = (n×a) / (n×b) to the effect of multiplying a/b by 1.

Grade: 5 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Number and Operations—Fractions Notes:

MG: 5	GD: 0	KY.5.N.SC.13 Number Operations: Students will explore the effects of operations on numbers
MG: 5	GD: 0	KY.5.N.SC.2 Number Sense: Students will compare and apply the relative sizes of common and mixed fractions
MG: 5	GD: 0	KY.5.N.SC.9 Number Operations: Students will develop and apply computational procedures to add, subtract, multiply and divide whole numbers using basic facts and technology as appropriate

Number and Operations—Fractions

Cluster: Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

CCSS: **CC.5.NF.6 Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.**

Grade: 5 DM: 3 = Excellent match between the two documents

Strand: Number and Operations—Fractions Notes:

MG: 6 GD: -1 KY.6.N.SC.8 Number Operations: Students will develop addition, subtraction, multiplication and division of common fractions and decimals with manipulatives and symbols (e.g., mental computation, paper and pencil, calculators)

MG: 6 GD: -1 KY.6.N.SC.9 Number Operations: Students will add, subtract, multiply, divide and apply order of operations with whole numbers, fractions and decimals to solve real-world problems

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Cluster: Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

CCSS: **CC.5.NF.7 Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. (Students able to multiply fractions in general can develop strategies to divide fractions in general, by reasoning about the relationship between multiplication and division. But division of a fraction by a fraction is not a requirement at this grade.)**

Grade: 5 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Number and Operations—Fractions Notes:

MG: 6 GD: -1 KY.6.N.SC.2 Number Sense: Students will extend applications of operations (+,-,×,÷) to include fractions and decimals

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Cluster: Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

CCSS: **CC.5.NF.7a Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. For example, create a story context for (1/3) ÷ 4 and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that (1/3) ÷ 4 = 1/12 because (1/12) × 4 = 1/3.**

Grade: 5 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Number and Operations—Fractions Notes:

MG: 6 GD: -1 KY.6.N.SC.2 Number Sense: Students will extend applications of operations (+,-,×,÷) to include fractions and decimals

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Cluster: Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

CCSS: **CC.5.NF.7b Interpret division of a whole number by a unit fraction, and compute such quotients. For example, create a story context for 4 ÷ (1/5) and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that 4 ÷ (1/5) = 20 because 20 × (1/5) = 4.**

Grade: 5 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Number and Operations—Fractions Notes:

MG: 6 GD: -1 KY.6.N.SC.2 Number Sense: Students will extend applications of operations (+,-,×,÷) to include fractions and decimals

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Cluster: Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

CCSS: **CC.5.NF.7c Solve real-world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. For example, how much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?**

Grade: 5 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Number and Operations—Fractions Notes:

MG: 6 GD: -1 KY.6.N.SC.2 Number Sense: Students will extend applications of operations (+,-,×,÷) to include fractions and decimals

Operations and Algebraic Thinking

Cluster: Write and interpret numerical expressions.

CCSS: **CC.5.OA.1 Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.**

Grade: 5 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Operations and Algebraic Thinking Notes:

MG: 4 GD: 1 KY.4.A.SC.9 Equations and Inequalities: Students will model real-world situations with simple number sentences using manipulatives, numbers and/or symbols

Cluster: Write and interpret numerical expressions.

CCSS: **CC.5.OA.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. For example, express the calculation "add 8 and 7, then multiply by 2" as 2 × (8 + 7). Recognize that 3 × (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.**

Grade: 5 DM: 3 = Excellent match between the two documents

Strand: Operations and Algebraic Thinking Notes:

MG: 6 GD: -1 KY.6.N.SC.17 Properties of Numbers and Operations: Students will explore and/or demonstrate how applications of properties (e.g., commutative, associative, inverse and identity for addition and multiplication) show relationships among numbers and operations

Cluster: Analyze patterns and relationships.

CCSS: **CC.5.OA.3 Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. For example, given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.**

Grade: 5 DM: 3 = Excellent match between the two documents

Strand: Operations and Algebraic Thinking Notes:

MG: 5 GD: 0 KY.5.A.EU.2 Students will understand that numerical patterns can be written as rules that generate the pattern.

MG: 5 GD: 0 KY.5.G.SC.10 Coordinate Geometry: Students will apply graphing in the coordinate system to solve real-world problems

MG: 5 GD: 0 KY.5.G.SC.8 Coordinate Geometry: Students will identify and graph ordered pairs on a positive coordinate system

MG: 6 GD: -1 KY.6.A.SC.3 Patterns, Relations and Functions: Students will organize input-output coordinate pairs into tables and plot points in the first quadrant of a coordinate (Cartesian) system/grid

Expressions and Equations

Cluster: Apply and extend previous understandings of arithmetic to algebraic expressions.

CCSS: **CC.6.EE.1 Write and evaluate numerical expressions involving whole-number exponents.**

Grade: 6 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Expressions and Equations Notes: POS limits exponents to positive only

MG: 7 GD: -1 KY.7.N.SC.11 Number Operations: Students will add, subtract, multiply, divide and apply order of operations (including positive whole number exponents) with fractions, decimals and integers to solve real-world problems

MG: 7 GD: -1 KY.7.N.SC.4 Number Sense: Students will use whole number exponents to represent/express numbers

Cluster: Apply and extend previous understandings of arithmetic to algebraic expressions.

CCSS: **CC.6.EE.2 Write, read, and evaluate expressions in which letters stand for numbers.**

Grade: 6 DM: 3 = Excellent match between the two documents

Strand: Expressions and Equations Notes:

MG: 6 GD: 0 KY.6.A.SC.5 Variables, Expressions and Operations: Students will explore the use of variables in expressions and equations

MG: 6 GD: 0 KY.6.A.SC.6 Variables, Expressions and Operations: Students will substitute numerical values for variables and evaluate algebraic expressions

MG: 6 GD: 0 KY.6.A.SC.7 Variables, Expressions and Operations: Students will describe, define and provide examples of algebraic expressions based on real-world and/or mathematical situations

Cluster: Apply and extend previous understandings of arithmetic to algebraic expressions.

CCSS: **CC.6.EE.2a Write expressions that record operations with numbers and with letters standing for numbers. For example, express the calculation "Subtract y from 5" as 5 – y.**

Grade: 6 DM: 3 = Excellent match between the two documents

Strand: Expressions and Equations Notes:

MG: 6 GD: 0 KY.6.A.SC.5 Variables, Expressions and Operations: Students will explore the use of variables in expressions and equations

MG: 6 GD: 0 KY.6.A.SC.7 Variables, Expressions and Operations: Students will describe, define and provide examples of algebraic expressions based on real-world and/or mathematical situations

Cluster: Apply and extend previous understandings of arithmetic to algebraic expressions.

CCSS: **CC.6.EE.2b Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. For example, describe the expression 2(8 + 7) as a product of two factors; view (8 + 7) as both a single entity and a sum of two terms.**

Grade: 6 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Expressions and Equations Notes:

MG: 6 GD: 0 KY.6.A.SC.7 Variables, Expressions and Operations: Students will describe, define and provide examples of algebraic expressions based on real-world and/or mathematical situations

Expressions and Equations

Cluster: Apply and extend previous understandings of arithmetic to algebraic expressions.

CCSS: **CC.6.EE.2c Evaluate expressions at specific values for their variables. Include expressions that arise from formulas in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). For example, use the formulas V = s^3 and A = 6 s^2 to find the volume and surface area of a cube with sides of length s = 1/2.**

Grade: 6 DM: 3 = Excellent match between the two documents

Strand: Expressions and Equations Notes:

MG: 6	GD: 0	KY.6.A.SC.6 Variables, Expressions and Operations: Students will substitute numerical values for variables and evaluate algebraic expressions
MG: 6	GD: 0	KY.6.A.SC.7 Variables, Expressions and Operations: Students will describe, define and provide examples of algebraic expressions based on real-world and/or mathematical situations
MG: 6	GD: 0	KY.6.N.SC.4 Number Sense: Students will explore positive integral exponents (e.g. squares, cubes)
MG: 8	GD: -2	KY.8.M.SC.7 Measuring Physical Attributes: Students will develop and apply formulas for volume and surface area of cubes, cylinders and right rectangular prisms; investigate relationships between and among them

Cluster: Apply and extend previous understandings of arithmetic to algebraic expressions.

CCSS: **CC.6.EE.3 Apply the properties of operations to generate equivalent expressions. For example, apply the distributive property to the expression 3(2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y.**

Grade: 6 DM: 3 = Excellent match between the two documents

Strand: Expressions and Equations Notes:

MG: 7	GD: -1	KY.7.N.SC.16 Properties of Numbers and Operations: Students will identify, explain and apply properties (e.g., commutative, associative, inverse and identity for addition and multiplication; distributive)

Cluster: Apply and extend previous understandings of arithmetic to algebraic expressions.

CCSS: **CC.6.EE.4 Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). For example, the expressions y + y + y and 3y are equivalent because they name the same number regardless of which number y stands for.**

Grade: 6 DM: 3 = Excellent match between the two documents

Strand: Expressions and Equations Notes:

MG: 7	GD: -1	KY.7.A.SC.6 Variables, Expressions and Operations: Students will simplify numeric and algebraic expressions
MG: 9-12	GD: -3 to -6	KY.9-12.A.SC.21 Variables, Expressions and Operations: Students write expressions, equations, inequalities and relations in equivalent forms

Cluster: Reason about and solve one-variable equations and inequalities

CCSS: **CC.6.EE.5 Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.**

Grade: 6 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Expressions and Equations Notes: POS does not require students to understand the solution set or defend answer.

MG: 6	GD: 0	KY.6.A.SC.10 Equations and Inequalities: Students will model and solve real-world problems with one variable equations and inequalities (e.g., 8x=4, x+2>5)
MG: 6	GD: 0	KY.6.A.SC.5 Variables, Expressions and Operations: Students will explore the use of variables in expressions and equations

Expressions and Equations

MG: 6	GD: 0	KY.6.A.SC.8 Equations and Inequalities: Students will use concrete and/or informal methods to solve equations with one variable that model real-world situations
MG: 7	GD: -1	KY.7.A.SC.11 Equations and Inequalities: Students will model and solve real-world problems with one- or two-step equations or inequalities (e.g., 2x+1=9, 3x+3<9)
MG: 7	GD: -1	KY.7.A.SC.9 Equations and Inequalities: Students will use multiple representations to model and solve single-variable equations and inequalities
MG: 8	GD: -2	KY.8.A.SC.13 Equations and Inequalities: Students will model and solve real-world problems with one- or two-step equations or inequalities (e.g., 4x+2=22, x-4<-60)

Cluster: Reason about and solve one-variable equations and inequalities

CCSS: **CC.6.EE.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.**

Grade: 6 DM: 3 = Excellent match between the two documents

Strand: Expressions and Equations Notes:

MG: 5	GD: 1	KY.5.A.SC.7 Variables, Expressions and Operations: Students will use variables or missing values to model verbal descriptions of real-world situations
MG: 6	GD: 0	KY.6.A.SC.5 Variables, Expressions and Operations: Students will explore the use of variables in expressions and equations
MG: 6	GD: 0	KY.6.A.SC.7 Variables, Expressions and Operations: Students will describe, define and provide examples of algebraic expressions based on real-world and/or mathematical situations

Cluster: Reason about and solve one-variable equations and inequalities

CCSS: **CC.6.EE.7 Reason about and solve one-variable equations and inequalities. Solve real-world and mathematical problems by writing and solving equations of the form x + p = q and px = q for cases in which p, q and x are all nonnegative rational numbers.**

Grade: 6 DM: 3 = Excellent match between the two documents

Strand: Expressions and Equations Notes:

MG: 6	GD: 0	KY.6.A.SC.10 Equations and Inequalities: Students will model and solve real-world problems with one variable equations and inequalities (e.g., 8x=4, x+2>5)
MG: 6	GD: 0	KY.6.A.SC.9 Equations and Inequalities: Students will solve problems involving simple formulas (e.g., A=lw, D=rt)

Cluster: Reason about and solve one-variable equations and inequalities

CCSS: **CC.6.EE.8 Write an inequality of the form x > c or x < c to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form x > c or x < c have infinitely many solutions; represent solutions of such inequalities on number line diagrams.**

Grade: 6 DM: 3 = Excellent match between the two documents

Strand: Expressions and Equations Notes:

MG: 9-12	GD: -3 to -6	KY.9-12.A.SC.35 Equations and Inequalities: Students will solve one-variable equations and inequalities using manipulatives, symbols, procedures and graphing, including graphing the solution set on a number line

Cluster: Represent and analyze quantitative relationships between dependent and independent variables

CCSS: **CC.6.EE.9 Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d = 65t to represent the relationship between distance and time.**

Grade: 6 DM: 3 = Excellent match between the two documents

Strand: Expressions and Equations Notes:

MG: 6	GD: 0	KY.6.A.SC.4 Patterns, Relations and Functions: Students will explain how the change in one quantity affects change in another quantity (e.g., in tables or graphs, input/output tables)
MG: 6	GD: 0	KY.6.G.SC.11 Coordinate Geometry: Students will apply graphing in the positive coordinate system to solve real-world and mathematical problems

Cluster: Solve real-world and mathematical problems involving area, surface area, and volume.

CCSS: **CC.6.G.1 Find area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.**

Grade: 6 DM: 3 = Excellent match between the two documents

Strand: Geometry Notes:

MG:	GD:	
6	0	KY.6.M.SC.3 Measuring Physical Attributes: Students will find area of plane figures composed of triangles, squares and rectangles by subdividing and measuring; use square units appropriately

Cluster: Solve real-world and mathematical problems involving area, surface area, and volume.

CCSS: **CC.6.G.2 Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas V = l w h and V = b h to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.**

Grade: 6 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Geometry Notes: POS lacks connection to real world

MG:	GD:	
8	-2	KY.8.M.SC.7 Measuring Physical Attributes: Students will develop and apply formulas for volume and surface area of cubes, cylinders and right rectangular prisms; investigate relationships between and among them

Cluster: Solve real-world and mathematical problems involving area, surface area, and volume.

CCSS: **CC.6.G.3 Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.**

Grade: 6 DM: 3 = Excellent match between the two documents

Strand: Geometry Notes: POS wording vague

MG:	GD:	
6	0	KY.6.G.SC.11 Coordinate Geometry: Students will apply graphing in the positive coordinate system to solve real-world and mathematical problems
7	-1	KY.7.G.SC.9 Coordinate Geometry: Students will apply graphing in the coordinate system to solve real-world and/or mathematical problems
9-12	-3 to -6	KY.9-12.G.SC.22 Coordinate Geometry: Students will investigate conjectures and solve problems involving two-dimensional figures and three-dimensional objects represented graphically

Cluster: Solve real-world and mathematical problems involving area, surface area, and volume.

CCSS: **CC.6.G.4 Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.**

Grade: 6 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Geometry Notes: find area using nets not addressed in POS

MG:	GD:	
9-12	-3 to -6	KY.9-12.G.SC.10 Shapes and Relationships: Students will visualize solids and surfaces in three-dimensional space when given two-dimensional representations and create two-dimensional representations for the surfaces of three-dimensional objects
9-12	-3 to -6	KY.9-12.M.SC.3 Measuring Physical Attributes: Students will determine the surface area and volume of right rectangular prisms, pyramids, cylinders, cones and spheres in realistic problems

Ratios and Proportional Relationships

Cluster: Understand ratio concepts and use ratio reasoning to solve problems.

CCSS: **CC.6.RP.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."**

Grade: 6 DM: 3 = Excellent match between the two documents

Strand: Ratios and Proportional Relationships Notes:

MG: 6 GD: 0 KY.6.N.SC.12 Ratios and Proportional Reasoning: Students will develop meaning of ratio (e.g., describe and compare two sets of data using ratios and appropriate notations: 3:5, 3/5, 3 to 5)

MG: 6 GD: 0 KY.6.N.SC.13 Ratios and Proportional Reasoning: Students will define and apply ratios to solve real-world problems

Cluster: Understand ratio concepts and use ratio reasoning to solve problems.

CCSS: **CC.6.RP.2 Understand the concept of a unit rate a/b associated with a ratio a:b with b ≠ 0 (b not equal to zero), and use rate language in the context of a ratio relationship. For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar." "We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger." (Expectations for unit rates in this grade are limited to non-complex fractions.)**

Grade: 6 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Ratios and Proportional Relationships Notes:

MG: 6 GD: 0 KY.6.N.SC.12 Ratios and Proportional Reasoning: Students will develop meaning of ratio (e.g., describe and compare two sets of data using ratios and appropriate notations: 3:5, 3/5, 3 to 5)

MG: 6 GD: 0 KY.6.N.SC.13 Ratios and Proportional Reasoning: Students will define and apply ratios to solve real-world problems

Cluster: Understand ratio concepts and use ratio reasoning to solve problems.

CCSS: **CC.6.RP.3 Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.**

Grade: 6 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Ratios and Proportional Relationships Notes:

MG: 7 GD: -1 KY.7.N.SC.15 Ratios and Proportional Reasoning: Students will develop proportional reasoning and apply to real-world and mathematical problems (e.g., rates, scaling, similarity)

Cluster: Understand ratio concepts and use ratio reasoning to solve problems.

CCSS: **CC.6.RP.3a 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. Use tables to compare ratios.**

Grade: 6 DM:

Strand: Ratios and Proportional Relationships Notes: Unmatched

MG: GD:

Ratios and Proportional Relationships

Cluster: Understand ratio concepts and use ratio reasoning to solve problems.

CCSS: **CC.6.RP.3b Solve unit rate problems including those involving unit pricing and constant speed. For example, If it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?**

Grade: 6 DM: 3 = Excellent match between the two documents

Strand: Ratios and Proportional Relationships Notes:

MG: 7 GD: -1 KY.7.N.SC.15 Ratios and Proportional Reasoning: Students will develop proportional reasoning and apply to real-world and mathematical problems (e.g., rates, scaling, similarity)

Cluster: Understand ratio concepts and use ratio reasoning to solve problems.

CCSS: **CC.6.RP.3c Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole given a part and the percent.**

Grade: 6 DM: 3 = Excellent match between the two documents

Strand: Ratios and Proportional Relationships Notes:

MG: 6 GD: 0 KY.6.N.SC.11 Ratios and Proportional Reasoning: Students will develop meaning of percent and how to determine a percentage

Cluster: Understand ratio concepts and use ratio reasoning to solve problems.

CCSS: **CC.6.RP.3d Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.**

Grade: 6 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Ratios and Proportional Relationships Notes:

MG: 6 GD: 0 KY.6.M.SC.8 Systems of Measurement: Students will estimate, compare and convert (meaning to make ballpark comparisons/not memorize conversion factors between U.S. and metric) units of measurement for length, weight/mass and volume/capacity within the U.S. customary system and within the metric system:o length (e.g., parts of an inch, inches, feet, yards, miles, millimeters, centimeters, meters, kilometers);o weight/mass (e.g., pounds, tons, grams, kilograms);o volume/capacity (e.g., cups, pints, quarts, gallons, milliliters, liters)

Statistics and Probability

Cluster: Develop understanding of statistical variability.

CCSS: **CC.6.SP.1 Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages.**

Grade: 6 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Statistics and Probability Notes: POS not as specific

MG: 6 GD: 0 KY.6.D.SC.7 Experiments and Samples: Students will pose questions; collect, organize and display data

Cluster: Develop understanding of statistical variability.

CCSS: **CC.6.SP.2 Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.**

Grade: 6 DM: 3 = Excellent match between the two documents

Strand: Statistics and Probability Notes:

MG: 6 GD: 0 KY.6.D.EU.5 Students will understand that for a given set of data or a graph, statistical measures (mean, median, mode, range) can be used to describe the distribution of the data.

Cluster: Develop understanding of statistical variability.

CCSS: **CC.6.SP.3 Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.**

Grade: 6 DM:

Strand: Statistics and Probability Notes: Unmatched

MG: GD:

Cluster: Summarize and describe distributions.

CCSS: **CC.6.SP.4 Display numerical data in plots on a number line, including dot plots, histograms, and box plots.**

Grade: 6 DM: 3 = Excellent match between the two documents

Strand: Statistics and Probability Notes:

MG: 6 GD: 0 KY.6.D.SC.1 Data Representations: Students will select an appropriate graph to represent given data and justify the selection

MG: 6 GD: 0 KY.6.D.SC.2 Data Representations: Students will collect, organize, construct, analyze and interpret data in a variety of graphical methods, including line plots, line graphs, circle graphs, bar graphs and stem-and-leaf plots

MG: 6 GD: 0 KY.6.D.SC.7 Experiments and Samples: Students will pose questions; collect, organize and display data

MG: 8 GD: -2 KY.8.D.SC.1 Data Representations: Students will collect, organize, construct, analyze and make inferences from data in a variety of graphical methods (e.g., drawings, tables/charts, pictographs, bar graphs, circle graphs, line plots, Venn diagrams, line graphs, stem-and-leaf plots, scatter plots, histograms, box-and-whiskers plots)

Cluster: Summarize and describe distributions.

CCSS: **CC.6.SP.5 Summarize numerical data sets in relation to their context, such as by: -- a. Reporting the number of observations. -- b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. -- c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data was gathered. -- d. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data was gathered.**

Grade: 6 DM: 3 = Excellent match between the two documents

Strand: Statistics and Probability Notes:

MG: 4	GD: 2	KY.4.D.SC.7 Characteristics of Data: Students will develop the meaning and interpretation of the median, mode and range of a set of data
MG: 6	GD: 0	KY.6.D.EU.4 Students will understand that inferences and predictions from data are used to make critical and informed decisions.
MG: 6	GD: 0	KY.6.D.SC.3 Data Representations: Students will compare data from various types of graphs
MG: 6	GD: 0	KY.6.D.SC.5 Characteristics of Data: Students will make predictions, draw conclusions and verify results from statistical data and probability experiments
MG: 6	GD: 0	KY.6.D.SC.8 Experiments and Samples: Students will explore how sample size affects the reliability of the outcome

The Number System

Cluster: Apply and extend previous understandings of multiplication and division to divide fractions by fractions.

CCSS: **CC.6.NS.1 Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b) ÷ (c/d) = ad/bc.) How much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 3/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi?**

Grade: 6 DM: 3 = Excellent match between the two documents

Strand: The Number System Notes:

MG: 6	GD: 0	KY.6.N.SC.10 Number Operations: Students will explain and/or demonstrate inversely-related operations (addition and subtraction; multiplication and division)
MG: 6	GD: 0	KY.6.N.SC.8 Number Operations: Students will develop addition, subtraction, multiplication and division of common fractions and decimals with manipulatives and symbols (e.g., mental computation, paper and pencil, calculators)

Cluster: Compute fluently with multi-digit numbers and find common factors and multiples.

CCSS: **CC.6.NS.2 Fluently divide multi-digit numbers using the standard algorithm.**

Grade: 6 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: The Number System Notes: POS not specific to multi-digit numbers

MG: 6	GD: 0	KY.6.N.SC.14 Properties of Numbers and Operations: Students will determine prime numbers, composite numbers, prime factorization, factors, multiples, greatest common factor and least common multiple
MG: 6	GD: 0	KY.6.N.SC.16 Properties of Numbers and Operations: Students will use prime numbers, composite numbers, factors, multiples and divisibility to solve problems
MG: 6	GD: 0	KY.6.N.SC.6 Estimation: Students will estimate and mentally compute to solve real-world and/or mathematical problems with whole numbers, fractions, decimals and percents, checking for reasonable and appropriate computational results

Cluster: Compute fluently with multi-digit numbers and find common factors and multiples.

CCSS: **CC.6.NS.3 Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.**

Grade: 6 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: The Number System Notes: Multidigit decimals is not explicitly mentioned in POS

MG: 6	GD: 0	KY.6.N.SC.2 Number Sense: Students will extend applications of operations (+,-,×,÷) to include fractions and decimals
MG: 6	GD: 0	KY.6.N.SC.3 Number Sense: Students will develop place value of large and small numbers, including decimals
MG: 6	GD: 0	KY.6.N.SC.8 Number Operations: Students will develop addition, subtraction, multiplication and division of common fractions and decimals with manipulatives and symbols (e.g., mental computation, paper and pencil, calculators)

The Number System

Cluster: Compute fluently with multi-digit numbers and find common factors and multiples.

CCSS: **CC.6.NS.4 Compute fluently with multi-digit numbers and find common factors and multiples. 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 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. For example, express 36 + 8 as 4 (9 + 2).**

Grade: 6 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: The Number System Notes: POS does not require students to use properties to rewrite numbers.

MG: 6	GD: 0	KY.6.N.SC.14 Properties of Numbers and Operations: Students will determine prime numbers, composite numbers, prime factorization, factors, multiples, greatest common factor and least common multiple
MG: 7	GD: -1	KY.7.N.SC.16 Properties of Numbers and Operations: Students will identify, explain and apply properties (e.g., commutative, associative, inverse and identity for addition and multiplication; distributive)
MG: 7	GD: -1	KY.7.N.SC.17 Properties of Numbers and Operations: Students will identify and apply prime numbers, composite numbers, prime factorization, factors, multiples and divisibility to solve real-world problems (e.g., use prime factorization to determine a least common multiple [LCM] or greatest common factor [GCF])

Cluster: Apply and extend previous understandings of numbers to the system of rational numbers.

CCSS: **CC.6.NS.5 Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, debits/credits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.**

Grade: 6 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: The Number System Notes: POS does not explicitly include all positive and negative numbers and the real world context of the real numbers including explaining the meaning of 0 to the situation.

MG: 7	GD: -1	KY.7.N.SC.1 Number Sense: Students will extend number sense for percents and integers
MG: 7	GD: -1	KY.7.N.SC.6 Number Sense: Students will provide examples of and use models, diagrams and symbols (e.g., number lines, 10 by 10 grids, rectangular arrays, number sentences) to describe and write equivalent forms of integers, fractions, decimals, percents, square roots and ∏

Cluster: Apply and extend previous understandings of numbers to the system of rational numbers.

CCSS: **CC.6.NS.6 Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.**

Grade: 6 DM: 3 = Excellent match between the two documents

Strand: The Number System Notes: At grade 6 the alignment is weak but looking at grade 7 the alignment is strong.

MG: 6	GD: 0	KY.6.A.SC.3 Patterns, Relations and Functions: Students will organize input-output coordinate pairs into tables and plot points in the first quadrant of a coordinate (Cartesian) system/grid
MG: 6	GD: 0	KY.6.G.SC.10 Coordinate Geometry: Students will identify and graph ordered pairs on a positive coordinate system, identifying the origin, axes and ordered pairs
MG: 7	GD: -1	KY.7.A.SC.3 Patterns, Relations and Functions: Students will organize input-output coordinate pairs into tables and plot points in all four quadrants of a coordinate (Cartesian) system/grid; interpret resulting patterns/trends

The Number System

Cluster: Apply and extend previous understandings of numbers to the system of rational numbers.

CCSS: **CC.6.NS.6a Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., –(–3) = 3, and that 0 is its own opposite.**

Grade: 6 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: The Number System Notes: POS does not include the understanding of opposites or their locations on a number line.

MG: 7 GD: -1 KY.7.N.SC.1 Number Sense: Students will extend number sense for percents and integers

Cluster: Apply and extend previous understandings of numbers to the system of rational numbers.

CCSS: **CC.6.NS.6b Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.**

Grade: 6 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: The Number System Notes: POS does not include recognition of location related to the signs of the ordered pair. Transformation include shapes only.

MG: 6 GD: 0 KY.6.G.SC.10 Coordinate Geometry: Students will identify and graph ordered pairs on a positive coordinate system, identifying the origin, axes and ordered pairs

MG: 7 GD: -1 KY.7.A.SC.3 Patterns, Relations and Functions: Students will organize input-output coordinate pairs into tables and plot points in all four quadrants of a coordinate (Cartesian) system/grid; interpret resulting patterns/trends

MG: 7 GD: -1 KY.7.G.SC.7 Transformations of Shapes: Students will move shapes in a plane and/or in a coordinate plane (translate [slide], rotate [turn] about the origin or a vertex, reflect [flip] over a horizontal or vertical line)

Cluster: Apply and extend previous understandings of numbers to the system of rational numbers.

CCSS: **CC.6.NS.6c Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.**

Grade: 6 DM: 3 = Excellent match between the two documents

Strand: The Number System Notes: Other rational numbers not addressed in POS

MG: 6 GD: 0 KY.6.N.SC.5 Number Sense: Students will compare, order and convert between whole numbers, fractions, decimals and percents using concrete materials, drawings or pictures and mathematical symbols (e.g., $<$, $\leq$, $>$, $\geq$, $=$, $\neq$, order on a number line)

MG: 7 GD: -1 KY.7.A.SC.3 Patterns, Relations and Functions: Students will organize input-output coordinate pairs into tables and plot points in all four quadrants of a coordinate (Cartesian) system/grid; interpret resulting patterns/trends

MG: 7 GD: -1 KY.7.G.EU.2 Students will understand that representational systems, including coordinate geometry, are means for specifying locations and describing spatial relationships and are organizers for making sense of the world around them.

Cluster: Apply and extend previous understandings of numbers to the system of rational numbers.

CCSS: **CC.6.NS.7 Understand ordering and absolute value of rational numbers.**

Grade: 6 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: The Number System Notes: POS does not include "absolute value" in MS.

MG: 8 GD: -2 KY.8.N.SC.2 Number Sense: Students will provide examples of, describe and compare irrational and rational numbers (e.g., magnitude, order on a number line, scientific notation, very large and very small integers, numbers close to zero)

The Number System

MG: 9-12 GD: -3 to -6 KY.9-12.N.SC.2 Number Sense: Students will locate the position of a real number on the number line, find its distance from the origin (absolute value/magnitude) and find the distance between two numbers on the number line (the absolute value of their difference)

Cluster: Apply and extend previous understandings of numbers to the system of rational numbers.

CCSS: **CC.6.NS.7a Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. For example, interpret –3 > –7 as a statement that –3 is located to the right of –7 on a number line oriented from left to right.**

Grade: 6 DM: 3 = Excellent match between the two documents

Strand: The Number System Notes:

MG: 6 GD: 0 KY.6.N.SC.5 Number Sense: Students will compare, order and convert between whole numbers, fractions, decimals and percents using concrete materials, drawings or pictures and mathematical symbols (e.g., < , ≤, >, ≥, =, ≠, order on a number line)

Cluster: Apply and extend previous understandings of numbers to the system of rational numbers.

CCSS: **CC.6.NS.7b Write, interpret, and explain statements of order for rational numbers in real-world contexts. For example, write –3°C > –7°C to express the fact that –3°C is warmer than –7°C.**

Grade: 6 DM: 3 = Excellent match between the two documents

Strand: The Number System Notes:

MG: 6 GD: 0 KY.6.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships among numbers and number systems are means of representing real-world quantities.

MG: 6 GD: 0 KY.6.N.SC.5 Number Sense: Students will compare, order and convert between whole numbers, fractions, decimals and percents using concrete materials, drawings or pictures and mathematical symbols (e.g., < , ≤, >, ≥, =, ≠, order on a number line)

MG: 7 GD: -1 KY.7.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships among numbers and number systems are means of representing real-world quantities.

MG: 8 GD: -2 KY.8.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships among numbers and number systems are means of representing real-world quantities.

MG: 8 GD: -2 KY.8.N.SC.6 Number Operations: Students will add, subtract, multiply, divide and apply order of operations (including positive whole number exponents) using rational numbers to solve real-world problems

Cluster: Apply and extend previous understandings of numbers to the system of rational numbers.

CCSS: **CC.6.NS.7c Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. For example, for an account balance of –30 dollars, write |–30| = 30 to describe the size of the debt in dollars.**

Grade: 6 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: The Number System Notes: POS does not require students to interpret absolute value in MS

MG: 8 GD: -2 KY.8.N.SC.2 Number Sense: Students will provide examples of, describe and compare irrational and rational numbers (e.g., magnitude, order on a number line, scientific notation, very large and very small integers, numbers close to zero)

MG: 9-12 GD: -3 to -6 KY.9-12.N.EU.4 Students will understand that problem solving and connections with other content areas require a strong sense of number, including applications of absolute value (magnitude) and the ordering of numbers.

MG: 9-12 GD: -3 to -6 KY.9-12.N.SC.12 Number Operations: Students will apply absolute value, integer exponents, roots and factorials to solve problems

The Number System

Cluster: Apply and extend previous understandings of numbers to the system of rational numbers.

CCSS: **CC.6.NS.7d Distinguish comparisons of absolute value from statements about order. For example, recognize that an account balance less than –30 dollars represents a debt greater than 30 dollars.**

Grade: 6 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: The Number System Notes: POS does not directly require students to compare absolute value to order.

MG: 6	GD: 0	KY.6.N.SC.5 Number Sense: Students will compare, order and convert between whole numbers, fractions, decimals and percents using concrete materials, drawings or pictures and mathematical symbols (e.g., $<$, $\leq$, $>$, $\geq$, $=$, $\neq$, order on a number line)
MG: 7	GD: -1	KY.7.N.SC.1 Number Sense: Students will extend number sense for percents and integers
MG: 8	GD: -2	KY.8.N.SC.2 Number Sense: Students will provide examples of, describe and compare irrational and rational numbers (e.g., magnitude, order on a number line, scientific notation, very large and very small integers, numbers close to zero)
MG: 9-12	GD: -3 to -6	KY.9-12.N.EU.4 Students will understand that problem solving and connections with other content areas require a strong sense of number, including applications of absolute value (magnitude) and the ordering of numbers.
MG: 9-12	GD: -3 to -6	KY.9-12.N.SC.2 Number Sense: Students will locate the position of a real number on the number line, find its distance from the origin (absolute value/magnitude) and find the distance between two numbers on the number line (the absolute value of their difference)

Cluster: Apply and extend previous understandings of numbers to the system of rational numbers.

CCSS: **CC.6.NS.8 Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.**

Grade: 6 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: The Number System Notes: POS in MS does not require students to know distance between points in a coordinate system even with the same first or second coordinate. HS POS does without limitations.

MG: 6	GD: 0	KY.6.G.SC.10 Coordinate Geometry: Students will identify and graph ordered pairs on a positive coordinate system, identifying the origin, axes and ordered pairs
MG: 6	GD: 0	KY.6.G.SC.11 Coordinate Geometry: Students will apply graphing in the positive coordinate system to solve real-world and mathematical problems
MG: 7	GD: -1	KY.7.A.SC.3 Patterns, Relations and Functions: Students will organize input-output coordinate pairs into tables and plot points in all four quadrants of a coordinate (Cartesian) system/grid; interpret resulting patterns/trends
MG: 9-12	GD: -3 to -6	KY.9-12.G.SC.18 Coordinate Geometry: Students will find the distance between two points using their coordinates and the Pythagorean theorem or the distance formula

Expressions and Equations

Cluster: Use properties of operations to generate equivalent expressions.

CCSS: **CC.7.EE.1 Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.**

Grade: 7 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Expressions and Equations Notes:

MG: 7	GD: 0	KY.7.N.SC.17 Properties of Numbers and Operations: Students will identify and apply prime numbers, composite numbers, prime factorization, factors, multiples and divisibility to solve real-world problems (e.g., use prime factorization to determine a least common multiple [LCM] or greatest common factor [GCF])
MG: 7	GD: 0	KY.7.N.SC.2 Number Sense: Students will extend applications of operations (+,-,×,÷) to include integers

Cluster: Use properties of operations to generate equivalent expressions.

CCSS: **CC.7.EE.2 Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. For example, a + 0.05a = 1.05a means that "increase by 5%" is the same as "multiply by 1.05."**

Grade: 7 DM: 3 = Excellent match between the two documents

Strand: Expressions and Equations Notes:

MG: 7	GD: 0	KY.7.N.EU.3 Students will understand that computing fluently and making reasonable estimates with fractions, decimals, percents and integers increases the ability to solve realistic problems encountered in everyday life.
MG: 7	GD: 0	KY.7.N.SC.6 Number Sense: Students will provide examples of and use models, diagrams and symbols (e.g., number lines, 10 by 10 grids, rectangular arrays, number sentences) to describe and write equivalent forms of integers, fractions, decimals, percents, square roots and π
MG: 7	GD: 0	KY.7.N.SC.9 Number Operations: Students will develop addition, subtraction, multiplication and division of integers both concretely and symbolically (mental, pencil and paper, calculators)

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

CCSS: **CC.7.EE.3 Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations as strategies to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.**

Grade: 7 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Expressions and Equations Notes: POS does not include converting between forms of numbers

MG: 7	GD: 0	KY.7.A.SC.11 Equations and Inequalities: Students will model and solve real-world problems with one- or two-step equations or inequalities (e.g., 2x+1=9, 3x+3<9)
MG: 7	GD: 0	KY.7.N.EU.3 Students will understand that computing fluently and making reasonable estimates with fractions, decimals, percents and integers increases the ability to solve realistic problems encountered in everyday life.
MG: 7	GD: 0	KY.7.N.SC.11 Number Operations: Students will add, subtract, multiply, divide and apply order of operations (including positive whole number exponents) with fractions, decimals and integers to solve real-world problems
MG: 7	GD: 0	KY.7.N.SC.16 Properties of Numbers and Operations: Students will identify, explain and apply properties (e.g., commutative, associative, inverse and identity for addition and multiplication; distributive)

Expressions and Equations

MG: 7 GD: 0 KY.7.N.SC.7 Estimation: Students will estimate and mentally compute to solve real-world and/or mathematical problems with fractions, decimals, percents and integers, checking for reasonable and appropriate computational results

MG: 8 GD: -1 KY.8.N.EU.3 Students will understand that computing fluently and making reasonable estimates with fractions, decimals, percents and integers increases the ability to solve realistic problems encountered in everyday life.

MG: 8 GD: -1 KY.8.N.SC.4 Estimation: Students will estimate to solve real-world and/or mathematical problems with rational numbers and common irrational numbers, checking for reasonable and appropriate computational results

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

CCSS: **CC.7.EE.4 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.**

Grade: 7 DM: 3 = Excellent match between the two documents

Strand: Expressions and Equations Notes:

MG: 7 GD: 0 KY.7.A.SC.11 Equations and Inequalities: Students will model and solve real-world problems with one- or two-step equations or inequalities (e.g., 2x+1=9, 3x+3<9)

MG: 7 GD: 0 KY.7.A.SC.8 Variables, Expressions and Operations: Students will describe, define and provide examples of algebraic expressions based on real-world and/or mathematical situations

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

CCSS: **CC.7.EE.4a Solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, The perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?**

Grade: 7 DM: 3 = Excellent match between the two documents

Strand: Expressions and Equations Notes: compare not in POS

MG: 7 GD: 0 KY.7.A.SC.11 Equations and Inequalities: Students will model and solve real-world problems with one- or two-step equations or inequalities (e.g., 2x+1=9, 3x+3<9)

MG: 7 GD: 0 KY.7.N.EU.3 Students will understand that computing fluently and making reasonable estimates with fractions, decimals, percents and integers increases the ability to solve realistic problems encountered in everyday life.

MG: 7 GD: 0 KY.7.N.SC.16 Properties of Numbers and Operations: Students will identify, explain and apply properties (e.g., commutative, associative, inverse and identity for addition and multiplication; distributive)

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

CCSS: **CC.7.EE.4b Solve word problems leading to inequalities of the form px + q > r or px + q < r, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. For example, As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions.**

Grade: 7 DM: 3 = Excellent match between the two documents

Strand: Expressions and Equations Notes:

MG: 7 GD: 0 KY.7.A.SC.11 Equations and Inequalities: Students will model and solve real-world problems with one- or two-step equations or inequalities (e.g., 2x+1=9, 3x+3<9)

MG: 8 GD: -1 KY.8.A.SC.12 Equations and Inequalities: Students will investigate linear inequalities using a variety of methods and representations

Cluster: Draw, construct, and describe geometrical figures and describe the relationships between them.

CCSS: **CC.7.G.1 Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.**

Grade: 7 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Geometry Notes:

MG: 7	GD: 0	KY.7.G.EU.4 Students will understand that shape and area are conserved during mathematical transformations (flips, slides and turns). Scale conserves shape, but changes size.
MG: 7	GD: 0	KY.7.M.SC.1 Measuring Physical Attributes: Students will read and use measurement tools (e.g., rulers, scales, protractors, angle rulers)
MG: 7	GD: 0	KY.7.M.SC.5 Measuring Physical Attributes: Students will determine the length of sides (to the nearest eighth of an inch or nearest centimeter), area and perimeter of triangles, quadrilaterals (rectangles, squares, trapezoids) and other polygons. (Using the Pythagorean theorem will not be required as a strategy)
MG: 8	GD: -1	KY.8.G.SC.6 Transformations of Shapes: Students will investigate the congruence, proportionality and/or similarity of pre-images and images of dilations (e.g., enlargements, reductions) in a coordinate plane

Cluster: Draw, construct, and describe geometrical figures and describe the relationships between them.

CCSS: **CC.7.G.2 Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.**

Grade: 7 DM: 3 = Excellent match between the two documents

Strand: Geometry Notes:

MG: 6	GD: 1	KY.6.M.SC.2 Measuring Physical Attributes: Students will read and use measurement tools (e.g., rulers, scales, protractors, angle rulers)
MG: 9-12	GD: -2 to -5	KY.9-12.G.SC.1 Shapes and Relationships: Students will identify and apply the definitions, properties and theorems about line segments, rays and angles and use them to prove theorems in Euclidean geometry, solve problems and perform basic geometric constructions using a straight edge and a compass
MG: 9-12	GD: -2 to -5	KY.9-12.G.SC.11 Shapes and Relationships: Students will draw and construct representations of two-dimensional figures and three-dimensional objects using a variety of tools

Cluster: Draw, construct, and describe geometrical figures and describe the relationships between them.

CCSS: **CC.7.G.3 Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.**

Grade: 7 DM: 3 = Excellent match between the two documents

Strand: Geometry Notes:

MG: 9-12	GD: -2 to -5	KY.9-12.G.SC.8 Shapes and Relationships: Students will describe the intersection of lines, planes and solids and visualize three-dimensional objects and spaces from different perspectives and analyze their cross sections

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

CCSS: **CC.7.G.4 Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.**

Grade: 7 DM: 3 = Excellent match between the two documents

Strand: Geometry Notes:

MG: 7	GD: 0	KY.7.M.SC.3 Measuring Physical Attributes: Students will estimate and find circle measurements in standard units (radius, diameter, circumference, area) and relationships among them

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

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

Grade: 7 DM: 3 = Excellent match between the two documents

Strand: Geometry Notes:

MG: 7	GD: 0	KY.7.G.SC.2 Shapes and Relationships: Students will identify characteristics of angles (e.g., adjacent, vertical, corresponding, interior, exterior)
MG: 9-12	GD: -2 to -5	KY.9-12.G.SC.3 Shapes and Relationships: Students will analyze and apply angle relationships (e.g., linear pairs, vertical, complementary, supplementary, corresponding and alternate interior angles) in real-world or mathematical situations

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

CCSS: **CC.7.G.6 Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.**

Grade: 7 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Geometry Notes:

MG: 7	GD: 0	KY.7.G.SC.4 Shapes and Relationships: Students will describe, provide examples of and identify elements (e.g., vertices, angles, faces, edges, congruent parts) of common three-dimensional figures (spheres, cones, cylinders, prisms and pyramids)
MG: 7	GD: 0	KY.7.M.SC.4 Measuring Physical Attributes: Students will develop and use the formulas for area of a triangle, a parallelogram and a trapezoid and relate each to the formula for the area of a rectangle (b x h)
MG: 8	GD: -1	KY.8.G.SC.3 Shapes and Relationships: Students will compare properties of three-dimensional figures (spheres, cones, cylinders, prisms, pyramids); apply these properties and figures to solve real-world problems
MG: 8	GD: -1	KY.8.M.SC.4 Measuring Physical Attributes: Students will determine the area of triangles and quadrilaterals
MG: 8	GD: -1	KY.8.M.SC.7 Measuring Physical Attributes: Students will develop and apply formulas for volume and surface area of cubes, cylinders and right rectangular prisms; investigate relationships between and among them

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Ratios and Proportional Relationships

Cluster: Analyze proportional relationships and use them to solve real-world and mathematical problems.

CCSS: **CC.7.RP.1 Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. For example, if a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction (1/2)/(1/4) miles per hour, equivalently 2 miles per hour.**

Grade: 7 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Ratios and Proportional Relationships Notes: complex fractions not indicated in POS

MG: 8 GD: -1 KY.8.N.SC.9 Ratios and Proportional Reasoning: Students will derive and use formulas for various rates (e.g., distance/time, miles per hour)

Cluster: Analyze proportional relationships and use them to solve real-world and mathematical problems.

CCSS: **CC.7.RP.2 Recognize and represent proportional relationships between quantities.**

Grade: 7 DM: 3 = Excellent match between the two documents

Strand: Ratios and Proportional Relationships Notes:

MG: 7 GD: 0 KY.7.N.SC.14 Ratios and Proportional Reasoning: Students will determine and solve proportions in real-world and mathematical situations

MG: 7 GD: 0 KY.7.N.SC.15 Ratios and Proportional Reasoning: Students will develop proportional reasoning and apply to real-world and mathematical problems (e.g., rates, scaling, similarity)

Cluster: Analyze proportional relationships and use them to solve real-world and mathematical problems.

CCSS: **CC.7.RP.2a Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.**

Grade: 7 DM:

Strand: Ratios and Proportional Relationships Notes: Unmatched

MG: GD:

Cluster: Analyze proportional relationships and use them to solve real-world and mathematical problems.

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

Grade: 7 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Ratios and Proportional Relationships Notes:

MG: 7 GD: 0 KY.7.N.EU.4 Students will understand that proportional reasoning is a tool for modeling and solving problems encountered in everyday situations.

MG: 7 GD: 0 KY.7.N.SC.14 Ratios and Proportional Reasoning: Students will determine and solve proportions in real-world and mathematical situations

MG: 7 GD: 0 KY.7.N.SC.15 Ratios and Proportional Reasoning: Students will develop proportional reasoning and apply to real-world and mathematical problems (e.g., rates, scaling, similarity)

Ratios and Proportional Relationships

Cluster: Analyze proportional relationships and use them to solve real-world and mathematical problems.

CCSS: **CC.7.RP.2c Represent proportional relationships by equations. For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as t = pn.**

Grade: 7 DM: 3 = Excellent match between the two documents

Strand: Ratios and Proportional Relationships Notes: POS requires students to model and solve.

MG: 6	GD: 1	KY.6.N.EU.4 Students will understand that proportional reasoning is a tool for modeling and solving problems encountered in everyday situations.
MG: 7	GD: 0	KY.7.N.EU.4 Students will understand that proportional reasoning is a tool for modeling and solving problems encountered in everyday situations.
MG: 7	GD: 0	KY.7.N.SC.14 Ratios and Proportional Reasoning: Students will determine and solve proportions in real-world and mathematical situations
MG: 7	GD: 0	KY.7.N.SC.15 Ratios and Proportional Reasoning: Students will develop proportional reasoning and apply to real-world and mathematical problems (e.g., rates, scaling, similarity)
MG: 8	GD: -1	KY.8.G.SC.5 Shapes and Relationships: Students will apply proportional reasoning to solve problems involving scale models and real objects and scale drawings and similar two-dimensional figures
MG: 8	GD: -1	KY.8.N.EU.4 Students will understand that proportional reasoning is a tool for modeling and solving problems encountered in everyday situations.

Cluster: Analyze proportional relationships and use them to solve real-world and mathematical problems.

CCSS: **CC.7.RP.2d Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate.**

Grade: 7 DM:

Strand: Ratios and Proportional Relationships Notes: Unmatched

MG: GD:

Cluster: Analyze proportional relationships and use them to solve real-world and mathematical problems.

CCSS: **CC.7.RP.3 Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.**

Grade: 7 DM: 3 = Excellent match between the two documents

Strand: Ratios and Proportional Relationships Notes:

MG: 8	GD: -1	KY.8.N.SC.8 Ratios and Proportional Reasoning: Students will use percentages and proportions in problem solving, including consumer applications (e.g., simple interest, percentages of increase and decrease, discounts, unit pricing, sale prices)

Cluster: Use random sampling to draw inferences about a population.

CCSS: **CC.7.SP.1 Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.**

Grade: 7 DM: 3 = Excellent match between the two documents

Strand: Statistics and Probability Notes:

MG: 8 GD: -1 KY.8.D.SC.10 Experiments and Samples: Students will explain how data gathering, bias issues or faulty data analysis can affect the results of data collection, data representation and data interpretation

Cluster: Use random sampling to draw inferences about a population.

CCSS: **CC.7.SP.2 Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.**

Grade: 7 DM: 3 = Excellent match between the two documents

Strand: Statistics and Probability Notes:

MG: 7 GD: 0 KY.7.D.SC.11 Experiments and Samples: Students will explore how sample size affects the reliability of the outcome

MG: 7 GD: 0 KY.7.D.SC.7 Characteristics of Data: Students will make predictions, draw conclusions and verify results from statistical data and probability experiments

Cluster: Draw informal comparative inferences about two populations.

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

Grade: 7 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Statistics and Probability Notes: Many POS require students to compare and look at distribution - POS is not specific to overlap or looking at mean absolute deviation.

MG: 6 GD: 1 KY.6.D.EU.3 Students will understand that the choice of data display can affect the visual message communicated.

MG: 6 GD: 1 KY.6.D.EU.5 Students will understand that for a given set of data or a graph, statistical measures (mean, median, mode, range) can be used to describe the distribution of the data.

MG: 6 GD: 1 KY.6.D.SC.2 Data Representations: Students will collect, organize, construct, analyze and interpret data in a variety of graphical methods, including line plots, line graphs, circle graphs, bar graphs and stem-and-leaf plots

MG: 6 GD: 1 KY.6.D.SC.6 Characteristics of Data: Students will determine and apply measures of distribution (mean, median, mode, range)

MG: 7 GD: 0 KY.7.D.EU.5 Students will understand that for a given set of data or a graph, statistical measures (mean, median, mode, range) can be used to describe the distribution of the data.

MG: 7 GD: 0 KY.7.D.SC.8 Characteristics of Data: Students will determine, apply and compare measures of mean, median, mode and/or range, as appropriate to the problem situation

Statistics and Probability

MG: 8	GD: -1	KY.8.D.EU.5 Students will understand that for a given set of data or a graph, statistical measures (mean, median, mode, range) can be used to describe the distribution of the data.
MG: 8	GD: -1	KY.8.D.SC.1 Data Representations: Students will collect, organize, construct, analyze and make inferences from data in a variety of graphical methods (e.g., drawings, tables/charts, pictographs, bar graphs, circle graphs, line plots, Venn diagrams, line graphs, stem-and-leaf plots, scatter plots, histograms, box-and-whiskers plots)
MG: 8	GD: -1	KY.8.D.SC.3 Data Representations: Students will compare similar data from various types of graphs
MG: 8	GD: -1	KY.8.D.SC.8 Characteristics of Data: Students will compare sets of data

Cluster: Draw informal comparative inferences about two populations.

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

Grade: 7 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Statistics and Probability Notes: POS includes some variability but not deviation from the mean.

MG: 6	GD: 1	KY.6.D.EU.5 Students will understand that for a given set of data or a graph, statistical measures (mean, median, mode, range) can be used to describe the distribution of the data.
MG: 6	GD: 1	KY.6.D.SC.6 Characteristics of Data: Students will determine and apply measures of distribution (mean, median, mode, range)
MG: 7	GD: 0	KY.7.D.EU.4 Students will understand that inferences and predictions from data are used to make critical and informed decisions.
MG: 7	GD: 0	KY.7.D.EU.5 Students will understand that for a given set of data or a graph, statistical measures (mean, median, mode, range) can be used to describe the distribution of the data.
MG: 7	GD: 0	KY.7.D.SC.8 Characteristics of Data: Students will determine, apply and compare measures of mean, median, mode and/or range, as appropriate to the problem situation
MG: 8	GD: -1	KY.8.D.EU.5 Students will understand that for a given set of data or a graph, statistical measures (mean, median, mode, range) can be used to describe the distribution of the data.
MG: 8	GD: -1	KY.8.D.SC.7 Characteristics of Data: Students will determine and interpret the mean, median, mode and range of a set of data

Cluster: Investigate chance processes and develop, use, and evaluate probability models.

CCSS: **CC.7.SP.5 Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.**

Grade: 7 DM: 3 = Excellent match between the two documents

Strand: Statistics and Probability Notes:

MG: 7	GD: 0	KY.7.D.SC.14 Probability: Students will investigate and explain the role of probability in decision making
MG: 7	GD: 0	KY.7.D.SC.16 Probability: Students will determine theoretical (mathematical) probabilities (expressed as a ratio, decimal or percent), compare to experimental results and explain reasons why there might be differences

Cluster: Investigate chance processes and develop, use, and evaluate probability models.

CCSS: **CC.7.SP.6 Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.**

Grade: 7 DM: 3 = Excellent match between the two documents

Strand: Statistics and Probability Notes:

MG: 7	GD: 0	KY.7.D.SC.13 Probability: Students will determine appropriate techniques to use when investigating possible outcomes of probability problems (using counting techniques, tree diagrams, area models and exhaustive organized lists, charts and tables)
MG: 7	GD: 0	KY.7.D.SC.7 Characteristics of Data: Students will make predictions, draw conclusions and verify results from statistical data and probability experiments
MG: 8	GD: -1	KY.8.D.SC.12 Probability: Students will analyze situations, such as games of chance, board games or grading scales and make predictions using knowledge of probability

Cluster: Investigate chance processes and develop, use, and evaluate probability models.

CCSS: **CC.7.SP.7 Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.**

Grade: 7 DM: 3 = Excellent match between the two documents

Strand: Statistics and Probability Notes:

MG: 7	GD: 0	KY.7.D.SC.10 Experiments and Samples: Students will pose questions; collect, organize and display data
MG: 7	GD: 0	KY.7.D.SC.11 Experiments and Samples: Students will explore how sample size affects the reliability of the outcome
MG: 7	GD: 0	KY.7.D.SC.12 Probability: Students will make predictions, draw conclusions and verify results from statistical data and probability experiments
MG: 7	GD: 0	KY.7.D.SC.13 Probability: Students will determine appropriate techniques to use when investigating possible outcomes of probability problems (using counting techniques, tree diagrams, area models and exhaustive organized lists, charts and tables)
MG: 7	GD: 0	KY.7.D.SC.15 Probability: Students will design and conduct probability experiments
MG: 7	GD: 0	KY.7.D.SC.16 Probability: Students will determine theoretical (mathematical) probabilities (expressed as a ratio, decimal or percent), compare to experimental results and explain reasons why there might be differences
MG: 7	GD: 0	KY.7.D.SC.7 Characteristics of Data: Students will make predictions, draw conclusions and verify results from statistical data and probability experiments

Cluster: Investigate chance processes and develop, use, and evaluate probability models.

CCSS: **CC.7.SP.7a Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.**

Grade: 7 DM: 3 = Excellent match between the two documents

Strand: Statistics and Probability Notes:

MG: 7	GD: 0	KY.7.D.SC.13 Probability: Students will determine appropriate techniques to use when investigating possible outcomes of probability problems (using counting techniques, tree diagrams, area models and exhaustive organized lists, charts and tables)
MG: 7	GD: 0	KY.7.D.SC.15 Probability: Students will design and conduct probability experiments

Statistics and Probability

MG: 7	GD: 0	KY.7.D.SC.17 Probability: Students will explore concepts of randomness and independent events
MG: 8	GD: -1	KY.8.D.SC.16 Probability: Students will explore concepts of randomness and independent events

Cluster: Investigate chance processes and develop, use, and evaluate probability models.

CCSS: **CC.7.SP.7b Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?**

Grade: 7 DM: 3 = Excellent match between the two documents

Strand: Statistics and Probability Notes:

MG: 7	GD: 0	KY.7.D.SC.10 Experiments and Samples: Students will pose questions; collect, organize and display data
MG: 7	GD: 0	KY.7.D.SC.11 Experiments and Samples: Students will explore how sample size affects the reliability of the outcome
MG: 7	GD: 0	KY.7.D.SC.12 Probability: Students will make predictions, draw conclusions and verify results from statistical data and probability experiments
MG: 7	GD: 0	KY.7.D.SC.15 Probability: Students will design and conduct probability experiments
MG: 7	GD: 0	KY.7.D.SC.16 Probability: Students will determine theoretical (mathematical) probabilities (expressed as a ratio, decimal or percent), compare to experimental results and explain reasons why there might be differences
MG: 7	GD: 0	KY.7.D.SC.7 Characteristics of Data: Students will make predictions, draw conclusions and verify results from statistical data and probability experiments

Cluster: Investigate chance processes and develop, use, and evaluate probability models.

CCSS: **CC.7.SP.8 Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.**

Grade: 7 DM: 3 = Excellent match between the two documents

Strand: Statistics and Probability Notes:

MG: 7	GD: 0	KY.7.D.SC.13 Probability: Students will determine appropriate techniques to use when investigating possible outcomes of probability problems (using counting techniques, tree diagrams, area models and exhaustive organized lists, charts and tables)
MG: 8	GD: -1	KY.8.D.SC.13 Probability: Students will identify and describe the number of possible arrangements of several objects, using a tree diagram or the basic counting principle; make a list, picture, chart or tree diagram to represent a sample space

Cluster: Investigate chance processes and develop, use, and evaluate probability models.

CCSS: **CC.7.SP.8a Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.**

Grade: 7 DM: 3 = Excellent match between the two documents

Strand: Statistics and Probability Notes: In order get match of 3 - had to use POS HS

MG: 7	GD: 0	KY.7.D.SC.13 Probability: Students will determine appropriate techniques to use when investigating possible outcomes of probability problems (using counting techniques, tree diagrams, area models and exhaustive organized lists, charts and tables)
MG: 8	GD: -1	KY.8.D.SC.13 Probability: Students will identify and describe the number of possible arrangements of several objects, using a tree diagram or the basic counting principle; make a list, picture, chart or tree diagram to represent a sample space
MG: 9-12	GD: -2 to -5	KY.9-12.D.SC.32 Probability: Students will compute the probability of a compound event

Cluster: Investigate chance processes and develop, use, and evaluate probability models.

CCSS: **CC.7.SP.8b Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event.**

Grade: 7 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Statistics and Probability Notes:

MG: 7	GD: 0	KY.7.D.SC.13 Probability: Students will determine appropriate techniques to use when investigating possible outcomes of probability problems (using counting techniques, tree diagrams, area models and exhaustive organized lists, charts and tables)
MG: 8	GD: -1	KY.8.D.SC.13 Probability: Students will identify and describe the number of possible arrangements of several objects, using a tree diagram or the basic counting principle; make a list, picture, chart or tree diagram to represent a sample space

Cluster: Investigate chance processes and develop, use, and evaluate probability models.

CCSS: **CC.7.SP.8c Design and use a simulation to generate frequencies for compound events. For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood?**

Grade: 7 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Statistics and Probability Notes:

MG: 8	GD: -1	KY.8.D.SC.11 Probability: Students will make predictions, draw conclusions and verify results from probability experiments or simulations, making use of technology as appropriate

The Number System

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

CCSS: **CC.7.NS.1 Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.**

Grade: 7 DM: 3 = Excellent match between the two documents

Strand: The Number System Notes:

MG: 7	GD: 0	KY.7.N.SC.11 Number Operations: Students will add, subtract, multiply, divide and apply order of operations (including positive whole number exponents) with fractions, decimals and integers to solve real-world problems
MG: 8	GD: -1	KY.8.N.SC.2 Number Sense: Students will provide examples of, describe and compare irrational and rational numbers (e.g., magnitude, order on a number line, scientific notation, very large and very small integers, numbers close to zero)

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

CCSS: **CC.7.NS.1a Describe situations in which opposite quantities combine to make 0. For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged.**

Grade: 7 DM: 3 = Excellent match between the two documents

Strand: The Number System Notes:

MG: 7	GD: 0	KY.7.N.SC.16 Properties of Numbers and Operations: Students will identify, explain and apply properties (e.g., commutative, associative, inverse and identity for addition and multiplication; distributive)

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

CCSS: **CC.7.NS.1b Understand p + q as the number located a distance |q| from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.**

Grade: 7 DM: 3 = Excellent match between the two documents

Strand: The Number System Notes:

MG: 7	GD: 0	KY.7.N.SC.11 Number Operations: Students will add, subtract, multiply, divide and apply order of operations (including positive whole number exponents) with fractions, decimals and integers to solve real-world problems
MG: 7	GD: 0	KY.7.N.SC.12 Number Operations: Students will explain inversely-related operations (addition and subtraction; multiplication and division)

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

CCSS: **CC.7.NS.1c Understand subtraction of rational numbers as adding the additive inverse, p – q = p + (–q). Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.**

Grade: 7 DM: 3 = Excellent match between the two documents

Strand: The Number System Notes:

MG: 6	GD: 1	KY.6.N.SC.10 Number Operations: Students will explain and/or demonstrate inversely-related operations (addition and subtraction; multiplication and division)
MG: 6	GD: 1	KY.6.N.SC.17 Properties of Numbers and Operations: Students will explore and/or demonstrate how applications of properties (e.g., commutative, associative, inverse and identity for addition and multiplication) show relationships among numbers and operations
MG: 7	GD: 0	KY.7.N.SC.12 Number Operations: Students will explain inversely-related operations (addition and subtraction; multiplication and division)

The Number System

MG: 7	GD: 0	KY.7.N.SC.16 Properties of Numbers and Operations: Students will identify, explain and apply properties (e.g., commutative, associative, inverse and identity for addition and multiplication; distributive)
MG: 7	GD: 0	KY.7.N.SC.9 Number Operations: Students will develop addition, subtraction, multiplication and division of integers both concretely and symbolically (mental, pencil and paper, calculators)
MG: 8	GD: -1	KY.8.N.SC.10 Properties of Numbers and Operations: Students will identify and use the commutative properties, the associative properties, the identity properties and the inverse properties for addition and multiplication, the distributive property and inverse relationships to justify a given step in solving problems
MG: 8	GD: -1	KY.8.N.SC.2 Number Sense: Students will provide examples of, describe and compare irrational and rational numbers (e.g., magnitude, order on a number line, scientific notation, very large and very small integers, numbers close to zero)

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

CCSS: **CC.7.NS.1d Apply properties of operations as strategies to add and subtract rational numbers.**

Grade: 7 DM: 3 = Excellent match between the two documents

Strand: The Number System Notes:

MG: 7	GD: 0	KY.7.N.SC.16 Properties of Numbers and Operations: Students will identify, explain and apply properties (e.g., commutative, associative, inverse and identity for addition and multiplication; distributive)

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

CCSS: **CC.7.NS.2 Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.**

Grade: 7 DM: 3 = Excellent match between the two documents

Strand: The Number System Notes:

MG: 7	GD: 0	KY.7.N.SC.11 Number Operations: Students will add, subtract, multiply, divide and apply order of operations (including positive whole number exponents) with fractions, decimals and integers to solve real-world problems

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

CCSS: **CC.7.NS.2a Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (–1)(–1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.**

Grade: 7 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: The Number System Notes: POS does not require students to interpret product of rational numbers

MG: 7	GD: 0	KY.7.N.EU.3 Students will understand that computing fluently and making reasonable estimates with fractions, decimals, percents and integers increases the ability to solve realistic problems encountered in everyday life.
MG: 7	GD: 0	KY.7.N.SC.1 Number Sense: Students will extend number sense for percents and integers
MG: 7	GD: 0	KY.7.N.SC.16 Properties of Numbers and Operations: Students will identify, explain and apply properties (e.g., commutative, associative, inverse and identity for addition and multiplication; distributive)
MG: 7	GD: 0	KY.7.N.SC.2 Number Sense: Students will extend applications of operations (+,-,×,÷) to include integers
MG: 8	GD: -1	KY.8.N.SC.6 Number Operations: Students will add, subtract, multiply, divide and apply order of operations (including positive whole number exponents) using rational numbers to solve real-world problems

The Number System

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

CCSS: **CC.7.NS.2b Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers then –(p/q) = (–p)/q = p/(–q). Interpret quotients of rational numbers by describing real-world contexts.**

Grade: 7 DM: 3 = Excellent match between the two documents

Strand: The Number System Notes:

MG: 7	GD: 0	KY.7.N.EU.3 Students will understand that computing fluently and making reasonable estimates with fractions, decimals, percents and integers increases the ability to solve realistic problems encountered in everyday life.
MG: 7	GD: 0	KY.7.N.SC.1 Number Sense: Students will extend number sense for percents and integers
MG: 7	GD: 0	KY.7.N.SC.2 Number Sense: Students will extend applications of operations (+,-,×,÷) to include integers
MG: 7	GD: 0	KY.7.N.SC.9 Number Operations: Students will develop addition, subtraction, multiplication and division of integers both concretely and symbolically (mental, pencil and paper, calculators)

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

CCSS: **CC.7.NS.2c Apply properties of operations as strategies to multiply and divide rational numbers.**

Grade: 7 DM: 3 = Excellent match between the two documents

Strand: The Number System Notes:

MG: 7	GD: 0	KY.7.N.SC.16 Properties of Numbers and Operations: Students will identify, explain and apply properties (e.g., commutative, associative, inverse and identity for addition and multiplication; distributive)
MG: 8	GD: -1	KY.8.N.SC.6 Number Operations: Students will add, subtract, multiply, divide and apply order of operations (including positive whole number exponents) using rational numbers to solve real-world problems

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

CCSS: **CC.7.NS.2d Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.**

Grade: 7 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: The Number System Notes: POS not specific to converting rational numbers to decimals through long division

MG: 6	GD: 1	KY.6.N.SC.5 Number Sense: Students will compare, order and convert between whole numbers, fractions, decimals and percents using concrete materials, drawings or pictures and mathematical symbols (e.g., < , ≤, >, ≥, =, ≠, order on a number line)
MG: 7	GD: 0	KY.7.N.SC.5 Number Sense: Students will compare, order and determine equivalent relationships among fractions, decimals and percents
MG: 7	GD: 0	KY.7.N.SC.6 Number Sense: Students will provide examples of and use models, diagrams and symbols (e.g., number lines, 10 by 10 grids, rectangular arrays, number sentences) to describe and write equivalent forms of integers, fractions, decimals, percents, square roots and ∏
MG: 8	GD: -1	KY.8.N.SC.6 Number Operations: Students will add, subtract, multiply, divide and apply order of operations (including positive whole number exponents) using rational numbers to solve real-world problems

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The Number System

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

CCSS: **CC.7.NS.3 Solve real-world and mathematical problems involving the four operations with rational numbers. (Computations with rational numbers extend the rules for manipulating fractions to complex fractions.)**

Grade: 7 DM: 3 = Excellent match between the two documents

Strand: The Number System Notes:

MG: 7	GD: 0	KY.7.N.SC.11 Number Operations: Students will add, subtract, multiply, divide and apply order of operations (including positive whole number exponents) with fractions, decimals and integers to solve real-world problems
MG: 8	GD: -1	KY.8.N.SC.6 Number Operations: Students will add, subtract, multiply, divide and apply order of operations (including positive whole number exponents) using rational numbers to solve real-world problems

Expressions and Equations

Cluster: Work with radicals and integer exponents.

CCSS: **CC.8.EE.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, 3^2 × 3^(–5) = 3^(–3) = 1/(3^3) = 1/27.**

Grade: 8 DM: 3 = Excellent match between the two documents

Strand: Expressions and Equations Notes:

MG: 8 GD: 0 KY.8.N.SC.6 Number Operations: Students will add, subtract, multiply, divide and apply order of operations (including positive whole number exponents) using rational numbers to solve real-world problems

MG: 9-12 GD: -1 to -4 KY.9-12.A.SC.25 Variables, Expressions and Operations: Students will understand the properties of integer exponents and roots and apply these properties to simplify algebraic expressions

Cluster: Work with radicals and integer exponents.

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

Grade: 8 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Expressions and Equations Notes:

MG: 8 GD: 0 KY.8.N.SC.1 Number Sense: Students will continue to develop number sense to include irrational numbers (e.g., square roots, cube roots, ∏)

MG: 8 GD: 0 KY.8.N.SC.3 Number Sense: Students will describe and provide multiple representations of numbers (rational, square roots, cube roots and pi (∏)) in a variety of equivalent forms using models, diagrams and symbols based on real-world and/or mathematical situations

MG: 8 GD: 0 KY.8.N.SC.7 Number Operations: Students will determine and explain the inverse relationship between addition and subtraction, multiplication and division, or raising to an exponent and taking the root of a number

Cluster: Work with radicals and integer exponents.

CCSS: **CC.8.EE.3 Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. For example, estimate the population of the United States as 3 × 10^8 and the population of the world as 7 × 10^9, and determine that the world population is more than 20 times larger.**

Grade: 8 DM: 3 = Excellent match between the two documents

Strand: Expressions and Equations Notes:

MG: 8 GD: 0 KY.8.N.SC.2 Number Sense: Students will provide examples of, describe and compare irrational and rational numbers (e.g., magnitude, order on a number line, scientific notation, very large and very small integers, numbers close to zero)

Cluster: Work with radicals and integer exponents.

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

Grade: 8 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Expressions and Equations Notes:

MG: 8 GD: 0 KY.8.N.SC.2 Number Sense: Students will provide examples of, describe and compare irrational and rational numbers (e.g., magnitude, order on a number line, scientific notation, very large and very small integers, numbers close to zero)

MG: 9-12 GD: -1 to -4 KY.9-12.N.SC.11 Number Operations: Students will multiply and divide numbers expressed in scientific notation

Expressions and Equations

Cluster: Understand the connections between proportional relationships, lines, and linear equations.

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

Grade: 8 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Expressions and Equations Notes:

MG: 8	GD: 0	KY.8.D.SC.3 Data Representations: Students will compare similar data from various types of graphs
MG: 8	GD: 0	KY.8.G.SC.11 Coordinate Geometry: Students will analyze the graph of a line to determine the slope , y-intercept and equation of the line
MG: 8	GD: 0	KY.8.G.SC.6 Transformations of Shapes: Students will investigate the congruence, proportionality and/or similarity of pre-images and images of dilations (e.g., enlargements, reductions) in a coordinate plane
MG: 8	GD: 0	KY.8.N.EU.4 Students will understand that proportional reasoning is a tool for modeling and solving problems encountered in everyday situations.

Cluster: Understand the connections between proportional relationships, lines, and linear equations.

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

Grade: 8 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Expressions and Equations Notes:

MG: 8	GD: 0	KY.8.G.SC.11 Coordinate Geometry: Students will analyze the graph of a line to determine the slope , y-intercept and equation of the line
MG: 8	GD: 0	KY.8.G.SC.6 Transformations of Shapes: Students will investigate the congruence, proportionality and/or similarity of pre-images and images of dilations (e.g., enlargements, reductions) in a coordinate plane

Cluster: Analyze and solve linear equations and pairs of simultaneous linear equations.

CCSS: **CC.8.EE.7 Solve linear equations in one variable.**

Grade: 8 DM: 3 = Excellent match between the two documents

Strand: Expressions and Equations Notes:

MG: 8	GD: 0	KY.8.A.SC.10 Equations and Inequalities: Students will use multiple representations to model and solve one- and two-variable linear equations

Cluster: Analyze and solve linear equations and pairs of simultaneous linear equations.

CCSS: **CC.8.EE.7a Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers).**

Grade: 8 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Expressions and Equations Notes:

MG: 9-12	GD: -1 to -4	KY.9-12.A.SC.35 Equations and Inequalities: Students will solve one-variable equations and inequalities using manipulatives, symbols, procedures and graphing, including graphing the solution set on a number line

Expressions and Equations

Cluster: Analyze and solve linear equations and pairs of simultaneous linear equations.

CCSS: **CC.8.EE.7b Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.**

Grade: 8 DM: 3 = Excellent match between the two documents

Strand: Expressions and Equations Notes:

MG: 8 GD: 0 KY.8.A.SC.10 Equations and Inequalities: Students will use multiple representations to model and solve one- and two-variable linear equations

MG: 8 GD: 0 KY.8.N.SC.10 Properties of Numbers and Operations: Students will identify and use the commutative properties, the associative properties, the identity properties and the inverse properties for addition and multiplication, the distributive property and inverse relationships to justify a given step in solving problems

Cluster: Analyze and solve linear equations and pairs of simultaneous linear equations.

CCSS: **CC.8.EE.8 Analyze and solve pairs of simultaneous linear equations.**

Grade: 8 DM: 3 = Excellent match between the two documents

Strand: Expressions and Equations Notes:

MG: 9-12 GD: -1 to -4 KY.9-12.A.SC.38 Equations and Inequalities: Students will solve systems of two linear equations in two variables

Cluster: Analyze and solve linear equations and pairs of simultaneous linear equations.

CCSS: **CC.8.EE.8a 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.**

Grade: 8 DM: 3 = Excellent match between the two documents

Strand: Expressions and Equations Notes:

MG: 9-12 GD: -1 to -4 KY.9-12.A.SC.44 Equations and Inequalities: Students will relate a solution of a system of two linear equations in two variables and the graphs of the corresponding lines

Cluster: Analyze and solve linear equations and pairs of simultaneous linear equations.

CCSS: **CC.8.EE.8b 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 3x + 2y cannot simultaneously be 5 and 6.**

Grade: 8 DM: 3 = Excellent match between the two documents

Strand: Expressions and Equations Notes:

MG: 9-12 GD: -1 to -4 KY.9-12.A.SC.38 Equations and Inequalities: Students will solve systems of two linear equations in two variables

Cluster: Analyze and solve linear equations and pairs of simultaneous linear equations.

CCSS: **CC.8.EE.8c Solve real-world and mathematical problems leading to two linear equations in two variables. For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.**

Grade: 8 DM: 3 = Excellent match between the two documents

Strand: Expressions and Equations Notes:

MG: 8 GD: 0 KY.8.A.SC.2 Patterns, Relations and Functions: Students will represent, interpret and describe linear and simple quadratic functional relationships (input/output) through tables, graphs and symbolic rules

Expressions and Equations

MG: 8	GD: 0	KY.8.A.SC.5 Patterns, Relations and Functions: Students will graph linear functions in a four quadrant (Cartesian) system/grid and interpret the results, using technology as appropriate
MG: 9-12	GD: -1 to -4	KY.9-12.A.SC.49 Equations and Inequalities: Students will write and solve linear sentences, describing real-world situations by using and relating formulas, tables, graphs and equations
MG: 9-12	GD: -1 to -4	KY.9-12.A.SC.50 Equations and Inequalities: Students will recognize and solve problems that can be modeled using a linear equation in one variable, a quadratic equation or a system of linear equations
MG: 9-12	GD: -1 to -4	KY.9-12.G.SC.17 Coordinate Geometry: Students will describe a line by a linear equation

Cluster: Define, evaluate, and compare functions.

CCSS: **CC.8.F.1 Understand that a function is a rule that assigns to each input exactly one 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.)**

Grade: 8 DM: 3 = Excellent match between the two documents

Strand: Functions Notes:

MG: 8 GD: 0 KY.8.A.SC.2 Patterns, Relations and Functions: Students will represent, interpret and describe linear and simple quadratic functional relationships (input/output) through tables, graphs and symbolic rules

Cluster: Define, evaluate, and compare functions.

CCSS: **CC.8.F.2 Compare properties of two functions each represented in a different way (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.**

Grade: 8 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Functions Notes:

MG: 8 GD: 0 KY.8.A.SC.4 Patterns, Relations and Functions: Students will interpret and explain relationships between tables, graphs, verbal rules and equations, using technology as appropriate

MG: 8 GD: 0 KY.8.A.SC.6 Patterns, Relations and Functions: Students will explain how change in the input affects change in the output (e.g., in d=rt, increasing the time (t) increases the distance (d))

Cluster: Define, evaluate, and compare functions.

CCSS: **CC.8.F.3 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. For example, the function A = s^2 giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line.**

Grade: 8 DM: 3 = Excellent match between the two documents

Strand: Functions Notes:

MG: 8 GD: 0 KY.8.A.SC.2 Patterns, Relations and Functions: Students will represent, interpret and describe linear and simple quadratic functional relationships (input/output) through tables, graphs and symbolic rules

Cluster: Use functions to model relationships between quantities.

CCSS: **CC.8.F.4 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 or 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.**

Grade: 8 DM: 3 = Excellent match between the two documents

Strand: Functions Notes:

MG: 8 GD: 0 KY.8.A.SC.2 Patterns, Relations and Functions: Students will represent, interpret and describe linear and simple quadratic functional relationships (input/output) through tables, graphs and symbolic rules

Cluster: Use functions to model relationships between quantities.

CCSS: **CC.8.F.5 Describe qualitatively the functional relationship between two quantities by analyzing 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.**

Grade: 8 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Functions Notes:

MG: 8 GD: 0 KY.8.A.SC.2 Patterns, Relations and Functions: Students will represent, interpret and describe linear and simple quadratic functional relationships (input/output) through tables, graphs and symbolic rules

Cluster: Understand congruence and similarity using physical models, transparencies, or geometry software.

CCSS: **CC.8.G.1 Verify experimentally the properties of rotations, reflections, and translations: -- a. Lines are taken to lines, and line segments to line segments of the same length. -- b. Angles are taken to angles of the same measure. -- c. Parallel lines are taken to parallel lines.**

Grade: 8 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Geometry Notes:

MG: 8 GD: 0 KY.8.G.SC.7 Transformations of Shapes: Students will describe, provide examples of and apply to real-world and/or mathematical situations rotational symmetry (45º, 90º, 180º, 270º, 360º)

MG: 8 GD: 0 KY.8.G.SC.9 Transformations of Shapes: Students will transform figures in a coordinate plane (translations, reflections and dilations [magnifications and contractions] with the center of dilation at the origin); determine the new coordinates of the image after the transformation

Cluster: Understand congruence and similarity using physical models, transparencies, or geometry software.

CCSS: **CC.8.G.2 Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.**

Grade: 8 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Geometry Notes:

MG: 8 GD: 0 KY.8.G.SC.4 Shapes and Relationships: Students will provide examples of and apply congruent and similar two-dimensional figures to solve real-world problems

Cluster: Understand congruence and similarity using physical models, transparencies, or geometry software.

CCSS: **CC.8.G.3 Describe the effect of dilations, translations, rotations and reflections on two-dimensional figures using coordinates.**

Grade: 8 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Geometry Notes:

MG: 8 GD: 0 KY.8.G.SC.9 Transformations of Shapes: Students will transform figures in a coordinate plane (translations, reflections and dilations [magnifications and contractions] with the center of dilation at the origin); determine the new coordinates of the image after the transformation

Cluster: Understand congruence and similarity using physical models, transparencies, or geometry software.

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

Grade: 8 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Geometry Notes:

MG: 8 GD: 0 KY.8.G.SC.6 Transformations of Shapes: Students will investigate the congruence, proportionality and/or similarity of pre-images and images of dilations (e.g., enlargements, reductions) in a coordinate plane

Cluster: Understand congruence and similarity using physical models, transparencies, or geometry software.

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

Grade: 8 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Geometry Notes:

MG: 9-12 GD: -1 to -4 KY.9-12.G.SC.3 Shapes and Relationships: Students will analyze and apply angle relationships (e.g., linear pairs, vertical, complementary, supplementary, corresponding and alternate interior angles) in real-world or mathematical situations

Cluster: Understand and apply the Pythagorean Theorem

CCSS: **CC.8.G.6 Explain a proof of the Pythagorean Theorem and its converse.**

Grade: 8 DM: 3 = Excellent match between the two documents

Strand: Geometry Notes:

MG: 8 GD: 0 KY.8.M.SC.6 Measuring Physical Attributes: Students will develop and apply the Pythagorean theorem

MG: 9-12 GD: -1 to -4 KY.9-12.M.SC.7 Measuring Physical Attributes: Students will apply special right triangles and the converse of the Pythagorean theorem to solve realistic problems

Cluster: Understand and apply the Pythagorean Theorem

CCSS: **CC.8.G.7 Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.**

Grade: 8 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Geometry Notes:

MG: 8 GD: 0 KY.8.M.SC.6 Measuring Physical Attributes: Students will develop and apply the Pythagorean theorem

Cluster: Understand and apply the Pythagorean Theorem

CCSS: **CC.8.G.8 Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.**

Grade: 8 DM: 3 = Excellent match between the two documents

Strand: Geometry Notes:

MG: 9-12 GD: -1 to -4 KY.9-12.G.SC.18 Coordinate Geometry: Students will find the distance between two points using their coordinates and the Pythagorean theorem or the distance formula

Cluster: Solve real-world and mathematical problems involving volume of cylinders, cones and spheres.

CCSS: **CC.8.G.9 Know the formulas for the volume of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.**

Grade: 8 DM: 3 = Excellent match between the two documents

Strand: Geometry Notes:

MG: 8 GD: 0 KY.8.M.SC.7 Measuring Physical Attributes: Students will develop and apply formulas for volume and surface area of cubes, cylinders and right rectangular prisms; investigate relationships between and among them

MG: 9-12 GD: -1 to -4 KY.9-12.M.SC.3 Measuring Physical Attributes: Students will determine the surface area and volume of right rectangular prisms, pyramids, cylinders, cones and spheres in realistic problems

Cluster: Investigate patterns of association in bivariate data.

CCSS: **CC.8.SP.1 Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.**

Grade: 8 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Statistics and Probability Notes:

MG: 8 GD: 0 KY.8.D.SC.1 Data Representations: Students will collect, organize, construct, analyze and make inferences from data in a variety of graphical methods (e.g., drawings, tables/charts, pictographs, bar graphs, circle graphs, line plots, Venn diagrams, line graphs, stem-and-leaf plots, scatter plots, histograms, box-and-whiskers plots)

MG: 8 GD: 0 KY.8.D.SC.5 Characteristics of Data: Students will determine and interpret clusters, quartiles, gaps and outliers in data

MG: 9-12 GD: -1 to -4 KY.9-12.D.SC.4 Data Representations: Students will display a scatterplot and describe its shape for bivariate data

Cluster: Investigate patterns of association in bivariate data.

CCSS: **CC.8.SP.2 Know that straight lines are widely used to model 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.**

Grade: 8 DM: 3 = Excellent match between the two documents

Strand: Statistics and Probability Notes:

MG: 9-12 GD: -1 to -4 KY.9-12.D.SC.12 Characteristics of Data Sets: Students will apply line-of-best fit equations for a set of two-variable data to make predictions

Cluster: Investigate patterns of association in bivariate data.

CCSS: **CC.8.SP.3 Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.**

Grade: 8 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Statistics and Probability Notes:

MG: 9-12 GD: -1 to -4 KY.9-12.D.SC.12 Characteristics of Data Sets: Students will apply line-of-best fit equations for a set of two-variable data to make predictions

Cluster: Investigate patterns of association in bivariate data.

CCSS: **CC.8.SP.4 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?**

Grade: 8 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Statistics and Probability Notes:

MG: 9-12 GD: -1 to -4 KY.9-12.D.SC.14 Characteristics of Data Sets: Students will identify trends in bivariate data and find functions that model the data or transform the data, so that they can be modeled

The Number System

Cluster: Know that there are numbers that are not rational, and approximate them by rational numbers.

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

Grade: 8 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: The Number System Notes:

MG:	GD:	
MG: 7	GD: 1	KY.7.N.SC.3 Number Sense: Students will develop number sense for ∏(pi) as one example of an irrational number
MG: 8	GD: 0	KY.8.N.SC.1 Number Sense: Students will continue to develop number sense to include irrational numbers (e.g., square roots, cube roots, ∏)
MG: 8	GD: 0	KY.8.N.SC.2 Number Sense: Students will provide examples of, describe and compare irrational and rational numbers (e.g., magnitude, order on a number line, scientific notation, very large and very small integers, numbers close to zero)

Cluster: Know that there are numbers that are not rational, and approximate them by rational numbers.

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

Grade: 8 DM: 3 = Excellent match between the two documents

Strand: The Number System Notes:

MG:	GD:	
MG: 8	GD: 0	KY.8.N.SC.2 Number Sense: Students will provide examples of, describe and compare irrational and rational numbers (e.g., magnitude, order on a number line, scientific notation, very large and very small integers, numbers close to zero)

Algebra: Arithmetic with Polynomials and Rational Expressions

Cluster: Perform arithmetic operations on polynomials.

CCSS: **CC.9-12.A.APR.1 Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.**

Grade: 9-12

DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Algebra: Arithmetic with Polynomials and Rational Expressions

Notes: POS does not require explicitly that students understand a closed system for polynomials.

MG: 6	GD: 3 to 6	KY.6.N.EU.2 Students will understand that meanings of and relationships among operations provide tools necessary to solve realistic problems encountered in everyday life.
MG: 7	GD: 2 to 5	KY.7.N.EU.2 Students will understand that meanings of and relationships among operations provide tools necessary to solve realistic problems encountered in everyday life.
MG: 8	GD: 1 to 4	KY.8.N.EU.2 Students will understand that meanings of and relationships among operations provide tools necessary to solve realistic problems encountered in everyday life.
MG: 9-12	GD: 0	KY.9-12.A.SC.26 Variables, Expressions and Operations: Students will add, subtract and multiply polynomials
MG: 9-12	GD: 0	KY.9-12.N.EU.2 Students will understand that meanings of and relationships among operations provide tools necessary to solve realistic problems encountered in everyday life and problems encountered in mathematical situations.
MG: 9-12	GD: 0	KY.9-12.N.SC.25 Properties of Numbers and Operations: Students will identify and apply real number properties

Cluster: Understand the relationship between zeros and factors of polynomial.

CCSS: **CC.9-12.A.APR.2 Know and apply the Remainder Theorem: For a polynomial p(x) and a number a, the remainder on division by x – a is p(a), so p(a) = 0 if and only if (x – a) is a factor of p(x).**

Grade: 9-12

DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Algebra: Arithmetic with Polynomials and Rational Expressions

Notes: POS does not require students to make the connections between zeros and factors of a polynomial by specifically applying the remainder theorem.

MG: 9-12	GD: 0	KY.9-12.A.SC.27 Variables, Expressions and Operations: Students will divide a polynomial by a first-degree polynomial
MG: 9-12	GD: 0	KY.9-12.A.SC.31 Variables, Expressions and Operations: Students will add, subtract, multiply, divide and simplify rational expressions

Cluster: Understand the relationship between zeros and factors of polynomial.

CCSS: **CC.9-12.A.APR.3 Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.**

Grade: 9-12

DM: 3 = Excellent match between the two documents

Strand: Algebra: Arithmetic with Polynomials and Rational Expressions

Notes:

MG: 9-12	GD: 0	KY.9-12.A.SC.13 Patterns, Relations and Functions: Students will graph linear, absolute value, quadratic and exponential functions and identify their key characteristics
MG: 9-12	GD: 0	KY.9-12.A.SC.3 Patterns, Relations and Functions: Students will analyze functions by investigating rates of change, intercepts, zeros, asymptotes and local and global behavior

MG: 9-12 GD: 0 KY.9-12.A.SC.48 Equations and Inequalities: Students will graph a quadratic function and understand the relationship between its real zeros and the x-intercepts of the graph

Cluster: Use polynomial identities to solve problems.

CCSS: **CC.9-12.A.APR.4 Prove polynomial identities and use them to describe numerical relationships. For example, the polynomial identity (x^2 + y^2)^2 = (x^2 – y^2)^2 + (2xy)^2 can be used to generate Pythagorean triples.**

Grade: 9-12 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Algebra: Arithmetic with Polynomials and Rational Expressions Notes: Inferred, but not to the "prove" cognitive level.

MG: 9-12 GD: 0 KY.9-12.A.EU.3 Students will understand that algebra represents mathematical situations and structures for analysis and problem solving.

MG: 9-12 GD: 0 KY.9-12.A.SC.22 Variables, Expressions and Operations: Students will use symbolic algebra to represent and explain mathematical relationships

MG: 9-12 GD: 0 KY.9-12.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships among numbers and number systems are means of representing real-world quantities.

Cluster: Use polynomial identities to solve problems.

CCSS: **CC.9-12.A.APR.5 (+) Know and apply that the Binomial Theorem gives the expansion of (x + y)^n in powers of x and y for a positive integer n, where x and y are any numbers, with coefficients determined for example by Pascal's Triangle. (The Binomial Theorem can be proved by mathematical induction or by a combinatorial argument.)**

Grade: 9-12 DM:

Strand: Algebra: Arithmetic with Polynomials and Rational Expressions Notes: Unmatched

MG: GD:

Cluster: Rewrite rational expressions.

CCSS: **CC.9-12.A.APR.6 Rewrite simple rational expressions in different forms; write a(x)/b(x) in the form q(x) + r(x)/b(x), where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system.**

Grade: 9-12 DM: 3 = Excellent match between the two documents

Strand: Algebra: Arithmetic with Polynomials and Rational Expressions Notes:

MG: 9-12 GD: 0 KY.9-12.A.SC.25 Variables, Expressions and Operations: Students will understand the properties of integer exponents and roots and apply these properties to simplify algebraic expressions

MG: 9-12 GD: 0 KY.9-12.A.SC.27 Variables, Expressions and Operations: Students will divide a polynomial by a first-degree polynomial

MG: 9-12 GD: 0 KY.9-12.A.SC.31 Variables, Expressions and Operations: Students will add, subtract, multiply, divide and simplify rational expressions

Cluster: Rewrite rational expressions.

CCSS: **CC.9-12.A.APR.7 (+) Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.**

Grade: 9-12

DM:

Strand: Algebra: Arithmetic with Polynomials and Rational Expressions

Notes: Unmatched

MG:

GD:

Algebra: Creating Equations

Cluster: Create equations that describe numbers or relationship.

CCSS: **CC.9-12.A.CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.***

Grade: 9-12 DM: 3 = Excellent match between the two documents

Strand: Algebra: Creating Equations Notes: simple rational functions implied in POS but not explicit

MG: 9-12	GD: 0	KY.9-12.A.SC.21 Variables, Expressions and Operations: Students write expressions, equations, inequalities and relations in equivalent forms
MG: 9-12	GD: 0	KY.9-12.A.SC.33 Equations and Inequalities: Students will write equivalent forms of equations, inequalities and systems of equations and inequalities and solve them with fluency - mentally or with paper and pencil in simple cases and using technology in all cases
MG: 9-12	GD: 0	KY.9-12.A.SC.35 Equations and Inequalities: Students will solve one-variable equations and inequalities using manipulatives, symbols, procedures and graphing, including graphing the solution set on a number line
MG: 9-12	GD: 0	KY.9-12.A.SC.36 Equations and Inequalities: Students will solve linear equations and inequalities in one variable including those involving the absolute value of a linear function
MG: 9-12	GD: 0	KY.9-12.A.SC.40 Equations and Inequalities: Students will solve quadratic equations in one variable
MG: 9-12	GD: 0	KY.9-12.A.SC.49 Equations and Inequalities: Students will write and solve linear sentences, describing real-world situations by using and relating formulas, tables, graphs and equations
MG: 9-12	GD: 0	KY.9-12.A.SC.50 Equations and Inequalities: Students will recognize and solve problems that can be modeled using a linear equation in one variable, a quadratic equation or a system of linear equations
MG: 9-12	GD: 0	KY.9-12.A.SC.51 Equations and Inequalities: Students will use the skills learned to solve linear equations and inequalities to solve numerically, graphically or symbolically non-linear equations (e.g., absolute value, quadratic, exponential equations)
MG: 9-12	GD: 0	KY.9-12.N.SC.5 Number Sense: Students will compare and contrast number systems, including complex numbers as solutions to quadratic equations that do not have real solutions

Cluster: Create equations that describe numbers or relationship.

CCSS: **CC.9-12.A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.***

Grade: 9-12 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Algebra: Creating Equations Notes: POS does not require students to create equations and graphing 3D is not included in POS.

MG: 9-12	GD: 0	KY.9-12.A.SC.37 Equations and Inequalities: Students will solve an equation involving several variables for one variable in terms of the others
MG: 9-12	GD: 0	KY.9-12.A.SC.38 Equations and Inequalities: Students will solve systems of two linear equations in two variables
MG: 9-12	GD: 0	KY.9-12.A.SC.39 Equations and Inequalities: Students will solve systems of three linear equations in three variables
MG: 9-12	GD: 0	KY.9-12.A.SC.44 Equations and Inequalities: Students will relate a solution of a system of two linear equations in two variables and the graphs of the corresponding lines

Algebra: Creating Equations

Cluster: Create equations that describe numbers or relationship.

CCSS: **CC.9-12.A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.***

Grade: 9-12

DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Algebra: Creating Equations

Notes: POS requires students to write and solve but not to interpret solutions as viable or non-viable options within the context of the problem.

MG: 9-12 GD: 0 KY.9-12.A.SC.33 Equations and Inequalities: Students will write equivalent forms of equations, inequalities and systems of equations and inequalities and solve them with fluency - mentally or with paper and pencil in simple cases and using technology in all cases

MG: 9-12 GD: 0 KY.9-12.A.SC.6 Patterns, Relations and Functions: Students will interpret representations of functions of two variables

Cluster: Create equations that describe numbers or relationship.

CCSS: **CC.9-12.A.CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law V = IR to highlight resistance R.***

Grade: 9-12

DM: 3 = Excellent match between the two documents

Strand: Algebra: Creating Equations

Notes:

MG: 9-12 GD: 0 KY.9-12.A.SC.37 Equations and Inequalities: Students will solve an equation involving several variables for one variable in terms of the others

Algebra: Reasoning with Equations and Inequalities

Cluster: Understand solving equations as a process of reasoning and explain the reasoning.

CCSS: **CC.9-12.A.REI.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.**

Grade: 9-12

DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Algebra: Reasoning with Equations and Inequalities

Notes: POS does not require students to "explain" however it does require the students to judge reasonableness.

MG: 9-12 GD: 0 KY.9-12.A.SC.24 Variables, Expressions and Operations: Students will judge the meaning, utility and reasonableness of the results of symbol manipulations, including those carried out using technology

MG: 9-12 GD: 0 KY.9-12.A.SC.33 Equations and Inequalities: Students will write equivalent forms of equations, inequalities and systems of equations and inequalities and solve them with fluency - mentally or with paper and pencil in simple cases and using technology in all cases

Cluster: Understand solving equations as a process of reasoning and explain the reasoning.

CCSS: **CC.9-12.A.REI.2 Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.**

Grade: 9-12

DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Algebra: Reasoning with Equations and Inequalities

Notes: POS requires students to evaluate rational expressions that contain radical but POS does not specify solving rational and radical equations and providing examples of how extraneous solutions may arise. The development of the skill is there.

MG: 9-12 GD: 0 KY.9-12.A.SC.30 Variables, Expressions and Operations: Students will determine when an expression is undefined

MG: 9-12 GD: 0 KY.9-12.A.SC.32 Variables, Expressions and Operations: Students will evaluate polynomial and rational expressions and expressions containing radicals and absolute values at specified values of their variables

MG: 9-12 GD: 0 KY.9-12.N.SC.17 Number Operations: Students will solve realistic problems to a specified degree of accuracy

Cluster: Solve equations and inequalities in one variable.

CCSS: **CC.9-12.A.REI.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.**

Grade: 9-12

DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Algebra: Reasoning with Equations and Inequalities

Notes: POS does not include "equations with coefficients represented by letters" however, POS does include solving an equation involving several variables for one variable in terms of the others.

MG: 9-12 GD: 0 KY.9-12.A.SC.33 Equations and Inequalities: Students will write equivalent forms of equations, inequalities and systems of equations and inequalities and solve them with fluency - mentally or with paper and pencil in simple cases and using technology in all cases

MG: 9-12 GD: 0 KY.9-12.A.SC.35 Equations and Inequalities: Students will solve one-variable equations and inequalities using manipulatives, symbols, procedures and graphing, including graphing the solution set on a number line

MG: 9-12 GD: 0 KY.9-12.A.SC.36 Equations and Inequalities: Students will solve linear equations and inequalities in one variable including those involving the absolute value of a linear function

MG: 9-12 GD: 0 KY.9-12.A.SC.37 Equations and Inequalities: Students will solve an equation involving several variables for one variable in terms of the others

MG: 9-12 GD: 0 KY.9-12.A.SC.50 Equations and Inequalities: Students will recognize and solve problems that can be modeled using a linear equation in one variable, a quadratic equation or a system of linear equations

Cluster: Solve equations and inequalities in one variable.

CCSS: **CC.9-12.A.REI.4 Solve quadratic equations in one variable.**

Grade: 9-12 DM: 3 = Excellent match between the two documents

Strand: Algebra: Reasoning with Equations and Inequalities Notes:

MG: 9-12 GD: 0 KY.9-12.A.SC.14 Patterns, Relations and Functions: Students will recognize and solve problems that can be modeled using linear, absolute value, quadratic or exponential functions

MG: 9-12 GD: 0 KY.9-12.A.SC.40 Equations and Inequalities: Students will solve quadratic equations in one variable

MG: 9-12 GD: 0 KY.9-12.A.SC.50 Equations and Inequalities: Students will recognize and solve problems that can be modeled using a linear equation in one variable, a quadratic equation or a system of linear equations

MG: 9-12 GD: 0 KY.9-12.A.SC.51 Equations and Inequalities: Students will use the skills learned to solve linear equations and inequalities to solve numerically, graphically or symbolically non-linear equations (e.g., absolute value, quadratic, exponential equations)

Cluster: Solve equations and inequalities in one variable.

CCSS: **CC.9-12.A.REI.4a Use the method of completing the square to transform any quadratic equation in x into an equation of the form (x – p)^2 = q that has the same solutions. Derive the quadratic formula from this form.**

Grade: 9-12 DM:

Strand: Algebra: Reasoning with Equations and Inequalities Notes: Unmatched

MG: GD:

Cluster: Solve equations and inequalities in one variable.

CCSS: **CC.9-12.A.REI.4b Solve quadratic equations by inspection (e.g., for x^2 = 49), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as a ± bi for real numbers a and b.**

Grade: 9-12 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Algebra: Reasoning with Equations and Inequalities Notes: No match found - POS does not specify how students will solve quadratic equations when the solution set includes complex numbers. However it does state that students will explore this.

MG: 9-12 GD: 0 KY.9-12.A.SC.14 Patterns, Relations and Functions: Students will recognize and solve problems that can be modeled using linear, absolute value, quadratic or exponential functions

MG: 9-12 GD: 0 KY.9-12.A.SC.40 Equations and Inequalities: Students will solve quadratic equations in one variable

MG: 9-12 GD: 0 KY.9-12.A.SC.50 Equations and Inequalities: Students will recognize and solve problems that can be modeled using a linear equation in one variable, a quadratic equation or a system of linear equations

MG: 9-12 GD: 0 KY.9-12.A.SC.51 Equations and Inequalities: Students will use the skills learned to solve linear equations and inequalities to solve numerically, graphically or symbolically non-linear equations (e.g., absolute value, quadratic, exponential equations)

MG: 9-12 GD: 0 KY.9-12.A.SC.52 Equations and Inequalities: Students will use graphing technology to explore the meaning of quadratic equations with complex solutions

MG: 9-12 GD: 0 KY.9-12.N.SC.5 Number Sense: Students will compare and contrast number systems, including complex numbers as solutions to quadratic equations that do not have real solutions

Cluster: Solve systems of equations.

CCSS: **CC.9-12.A.REI.5 Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.**

Grade: 9-12 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Algebra: Reasoning with Equations and Inequalities Notes: CCSS specifies how the student will solve the system and POS does not specify linear combination.

MG: 9-12 GD: 0 KY.9-12.A.SC.38 Equations and Inequalities: Students will solve systems of two linear equations in two variables

MG: 9-12 GD: 0 KY.9-12.A.SC.39 Equations and Inequalities: Students will solve systems of three linear equations in three variables

Cluster: Solve systems of equations.

CCSS: **CC.9-12.A.REI.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.**

Grade: 9-12 DM: 3 = Excellent match between the two documents

Strand: Algebra: Reasoning with Equations and Inequalities Notes:

MG: 9-12 GD: 0 KY.9-12.A.SC.38 Equations and Inequalities: Students will solve systems of two linear equations in two variables

MG: 9-12 GD: 0 KY.9-12.A.SC.39 Equations and Inequalities: Students will solve systems of three linear equations in three variables

MG: 9-12 GD: 0 KY.9-12.A.SC.44 Equations and Inequalities: Students will relate a solution of a system of two linear equations in two variables and the graphs of the corresponding lines

MG: 9-12 GD: 0 KY.9-12.A.SC.47 Equations and Inequalities: Students will read information and draw conclusions from graphs and identify properties of a graph that provide useful information about the original problem

Cluster: Solve systems of equations.

CCSS: **CC.9-12.A.REI.7 Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line y = –3x and the circle x^2 + y^2 = 3.**

Grade: 9-12 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Algebra: Reasoning with Equations and Inequalities Notes: POS only requires 2 linear equations not linear and quadratic

MG: 9-12 GD: 0 KY.9-12.A.SC.38 Equations and Inequalities: Students will solve systems of two linear equations in two variables

Cluster: Solve systems of equations.

CCSS: **CC.9-12.A.REI.8 (+) Represent a system of linear equations as a single matrix equation in a vector variable.**

Grade: 9-12 DM:

Strand: Algebra: Reasoning with Equations and Inequalities Notes: Unmatched

MG: GD:

Algebra: Reasoning with Equations and Inequalities

Cluster: Solve systems of equations.

CCSS: **CC.9-12.A.REI.9 (+) Find the inverse of a matrix if it exists and use it to solve systems of linear equations (using technology for matrices of dimension 3 × 3 or greater).**

Grade: 9-12 DM:

Strand: Algebra: Reasoning with Equations and Inequalities Notes: Unmatched

MG: GD:

Cluster: Represent and solve equations and inequalities graphically.

CCSS: **CC.9-12.A.REI.10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).**

Grade: 9-12 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Algebra: Reasoning with Equations and Inequalities Notes: Although several POS standards are listed with this CCSS it is not clear that students understand the relationship between equations and the graphical representation (plotted solutions.)

MG: 9-12 GD: 0 KY.9-12.A.EU.6 Students will understand that functions can be written in words, in a symbolic sentence or in a table or graph.

MG: 9-12 GD: 0 KY.9-12.A.SC.47 Equations and Inequalities: Students will read information and draw conclusions from graphs and identify properties of a graph that provide useful information about the original problem

MG: 9-12 GD: 0 KY.9-12.A.SC.49 Equations and Inequalities: Students will write and solve linear sentences, describing real-world situations by using and relating formulas, tables, graphs and equations

MG: 9-12 GD: 0 KY.9-12.A.SC.51 Equations and Inequalities: Students will use the skills learned to solve linear equations and inequalities to solve numerically, graphically or symbolically non-linear equations (e.g., absolute value, quadratic, exponential equations)

MG: 9-12 GD: 0 KY.9-12.A.SC.9 Patterns, Relations and Functions: Students will determine whether a relationship given in symbolic or graphical form is a function

Cluster: Represent and solve equations and inequalities graphically.

CCSS: **CC.9-12.A.REI.11 Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.***

Grade: 9-12 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Algebra: Reasoning with Equations and Inequalities Notes: POS does not require students to explain

MG: 9-12 GD: 0 KY.9-12.A.SC.44 Equations and Inequalities: Students will relate a solution of a system of two linear equations in two variables and the graphs of the corresponding lines

Algebra: Reasoning with Equations and Inequalities

Cluster: Represent and solve equations and inequalities graphically.

CCSS: **CC.9-12.A.REI.12 Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.**

Grade: 9-12

DM: 3 = Excellent match between the two documents

Strand: Algebra: Reasoning with Equations and Inequalities

Notes:

MG: 9-12 GD: 0 KY.9-12.A.SC.46 Equations and Inequalities: Students will graph the solution set of a system of two or three linear inequalities

Algebra: Seeing Structure in Expressions

Cluster: Interpret the structure of expressions.

CCSS: **CC.9-12.A.SSE.1 Interpret expressions that represent a quantity in terms of its context.***

Grade: 9-12 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Algebra: Seeing Structure in Expressions Notes: POS Write and use ... CCSS interpret

MG: 9-12 GD: 0 KY.9-12.A.SC.21 Variables, Expressions and Operations: Students write expressions, equations, inequalities and relations in equivalent forms

MG: 9-12 GD: 0 KY.9-12.A.SC.22 Variables, Expressions and Operations: Students will use symbolic algebra to represent and explain mathematical relationships

MG: 9-12 GD: 0 KY.9-12.A.SC.23 Variables, Expressions and Operations: Students will use symbolic expressions, including iterative and recursive forms, to represent relationships among various contexts

Cluster: Interpret the structure of expressions.

CCSS: **CC.9-12.A.SSE.1a Interpret parts of an expression, such as terms, factors, and coefficients.***

Grade: 9-12 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Algebra: Seeing Structure in Expressions Notes:

MG: 9-12 GD: 0 KY.9-12.A.SC.22 Variables, Expressions and Operations: Students will use symbolic algebra to represent and explain mathematical relationships

Cluster: Interpret the structure of expressions.

CCSS: **CC.9-12.A.SSE.1b Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret P(1+r)^n as the product of P and a factor not depending on P.***

Grade: 9-12 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Algebra: Seeing Structure in Expressions Notes: POS does not require interpretation.

MG: 9-12 GD: 0 KY.9-12.A.SC.21 Variables, Expressions and Operations: Students write expressions, equations, inequalities and relations in equivalent forms

MG: 9-12 GD: 0 KY.9-12.A.SC.22 Variables, Expressions and Operations: Students will use symbolic algebra to represent and explain mathematical relationships

MG: 9-12 GD: 0 KY.9-12.A.SC.23 Variables, Expressions and Operations: Students will use symbolic expressions, including iterative and recursive forms, to represent relationships among various contexts

Cluster: Interpret the structure of expressions.

CCSS: **CC.9-12.A.SSE.2 Use the structure of an expression to identify ways to rewrite it. For example, see x^4 – y^4 as (x^2)^2 – (y^2)^2, thus recognizing it as a difference of squares that can be factored as (x^2 – y^2)(x^2 + y^2).**

Grade: 9-12 DM: 3 = Excellent match between the two documents

Strand: Algebra: Seeing Structure in Expressions Notes:

MG: 9-12 GD: 0 KY.9-12.A.SC.28 Variables, Expressions and Operations: Students will factor polynomials by removing the greatest common factor

MG: 9-12 GD: 0 KY.9-12.A.SC.29 Variables, Expressions and Operations: Students will factor quadratic polynomials

Algebra: Seeing Structure in Expressions

Cluster: Write expressions in equivalent forms to solve problems.

CCSS: **CC.9-12.A.SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.***

Grade: 9-12 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Algebra: Seeing Structure in Expressions Notes: Explaining is not a requirement of POS

MG: 9-12 GD: 0 KY.9-12.A.SC.21 Variables, Expressions and Operations: Students write expressions, equations, inequalities and relations in equivalent forms

MG: 9-12 GD: 0 KY.9-12.A.SC.33 Equations and Inequalities: Students will write equivalent forms of equations, inequalities and systems of equations and inequalities and solve them with fluency - mentally or with paper and pencil in simple cases and using technology in all cases

Cluster: Write expressions in equivalent forms to solve problems.

CCSS: **CC.9-12.A.SSE.3a Factor a quadratic expression to reveal the zeros of the function it defines.***

Grade: 9-12 DM: 3 = Excellent match between the two documents

Strand: Algebra: Seeing Structure in Expressions Notes:

MG: 9-12 GD: 0 KY.9-12.A.SC.13 Patterns, Relations and Functions: Students will graph linear, absolute value, quadratic and exponential functions and identify their key characteristics

MG: 9-12 GD: 0 KY.9-12.A.SC.29 Variables, Expressions and Operations: Students will factor quadratic polynomials

Cluster: Write expressions in equivalent forms to solve problems.

CCSS: **CC.9-12.A.SSE.3b Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.***

Grade: 9-12 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Algebra: Seeing Structure in Expressions Notes: Determining key characteristics by completing the square is not necessary in the POS.

MG: 9-12 GD: 0 KY.9-12.A.SC.13 Patterns, Relations and Functions: Students will graph linear, absolute value, quadratic and exponential functions and identify their key characteristics

MG: 9-12 GD: 0 KY.9-12.A.SC.48 Equations and Inequalities: Students will graph a quadratic function and understand the relationship between its real zeros and the x-intercepts of the graph

Cluster: Write expressions in equivalent forms to solve problems.

CCSS: **CC.9-12.A.SSE.3c Use the properties of exponents to transform expressions for exponential functions. For example the expression 1.15^t can be rewritten as [1.15^(1/12)]^(12t) ≈ 1.012^(12t) to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.***

Grade: 9-12 DM: 3 = Excellent match between the two documents

Strand: Algebra: Seeing Structure in Expressions Notes:

MG: 9-12 GD: 0 KY.9-12.A.SC.14 Patterns, Relations and Functions: Students will recognize and solve problems that can be modeled using linear, absolute value, quadratic or exponential functions

MG: 9-12 GD: 0 KY.9-12.A.SC.25 Variables, Expressions and Operations: Students will understand the properties of integer exponents and roots and apply these properties to simplify algebraic expressions

Algebra: Seeing Structure in Expressions

MG: 9-12 GD: 0 KY.9-12.A.SC.51 Equations and Inequalities: Students will use the skills learned to solve linear equations and inequalities to solve numerically, graphically or symbolically non-linear equations (e.g., absolute value, quadratic, exponential equations)

Cluster: Write expressions in equivalent forms to solve problems.

CCSS: **CC.9-12.A.SSE.4 Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. For example, calculate mortgage payments.***

Grade: 9-12

DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Algebra: Seeing Structure in Expressions

Notes: POS does not require students to derive the formula of the sum of a finite geometric series.

MG: 9-12 GD: 0 KY.9-12.N.SC.16 Number Operations: Students will apply sequences and arithmetic and geometric series to solve realistic problems

Cluster: Build a function that models a relationship between two quantities.

CCSS: **CC.9-12.F.BF.1 Write a function that describes a relationship between two quantities.***

Grade: 9-12 DM: 3 = Excellent match between the two documents

Strand: Functions: Building Functions Notes:

MG: 9-12 GD: 0 KY.9-12.A.EU.2 Students will understand that there are relationships between and among patterns and functions, their representations and their properties.

MG: 9-12 GD: 0 KY.9-12.A.SC.22 Variables, Expressions and Operations: Students will use symbolic algebra to represent and explain mathematical relationships

MG: 9-12 GD: 0 KY.9-12.A.SC.23 Variables, Expressions and Operations: Students will use symbolic expressions, including iterative and recursive forms, to represent relationships among various contexts

MG: 9-12 GD: 0 KY.9-12.N.EU.1 Students will understand that numbers, ways of representing numbers, relationships among numbers and number systems are means of representing real-world quantities.

Cluster: Build a function that models a relationship between two quantities.

CCSS: **CC.9-12.F.BF.1a Determine an explicit expression, a recursive process, or steps for calculation from a context.**

Grade: 9-12 DM: 3 = Excellent match between the two documents

Strand: Functions: Building Functions Notes:

MG: 9-12 GD: 0 KY.9-12.A.SC.1 Patterns, Relations and Functions: Students will use explicitly-defined or recursively defined functions to generalize patterns

MG: 9-12 GD: 0 KY.9-12.A.SC.23 Variables, Expressions and Operations: Students will use symbolic expressions, including iterative and recursive forms, to represent relationships among various contexts

MG: 9-12 GD: 0 KY.9-12.A.SC.7 Patterns, Relations and Functions: Students will use a variety of symbolic representations, including recursive and parametric equations, for functions and relations

MG: 9-12 GD: 0 KY.9-12.N.SC.15 Number Operations: Students will determine an explicit rule for the nth term of an arithmetic sequence

Cluster: Build a function that models a relationship between two quantities.

CCSS: **CC.9-12.F.BF.1b Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.**

Grade: 9-12 DM: 3 = Excellent match between the two documents

Strand: Functions: Building Functions Notes:

MG: 9-12 GD: 0 KY.9-12.A.SC.4 Patterns, Relations and Functions: Students will transform functions (e.g., arithmetically combining, composing and inverting commonly used functions), using technology on more complicated symbolic expressions

Cluster: Build a function that models a relationship between two quantities.

CCSS: **CC.9-12.F.BF.1c (+) Compose functions. For example, if T(y) is the temperature in the atmosphere as a function of height, and h(t) is the height of a weather balloon as a function of time, then T(h(t)) is the temperature at the location of the weather balloon as a function of time.**

Grade: 9-12 DM: 3 = Excellent match between the two documents

Strand: Functions: Building Functions Notes: Beyond CCSS

MG: 9-12 GD: 0 KY.9-12.A.SC.12 Patterns, Relations and Functions: Students will combine functions by addition, subtraction, multiplication and compositions

Cluster: Build a function that models a relationship between two quantities.

CCSS: **CC.9-12.F.BF.2 Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.***

Grade: 9-12 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Functions: Building Functions Notes: POS does not require students for translate between forms.

MG: 9-12 GD: 0 KY.9-12.A.SC.16 Patterns, Relations and Functions: Students will see the patterns in arithmetic and geometric sequences using recursion

MG: 9-12 GD: 0 KY.9-12.N.SC.15 Number Operations: Students will determine an explicit rule for the nth term of an arithmetic sequence

MG: 9-12 GD: 0 KY.9-12.N.SC.16 Number Operations: Students will apply sequences and arithmetic and geometric series to solve realistic problems

Cluster: Build new functions from existing functions

CCSS: **CC.9-12.F.BF.3 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. Include recognizing even and odd functions from their graphs and algebraic expressions for them.**

Grade: 9-12 DM:

Strand: Functions: Building Functions Notes: Unmatched

MG: GD:

Cluster: Build new functions from existing functions

CCSS: **CC.9-12.F.BF.4 Find inverse functions.**

Grade: 9-12 DM:

Strand: Functions: Building Functions Notes: Unmatched

MG: GD:

Cluster: Build new functions from existing functions

CCSS: **CC.9-12.F.BF.4a Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse. For example, f(x) =2(x^3) or f(x) = (x+1)/(x-1) for x ≠ 1 (x not equal to 1).**

Grade: 9-12 DM:

Strand: Functions: Building Functions Notes: Unmatched

MG: GD:

Cluster: Build new functions from existing functions

CCSS: **CC.9-12.F.BF.4b (+) Verify by composition that one function is the inverse of another.**

Grade: 9-12 DM:

Strand: Functions: Building Functions Notes: Unmatched-Beyond CCSS

MG: GD:

Cluster: Build new functions from existing functions

CCSS: **CC.9-12.F.BF.4c (+) Read values of an inverse function from a graph or a table, given that the function has an inverse.**

Grade: 9-12 DM:

Strand: Functions: Building Functions Notes: Unmatched-Beyond CCSS

MG: GD:

Cluster: Build new functions from existing functions

CCSS: **CC.9-12.F.BF.4d (+) Produce an invertible function from a non-invertible function by restricting the domain.**

Grade: 9-12 DM:

Strand: Functions: Building Functions Notes: Unmatched-Beyond CCSS

MG: GD:

Cluster: Build new functions from existing functions

CCSS: **CC.9-12.F.BF.5 (+) Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.**

Grade: 9-12 DM:

Strand: Functions: Building Functions Notes: Unmatched-Beyond CCSS

MG: GD:

Functions: Interpreting Functions

Cluster: Understand the concept of a function and use function notation.

CCSS: **CC.9-12.F.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. The graph of f is the graph of the equation y = f(x).**

Grade: 9-12 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Functions: Interpreting Functions Notes: POS requires students to determine domain not just know definition.

MG: 9-12 GD: 0 KY.9-12.A.SC.10 Patterns, Relations and Functions: Students will determine the domain of a function represented in either symbolic or graphical form

Cluster: Understand the concept of a function and use function notation.

CCSS: **CC.9-12.F.IF.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.**

Grade: 9-12 DM: 3 = Excellent match between the two documents

Strand: Functions: Interpreting Functions Notes:

MG: 9-12 GD: 0 KY.9-12.A.SC.11 Patterns, Relations and Functions: Students will understand functional notation and evaluate a function at a specified point in its domain

Cluster: Understand the concept of a function and use function notation.

CCSS: **CC.9-12.F.IF.3 Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by f(0) = f(1) = 1, f(n+1) = f(n) + f(n-1) for n ≥ 1 (n is greater than or equal to 1).**

Grade: 9-12 DM: 3 = Excellent match between the two documents

Strand: Functions: Interpreting Functions Notes: Although not specific to Fibonacci sequence the match is rated as excellent.

MG: 9-12 GD: 0 KY.9-12.A.SC.16 Patterns, Relations and Functions: Students will see the patterns in arithmetic and geometric sequences using recursion

MG: 9-12 GD: 0 KY.9-12.A.SC.17 Patterns, Relations and Functions: Students will see patterns in other sequences (e.g., quadratic, cubic)

MG: 9-12 GD: 0 KY.9-12.A.SC.18 Patterns, Relations and Functions: Students will relate the patterns in arithmetic sequences to linear functions

MG: 9-12 GD: 0 KY.9-12.A.SC.19 Patterns, Relations and Functions: Students will relate the patterns in geometric sequences to exponential functions

Cluster: Interpret functions that arise in applications in terms of the context.

CCSS: **CC.9-12.F.IF.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.***

Grade: 9-12 DM: 3 = Excellent match between the two documents

Strand: Functions: Interpreting Functions Notes: Although POS does not require students to interpret, it does require students to analyze.

MG: 9-12 GD: 0 KY.9-12.A.EU.6 Students will understand that functions can be written in words, in a symbolic sentence or in a table or graph.

MG: 9-12 GD: 0 KY.9-12.A.SC.3 Patterns, Relations and Functions: Students will analyze functions by investigating rates of change, intercepts, zeros, asymptotes and local and global behavior

MG: 9-12 GD: 0 KY.9-12.A.SC.43 Equations and Inequalities: Students will relate the coefficients of a linear equation and the slope and x- and y-intercepts of its graph

MG: 9-12 GD: 0 KY.9-12.A.SC.48 Equations and Inequalities: Students will graph a quadratic function and understand the relationship between its real zeros and the x-intercepts of the graph

Cluster: Interpret functions that arise in applications in terms of the context.

CCSS: **CC.9-12.F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.***

Grade: 9-12 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Functions: Interpreting Functions Notes: POS has no context standards for domain of function.

MG: 9-12 GD: 0 KY.9-12.A.SC.10 Patterns, Relations and Functions: Students will determine the domain of a function represented in either symbolic or graphical form

MG: 9-12 GD: 0 KY.9-12.A.SC.11 Patterns, Relations and Functions: Students will understand functional notation and evaluate a function at a specified point in its domain

Cluster: Interpret functions that arise in applications in terms of the context.

CCSS: **CC.9-12.F.IF.6 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.***

Grade: 9-12 DM: 3 = Excellent match between the two documents

Strand: Functions: Interpreting Functions Notes:

MG: 9-12 GD: 0 KY.9-12.A.SC.3 Patterns, Relations and Functions: Students will analyze functions by investigating rates of change, intercepts, zeros, asymptotes and local and global behavior

MG: 9-12 GD: 0 KY.9-12.A.SC.41 Equations and Inequalities: Students will approximate and interpret rates of change from graphical and numerical data

MG: 9-12 GD: 0 KY.9-12.A.SC.42 Equations and Inequalities: Students will graph a linear equation and demonstrate that it has a constant rate of change

Cluster: Analyze functions using different representations.

CCSS: **CC.9-12.F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.***

Grade: 9-12 DM: 3 = Excellent match between the two documents

Strand: Functions: Interpreting Functions Notes:

MG: 9-12 GD: 0 KY.9-12.A.SC.13 Patterns, Relations and Functions: Students will graph linear, absolute value, quadratic and exponential functions and identify their key characteristics

MG: 9-12 GD: 0 KY.9-12.A.SC.52 Equations and Inequalities: Students will use graphing technology to explore the meaning of quadratic equations with complex solutions

Cluster: Analyze functions using different representations.

CCSS: **CC.9-12.F.IF.7a Graph linear and quadratic functions and show intercepts, maxima, and minima.***

Grade: 9-12 DM: 3 = Excellent match between the two documents

Strand: Functions: Interpreting Functions Notes:

MG: 9-12 GD: 0 KY.9-12.A.SC.13 Patterns, Relations and Functions: Students will graph linear, absolute value, quadratic and exponential functions and identify their key characteristics

MG: 9-12 GD: 0 KY.9-12.A.SC.43 Equations and Inequalities: Students will relate the coefficients of a linear equation and the slope and x- and y-intercepts of its graph

MG: 9-12 GD: 0 KY.9-12.A.SC.48 Equations and Inequalities: Students will graph a quadratic function and understand the relationship between its real zeros and the x-intercepts of the graph

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Cluster: Analyze functions using different representations.

CCSS: **CC.9-12.F.IF.7b Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.***

Grade: 9-12 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Functions: Interpreting Functions Notes: POS does not require graphing of these functions.

MG: 9-12 GD: 0 KY.9-12.A.SC.5 Patterns, Relations and Functions: Students will understand and compare the properties of classes of functions (e.g., absolute value, step, exponential, polynomial, rational, logarithmic, periodic)

Cluster: Analyze functions using different representations.

CCSS: **CC.9-12.F.IF.7c Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.***

Grade: 9-12 DM: 3 = Excellent match between the two documents

Strand: Functions: Interpreting Functions Notes:

MG: 9-12 GD: 0 KY.9-12.A.SC.3 Patterns, Relations and Functions: Students will analyze functions by investigating rates of change, intercepts, zeros, asymptotes and local and global behavior

MG: 9-12 GD: 0 KY.9-12.A.SC.5 Patterns, Relations and Functions: Students will understand and compare the properties of classes of functions (e.g., absolute value, step, exponential, polynomial, rational, logarithmic, periodic)

Cluster: Analyze functions using different representations.

CCSS: **CC.9-12.F.IF.7d (+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.***

Grade: 9-12 DM: 3 = Excellent match between the two documents

Strand: Functions: Interpreting Functions Notes: Beyond CCSS

MG: 9-12 GD: 0 KY.9-12.A.SC.3 Patterns, Relations and Functions: Students will analyze functions by investigating rates of change, intercepts, zeros, asymptotes and local and global behavior

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Cluster: Analyze functions using different representations.

CCSS: **CC.9-12.F.IF.7e Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.***

Grade: 9-12 DM: 3 = Excellent match between the two documents

Strand: Functions: Interpreting Functions Notes: This is a weak 3 but a strong 2.

MG: 9-12 GD: 0 KY.9-12.A.SC.13 Patterns, Relations and Functions: Students will graph linear, absolute value, quadratic and exponential functions and identify their key characteristics

MG: 9-12 GD: 0 KY.9-12.A.SC.14 Patterns, Relations and Functions: Students will recognize and solve problems that can be modeled using linear, absolute value, quadratic or exponential functions

MG: 9-12 GD: 0 KY.9-12.A.SC.5 Patterns, Relations and Functions: Students will understand and compare the properties of classes of functions (e.g., absolute value, step, exponential, polynomial, rational, logarithmic, periodic)

Functions: Interpreting Functions

Cluster: Analyze functions using different representations.

CCSS: **CC.9-12.F.IF.8 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.**

Grade: 9-12 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Functions: Interpreting Functions Notes: POS does not require students to explain different properties of the function.

MG: 9-12 GD: 0 KY.9-12.A.SC.2 Patterns, Relations and Functions: Students will understand relations and functions and use various representations for them

MG: 9-12 GD: 0 KY.9-12.A.SC.21 Variables, Expressions and Operations: Students write expressions, equations, inequalities and relations in equivalent forms

MG: 9-12 GD: 0 KY.9-12.A.SC.33 Equations and Inequalities: Students will write equivalent forms of equations, inequalities and systems of equations and inequalities and solve them with fluency - mentally or with paper and pencil in simple cases and using technology in all cases

MG: 9-12 GD: 0 KY.9-12.A.SC.4 Patterns, Relations and Functions: Students will transform functions (e.g., arithmetically combining, composing and inverting commonly used functions), using technology on more complicated symbolic expressions

Cluster: Analyze functions using different representations.

CCSS: **CC.9-12.F.IF.8a Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.**

Grade: 9-12 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Functions: Interpreting Functions Notes: POS only refers to quadratic functions and solving by graphing. Solving quadratics equations in one variable.

MG: 9-12 GD: 0 KY.9-12.A.SC.40 Equations and Inequalities: Students will solve quadratic equations in one variable

MG: 9-12 GD: 0 KY.9-12.A.SC.48 Equations and Inequalities: Students will graph a quadratic function and understand the relationship between its real zeros and the x-intercepts of the graph

Cluster: Analyze functions using different representations.

CCSS: **CC.9-12.F.IF.8b Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as y = (1.02)^t, y = (0.97)^t, y = (1.01)^(12t), y = (1.2)^(t/10), and classify them as representing exponential growth and decay.**

Grade: 9-12 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Functions: Interpreting Functions Notes: POS does not require students to specifically use prop of exp to interpret exponential functions.

MG: 9-12 GD: 0 KY.9-12.A.SC.25 Variables, Expressions and Operations: Students will understand the properties of integer exponents and roots and apply these properties to simplify algebraic expressions

MG: 9-12 GD: 0 KY.9-12.A.SC.5 Patterns, Relations and Functions: Students will understand and compare the properties of classes of functions (e.g., absolute value, step, exponential, polynomial, rational, logarithmic, periodic)

Cluster: Analyze functions using different representations.

CCSS: **CC.9-12.F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.**

Grade: 9-12 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Functions: Interpreting Functions Notes: POS does not require students to explicitly compare functions represented in different ways.

MG: 9-12 GD: 0 KY.9-12.A.EU.2 Students will understand that there are relationships between and among patterns and functions, their representations and their properties.

Grade: 9-12

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Functions: Interpreting Functions

MG: 9-12	GD: 0	KY.9-12.A.SC.47 Equations and Inequalities: Students will read information and draw conclusions from graphs and identify properties of a graph that provide useful information about the original problem
MG: 9-12	GD: 0	KY.9-12.A.SC.5 Patterns, Relations and Functions: Students will understand and compare the properties of classes of functions (e.g., absolute value, step, exponential, polynomial, rational, logarithmic, periodic)

Functions: Linear, Quadratic and Exponential Models

Cluster: Construct and compare linear, quadratic, and exponential models and solve problems.

CCSS: **CC.9-12.F.LE.1 Distinguish between situations that can be modeled with linear functions and with exponential functions.***

Grade: 9-12

DM: 3 = Excellent match between the two documents

Strand: Functions: Linear, Quadratic and Exponential Models

Notes: POS requires students to understand and recognize but not specifically distinguish between modeled situations

MG: 9-12 GD: 0 KY.9-12.A.SC.13 Patterns, Relations and Functions: Students will graph linear, absolute value, quadratic and exponential functions and identify their key characteristics

MG: 9-12 GD: 0 KY.9-12.A.SC.14 Patterns, Relations and Functions: Students will recognize and solve problems that can be modeled using linear, absolute value, quadratic or exponential functions

MG: 9-12 GD: 0 KY.9-12.A.SC.5 Patterns, Relations and Functions: Students will understand and compare the properties of classes of functions (e.g., absolute value, step, exponential, polynomial, rational, logarithmic, periodic)

Cluster: Construct and compare linear, quadratic, and exponential models and solve problems.

CCSS: **CC.9-12.F.LE.1a Prove that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals.***

Grade: 9-12

DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Functions: Linear, Quadratic and Exponential Models

Notes: POS does not require students to explore or prove equal diffs or equal factors.

MG: 9-12 GD: 0 KY.9-12.A.SC.13 Patterns, Relations and Functions: Students will graph linear, absolute value, quadratic and exponential functions and identify their key characteristics

MG: 9-12 GD: 0 KY.9-12.A.SC.42 Equations and Inequalities: Students will graph a linear equation and demonstrate that it has a constant rate of change

Cluster: Construct and compare linear, quadratic, and exponential models and solve problems.

CCSS: **CC.9-12.F.LE.1b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.***

Grade: 9-12

DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Functions: Linear, Quadratic and Exponential Models

Notes: POS limited to linear equation and rate of change

MG: 9-12 GD: 0 KY.9-12.A.SC.42 Equations and Inequalities: Students will graph a linear equation and demonstrate that it has a constant rate of change

Cluster: Construct and compare linear, quadratic, and exponential models and solve problems.

CCSS: **CC.9-12.F.LE.1c Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.***

Grade: 9-12

DM:

Strand: Functions: Linear, Quadratic and Exponential Models

Notes: Unmatched

MG: GD:

Functions: Linear, Quadratic and Exponential Models

Cluster: Construct and compare linear, quadratic, and exponential models and solve problems.

CCSS: **CC.9-12.F.LE.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).***

Grade: 9-12 DM: 3 = Excellent match between the two documents

Strand: Functions: Linear, Quadratic and Exponential Models Notes:

MG: 9-12 GD: 0 KY.9-12.A.SC.49 Equations and Inequalities: Students will write and solve linear sentences, describing real-world situations by using and relating formulas, tables, graphs and equations

MG: 9-12 GD: 0 KY.9-12.A.SC.51 Equations and Inequalities: Students will use the skills learned to solve linear equations and inequalities to solve numerically, graphically or symbolically non-linear equations (e.g., absolute value, quadratic, exponential equations)

Cluster: Construct and compare linear, quadratic, and exponential models and solve problems.

CCSS: **CC.9-12.F.LE.3 Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.***

Grade: 9-12 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Functions: Linear, Quadratic and Exponential Models Notes:

MG: 9-12 GD: 0 KY.9-12.A.SC.34 Equations and Inequalities: Students will draw reasonable conclusions about a situation being modeled

MG: 9-12 GD: 0 KY.9-12.A.SC.47 Equations and Inequalities: Students will read information and draw conclusions from graphs and identify properties of a graph that provide useful information about the original problem

Cluster: Construct and compare linear, quadratic, and exponential models and solve problems.

CCSS: **CC.9-12.F.LE.4 For exponential models, express as a logarithm the solution to ab^(ct) = d where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.***

Grade: 9-12 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Functions: Linear, Quadratic and Exponential Models Notes:

MG: 9-12 GD: 0 KY.9-12.A.SC.5 Patterns, Relations and Functions: Students will understand and compare the properties of classes of functions (e.g., absolute value, step, exponential, polynomial, rational, logarithmic, periodic)

Cluster: Interpret expressions for functions in terms of the situation they model

CCSS: **CC.9-12.F.LE.5 Interpret the parameters in a linear or exponential function in terms of a context.***

Grade: 9-12 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Functions: Linear, Quadratic and Exponential Models Notes: POS not to depth of interpreting parameters in context

MG: 9-12 GD: 0 KY.9-12.A.SC.13 Patterns, Relations and Functions: Students will graph linear, absolute value, quadratic and exponential functions and identify their key characteristics

MG: 9-12 GD: 0 KY.9-12.A.SC.14 Patterns, Relations and Functions: Students will recognize and solve problems that can be modeled using linear, absolute value, quadratic or exponential functions

Grade: 9-12

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Functions: Linear, Quadratic and Exponential Models

MG: 9-12 GD: 0 KY.9-12.A.SC.50 Equations and Inequalities: Students will recognize and solve problems that can be modeled using a linear equation in one variable, a quadratic equation or a system of linear equations

Cluster: Extend the domain of trigonometric functions using the unit circle.

CCSS: **CC.9-12.F.TF.1 Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.**

Grade: 9-12 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Functions: Trigonometric Functions Notes: "basic properties" does not automatically relate to understanding radian measure of an angle related to the length of the arc.

MG: 9-12 GD: 0 KY.9-12.G.SC.5 Shapes and Relationships: Students will use the definitions and basic properties of a circle (e.g., arcs, chords, central angles, inscribed angles) to prove basic theorems and solve problems

Cluster: Extend the domain of trigonometric functions using the unit circle.

CCSS: **CC.9-12.F.TF.2 Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.**

Grade: 9-12 DM:

Strand: Functions: Trigonometric Functions Notes: Unmatched

MG: GD:

Cluster: Extend the domain of trigonometric functions using the unit circle.

CCSS: **CC.9-12.F.TF.3 (+) Use special triangles to determine geometrically the values of sine, cosine, tangent for π/3, π/4 and π/6, and use the unit circle to express the values of sine, cosine, and tangent for π - x, π + x, and 2π - x in terms of their values for x, where x is any real number.**

Grade: 9-12 DM:

Strand: Functions: Trigonometric Functions Notes: Unmatched

MG: GD:

Cluster: Extend the domain of trigonometric functions using the unit circle.

CCSS: **CC.9-12.F.TF.4 (+) Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.**

Grade: 9-12 DM:

Strand: Functions: Trigonometric Functions Notes: Unmatched-Beyond CCSS

MG: GD:

Cluster: Model periodic phenomena with trigonometric functions.

CCSS: **CC.9-12.F.TF.5 Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.***

Grade: 9-12 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Functions: Trigonometric Functions Notes: POS not specific to trig functions

MG: 9-12 GD: 0 KY.9-12.A.SC.5 Patterns, Relations and Functions: Students will understand and compare the properties of classes of functions (e.g., absolute value, step, exponential, polynomial, rational, logarithmic, periodic)

MG: 9-12 GD: 0 KY.9-12.M.SC.8 Measuring Physical Attributes: Students will explore periodic real-world phenomena, using technology (e.g., graphing calculator) as appropriate

Functions: Trigonometric Functions

Cluster: Model periodic phenomena with trigonometric functions.

CCSS: **CC.9-12.F.TF.6 (+) Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed.**

Grade: 9-12 DM:

Strand: Functions: Trigonometric Functions Notes: Unmatched-Beyond CCSS

MG: GD:

Cluster: Model periodic phenomena with trigonometric functions.

CCSS: **CC.9-12.F.TF.7 (+) Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context.***

Grade: 9-12 DM:

Strand: Functions: Trigonometric Functions Notes: Unmatched-Beyond CCSS

MG: GD:

Cluster: Prove and apply trigonometric identities

CCSS: **CC.9-12.F.TF.8 Prove the Pythagorean identity (sin A)^2 + (cos A)^2 = 1 and use it to find sin A, cos A, or tan A, given sin A, cos A, or tan A, and the quadrant of the angle.**

Grade: 9-12 DM:

Strand: Functions: Trigonometric Functions Notes: Unmatched

MG: GD:

Cluster: Prove and apply trigonometric identities

CCSS: **CC.9-12.F.TF.9 (+) Prove the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems.**

Grade: 9-12 DM:

Strand: Functions: Trigonometric Functions Notes: Unmatched-Beyond CCSS

MG: GD:

Cluster: Understand and apply theorems about circles.

CCSS: **CC.9-12.G.C.1 Prove that all circles are similar.**

Grade: 9-12 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Geometry: Circles Notes: POS not specific to circles

MG: 9-12 GD: 0 KY.9-12.G.EU.4 Students will understand that similarity of figures and scale factors are used to analyze and solve problems.

Cluster: Understand and apply theorems about circles.

CCSS: **CC.9-12.G.C.2 Identify and describe relationships among inscribed angles, radii, and chords. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.**

Grade: 9-12 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Geometry: Circles Notes: POS not specific and does not require students to describe.

MG: 9-12 GD: 0 KY.9-12.G.SC.5 Shapes and Relationships: Students will use the definitions and basic properties of a circle (e.g., arcs, chords, central angles, inscribed angles) to prove basic theorems and solve problems

Cluster: Understand and apply theorems about circles.

CCSS: **CC.9-12.G.C.3 Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.**

Grade: 9-12 DM:

Strand: Geometry: Circles Notes: Unmatched

MG: GD:

Cluster: Understand and apply theorems about circles.

CCSS: **CC.9-12.G.C.4 (+) Construct a tangent line from a point outside a given circle to the circle.**

Grade: 9-12 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Geometry: Circles Notes: Beyond CCSS - Constructing a tangent line is not specifically included but could be implied with "basic constructions"

MG: 9-12 GD: 0 KY.9-12.G.SC.1 Shapes and Relationships: Students will identify and apply the definitions, properties and theorems about line segments, rays and angles and use them to prove theorems in Euclidean geometry, solve problems and perform basic geometric constructions using a straight edge and a compass

Cluster: Find arc lengths and areas of sectors of circles

CCSS: **CC.9-12.G.C.5 Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.**

Grade: 9-12 DM:

Strand: Geometry: Circles Notes: Unmatched

MG: GD:

Cluster: Experiment with transformations in the plane.

CCSS: **CC.9-12.G.CO.1 Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.**

Grade: 9-12 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Geometry: Congruence Notes: POS not clear if knowing precise definition nec. to identify, analyze and apply spatial relationships.

MG: 9-12 GD: 0 KY.9-12.G.SC.2 Shapes and Relationships: Students will identify and apply properties and theorems about parallel and perpendicular lines and use them to prove theorems and to perform constructions

MG: 9-12 GD: 0 KY.9-12.G.SC.6 Shapes and Relationships: Students will analyze and apply spatial relationships (not using Cartesian coordinates) among points, lines and planes (e.g., "betweenness" of points, midpoint, segment length, collinear, coplanar, parallel, perpendicular, skew)

Cluster: Experiment with transformations in the plane.

CCSS: **CC.9-12.G.CO.2 Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).**

Grade: 9-12 DM: 3 = Excellent match between the two documents

Strand: Geometry: Congruence Notes:

MG: 9-12 GD: 0 KY.9-12.G.SC.14 Transformations of Shapes: Students will understand and represent transformations within a plane (translations, reflections, rotations and dilations) of figures by using sketches, coordinates, vectors, function notation, matrices and technology

MG: 9-12 GD: 0 KY.9-12.G.SC.15 Transformations of Shapes: Students will use various representations, including electronic displays, to understand the effects of simple transformations within a plane and compositions of transformations

Cluster: Experiment with transformations in the plane.

CCSS: **CC.9-12.G.CO.3 Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.**

Grade: 9-12 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Geometry: Congruence Notes: POS does not require students to describe but could be how the student demonstrates understanding

MG: 9-12 GD: 0 KY.9-12.G.SC.14 Transformations of Shapes: Students will understand and represent transformations within a plane (translations, reflections, rotations and dilations) of figures by using sketches, coordinates, vectors, function notation, matrices and technology

Cluster: Experiment with transformations in the plane.

CCSS: **CC.9-12.G.CO.4 Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.**

Grade: 9-12 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Geometry: Congruence Notes: POS students are not required to develop definitions

MG: 9-12 GD: 0 KY.9-12.G.SC.1 Shapes and Relationships: Students will identify and apply the definitions, properties and theorems about line segments, rays and angles and use them to prove theorems in Euclidean geometry, solve problems and perform basic geometric constructions using a straight edge and a compass

MG: 9-12 GD: 0 KY.9-12.G.SC.14 Transformations of Shapes: Students will understand and represent transformations within a plane (translations, reflections, rotations and dilations) of figures by using sketches, coordinates, vectors, function notation, matrices and technology

MG: 9-12 GD: 0 KY.9-12.G.SC.4 Shapes and Relationships: Students will use the definitions, properties and theorems about congruent and similar triangles and other figures to prove additional theorems and apply these to solve real-world problems

Cluster: Experiment with transformations in the plane.

CCSS: **CC.9-12.G.CO.5 Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.**

Grade: 9-12 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Geometry: Congruence Notes: POS does not require students to move past representing.

MG: 9-12 GD: 0 KY.9-12.G.SC.14 Transformations of Shapes: Students will understand and represent transformations within a plane (translations, reflections, rotations and dilations) of figures by using sketches, coordinates, vectors, function notation, matrices and technology

Cluster: Understand congruence in terms of rigid motions.

CCSS: **CC.9-12.G.CO.6 Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.**

Grade: 9-12 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Geometry: Congruence Notes: POS does not require students to use descriptions of rigid motion to predict or determine congruency.

MG: 9-12 GD: 0 KY.9-12.G.SC.15 Transformations of Shapes: Students will use various representations, including electronic displays, to understand the effects of simple transformations within a plane and compositions of transformations

MG: 9-12 GD: 0 KY.9-12.G.SC.4 Shapes and Relationships: Students will use the definitions, properties and theorems about congruent and similar triangles and other figures to prove additional theorems and apply these to solve real-world problems

Cluster: Understand congruence in terms of rigid motions.

CCSS: **CC.9-12.G.CO.7 Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.**

Grade: 9-12 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Geometry: Congruence Notes: POS does not require students to use descriptions of rigid motion to predict or determine congruency.

MG: 9-12 GD: 0 KY.9-12.G.SC.15 Transformations of Shapes: Students will use various representations, including electronic displays, to understand the effects of simple transformations within a plane and compositions of transformations

Cluster: Understand congruence in terms of rigid motions.

CCSS: **CC.9-12.G.CO.8 Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.**

Grade: 9-12 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Geometry: Congruence Notes: POS does not require students to use descriptions of rigid motion to predict or determine congruency.

MG: 9-12 GD: 0 KY.9-12.G.SC.4 Shapes and Relationships: Students will use the definitions, properties and theorems about congruent and similar triangles and other figures to prove additional theorems and apply these to solve real-world problems

Cluster: Prove geometric theorems.

CCSS: **CC.9-12.G.CO.9 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; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.**

Grade: 9-12 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Geometry: Congruence Notes: POS not as specific

MG: 9-12 GD: 0 KY.9-12.G.SC.1 Shapes and Relationships: Students will identify and apply the definitions, properties and theorems about line segments, rays and angles and use them to prove theorems in Euclidean geometry, solve problems and perform basic geometric constructions using a straight edge and a compass

MG: 9-12 GD: 0 KY.9-12.G.SC.2 Shapes and Relationships: Students will identify and apply properties and theorems about parallel and perpendicular lines and use them to prove theorems and to perform constructions

Cluster: Prove geometric theorems.

CCSS: **CC.9-12.G.CO.10 Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180 degrees; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.**

Grade: 9-12 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Geometry: Congruence Notes: POS does not specify theorems

MG: 9-12 GD: 0 KY.9-12.G.SC.2 Shapes and Relationships: Students will identify and apply properties and theorems about parallel and perpendicular lines and use them to prove theorems and to perform constructions

MG: 9-12 GD: 0 KY.9-12.G.SC.26 Foundational Statements: Students will establish the validity of geometric conjectures using deduction, prove theorems and critique arguments made by others

Cluster: Prove geometric theorems.

CCSS: **CC.9-12.G.CO.11 Prove theorems about parallelograms. Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.**

Grade: 9-12 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Geometry: Congruence Notes: POS not specific

MG: 9-12 GD: 0 KY.9-12.G.SC.1 Shapes and Relationships: Students will identify and apply the definitions, properties and theorems about line segments, rays and angles and use them to prove theorems in Euclidean geometry, solve problems and perform basic geometric constructions using a straight edge and a compass

MG: 9-12 GD: 0 KY.9-12.G.SC.2 Shapes and Relationships: Students will identify and apply properties and theorems about parallel and perpendicular lines and use them to prove theorems and to perform constructions

MG: 9-12 GD: 0 KY.9-12.G.SC.26 Foundational Statements: Students will establish the validity of geometric conjectures using deduction, prove theorems and critique arguments made by others

Cluster: Make geometric constructions.

CCSS: **CC.9-12.G.CO.12 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.**

Grade: 9-12 DM: 3 = Excellent match between the two documents

Strand: Geometry: Congruence Notes:

MG: 9-12 GD: 0 KY.9-12.G.SC.1 Shapes and Relationships: Students will identify and apply the definitions, properties and theorems about line segments, rays and angles and use them to prove theorems in Euclidean geometry, solve problems and perform basic geometric constructions using a straight edge and a compass

MG: 9-12 GD: 0 KY.9-12.G.SC.2 Shapes and Relationships: Students will identify and apply properties and theorems about parallel and perpendicular lines and use them to prove theorems and to perform constructions

MG: 9-12 GD: 0 KY.9-12.G.SC.27 Foundational Statements: Students will perform constructions such as a line parallel to a given line through a point not on the line, the perpendicular bisector of a line segment and the bisector of an angle

Cluster: Make geometric constructions.

CCSS: **CC.9-12.G.CO.13 Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.**

Grade: 9-12 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Geometry: Congruence Notes: POS does not specify inscribing in a circle

MG: 9-12 GD: 0 KY.9-12.G.SC.1 Shapes and Relationships: Students will identify and apply the definitions, properties and theorems about line segments, rays and angles and use them to prove theorems in Euclidean geometry, solve problems and perform basic geometric constructions using a straight edge and a compass

MG: 9-12 GD: 0 KY.9-12.G.SC.2 Shapes and Relationships: Students will identify and apply properties and theorems about parallel and perpendicular lines and use them to prove theorems and to perform constructions

Geometry: Expressing Geometric Properties with Equations

Cluster: Translate between the geometric description and the equation for a conic section.

CCSS: **CC.9-12.G.GPE.1 Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.**

Grade: 9-12

DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Geometry: Expressing Geometric Properties with Equations

Notes: POS does not require students to complete the square

MG: 9-12 GD: 0 KY.9-12.G.SC.19 Coordinate Geometry: Students will find the equation of a circle given its center and radius; given the equation of a circle, find its center and radius

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Cluster: Translate between the geometric description and the equation for a conic section.

CCSS: **CC.9-12.G.GPE.2 Derive the equation of a parabola given a focus and directrix.**

Grade: 9-12

DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Geometry: Expressing Geometric Properties with Equations

Notes: POS does not specifically require students to know or derive the focus or directrix of a parabola.

MG: 9-12 GD: 0 KY.9-12.A.SC.13 Patterns, Relations and Functions: Students will graph linear, absolute value, quadratic and exponential functions and identify their key characteristics

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Cluster: Translate between the geometric description and the equation for a conic section.

CCSS: **CC.9-12.G.GPE.3 (+) Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant.**

Grade: 9-12

DM:

Strand: Geometry: Expressing Geometric Properties with Equations

Notes: Unmatched-Beyond CCSS

MG: GD:

Cluster: Use coordinates to prove simple geometric theorems algebraically

CCSS: **CC.9-12.G.GPE.4 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, √3) lies on the circle centered at the origin and containing the point (0, 2).**

Grade: 9-12

DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Geometry: Expressing Geometric Properties with Equations

Notes: POS does not specify algebraically

MG: 9-12 GD: 0 KY.9-12.G.SC.26 Foundational Statements: Students will establish the validity of geometric conjectures using deduction, prove theorems and critique arguments made by others

Geometry: Expressing Geometric Properties with Equations

Cluster: Use coordinates to prove simple geometric theorems algebraically

CCSS: **CC.9-12.G.GPE.5 Prove the slope criteria for parallel and perpendicular lines and use them 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).**

Grade: 9-12 DM: 3 = Excellent match between the two documents

Strand: Geometry: Expressing Geometric Properties with Equations Notes:

MG: 9-12	GD: 0	KY.9-12.G.SC.1 Shapes and Relationships: Students will identify and apply the definitions, properties and theorems about line segments, rays and angles and use them to prove theorems in Euclidean geometry, solve problems and perform basic geometric constructions using a straight edge and a compass
MG: 9-12	GD: 0	KY.9-12.G.SC.16 Coordinate Geometry: Students will express the intuitive concept of the "slant" of a line as slope, use the coordinates of two points on a line to determine its slope and use slope to express the parallelism and perpendicularity of lines
MG: 9-12	GD: 0	KY.9-12.G.SC.2 Shapes and Relationships: Students will identify and apply properties and theorems about parallel and perpendicular lines and use them to prove theorems and to perform constructions
MG: 9-12	GD: 0	KY.9-12.G.SC.26 Foundational Statements: Students will establish the validity of geometric conjectures using deduction, prove theorems and critique arguments made by others

Cluster: Use coordinates to prove simple geometric theorems algebraically

CCSS: **CC.9-12.G.GPE.6 Find the point on a directed line segment between two given points that partitions the segment in a given ratio.**

Grade: 9-12 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Geometry: Expressing Geometric Properties with Equations Notes: POS not specific to situation

MG: 9-12	GD: 0	KY.9-12.N.SC.21 Number Operations: Students will use concrete, pictorial and abstract models to develop and/or generalize a procedure
MG: 9-12	GD: 0	KY.9-12.N.SC.22 Ratios and Proportional Reasoning: Students will calculate and apply ratios, proportions, rates and percentages to solve problems
MG: 9-12	GD: 0	KY.9-12.N.SC.25 Properties of Numbers and Operations: Students will identify and apply real number properties

Cluster: Use coordinates to prove simple geometric theorems algebraically

CCSS: **CC.9-12.G.GPE.7 Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.***

Grade: 9-12 DM: 3 = Excellent match between the two documents

Strand: Geometry: Expressing Geometric Properties with Equations Notes:

MG: 9-12	GD: 0	KY.9-12.G.SC.18 Coordinate Geometry: Students will find the distance between two points using their coordinates and the Pythagorean theorem or the distance formula
MG: 9-12	GD: 0	KY.9-12.G.SC.21 Coordinate Geometry: Students will use Cartesian coordinates and other coordinate systems (e.g., navigational, polar, spherical systems) to analyze geometric situations

Geometry: Geometric Measurement and Dimension

Cluster: Explain volume formulas and use them to solve problems

CCSS: **CC.9-12.G.GMD.1 Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri's principle, and informal limit arguments.**

Grade: 9-12

DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Geometry: Geometric Measurement and Dimension

Notes: POS requires students to use formulas but defend the formulas. There is no mention of dissecting or using Cavaleri's principle

MG: 9-12 GD: 0 KY.9-12.M.EU.3 Students will understand that measurements are determined by using appropriate techniques, tools, formulas and degree of accuracy needed for the situation.

MG: 9-12 GD: 0 KY.9-12.M.SC.3 Measuring Physical Attributes: Students will determine the surface area and volume of right rectangular prisms, pyramids, cylinders, cones and spheres in realistic problems

Cluster: Explain volume formulas and use them to solve problems

CCSS: **CC.9-12.G.GMD.2 (+) Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures.**

Grade: 9-12

DM:

Strand: Geometry: Geometric Measurement and Dimension

Notes: Unmatched-Beyond CCSS

MG: GD:

Cluster: Explain volume formulas and use them to solve problems

CCSS: **CC.9-12.G.GMD.3 Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.***

Grade: 9-12

DM: 3 = Excellent match between the two documents

Strand: Geometry: Geometric Measurement and Dimension

Notes:

MG: 9-12 GD: 0 KY.9-12.M.SC.3 Measuring Physical Attributes: Students will determine the surface area and volume of right rectangular prisms, pyramids, cylinders, cones and spheres in realistic problems

Cluster: Visualize relationships between two-dimensional and three-dimensional objects

CCSS: **CC.9-12.G.GMD.4 Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.**

Grade: 9-12

DM: 3 = Excellent match between the two documents

Strand: Geometry: Geometric Measurement and Dimension

Notes:

MG: 9-12 GD: 0 KY.9-12.G.EU.1 Students will understand that characteristics and properties of two-dimensional figures and three-dimensional objects describe the world and are used to develop mathematical arguments about geometric relationships and to evaluate the arguments of others.

MG: 9-12 GD: 0 KY.9-12.G.SC.10 Shapes and Relationships: Students will visualize solids and surfaces in three-dimensional space when given two-dimensional representations and create two-dimensional representations for the surfaces of three-dimensional objects

MG: 9-12 GD: 0 KY.9-12.G.SC.7 Shapes and Relationships: Students will classify, determine attributes of, analyze and apply properties of two-dimensional geometric figures and three-dimensional objects

Grade: 9-12

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Geometry: Geometric Measurement and Dimension

MG: 9-12 GD: 0 KY.9-12.G.SC.8 Shapes and Relationships: Students will describe the intersection of lines, planes and solids and visualize three-dimensional objects and spaces from different perspectives and analyze their cross sections

Geometry: Modeling with Geometry

Cluster: Apply geometric concepts in modeling situations

CCSS: **CC.9-12.G.MG.1 Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).***

Grade: 9-12 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Geometry: Modeling with Geometry Notes: POS does not require students to describe objects in terms of geometry - only to use knowledge of

MG: 9-12 GD: 0 KY.9-12.G.EU.1 Students will understand that characteristics and properties of two-dimensional figures and three-dimensional objects describe the world and are used to develop mathematical arguments about geometric relationships and to evaluate the arguments of others.

MG: 9-12 GD: 0 KY.9-12.G.EU.5 Students will understand that visualization, spatial reasoning and geometric relationships model real-world situations.

MG: 9-12 GD: 0 KY.9-12.G.SC.12 Shapes and Relationships: Students will use geometric models and ideas to gain insights into and answer questions in other areas of mathematics and into other disciplines and areas of interest, such as art and architecture

Cluster: Apply geometric concepts in modeling situations

CCSS: **CC.9-12.G.MG.2 Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).***

Grade: 9-12 DM:

Strand: Geometry: Modeling with Geometry Notes: Unmatched

MG: GD:

Cluster: Apply geometric concepts in modeling situations

CCSS: **CC.9-12.G.MG.3 Apply geometric concepts in modeling situations. Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).***

Grade: 9-12 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Geometry: Modeling with Geometry Notes: POS - students are required to use geometric models, not nec. to apply methods

MG: 9-12 GD: 0 KY.9-12.G.SC.12 Shapes and Relationships: Students will use geometric models and ideas to gain insights into and answer questions in other areas of mathematics and into other disciplines and areas of interest, such as art and architecture

Geometry: Similarity, Right Triangles and Trigonometry

Cluster: Understand similarity in terms of similarity transformations.

CCSS: **CC.9-12.G.SRT.1 Verify experimentally the properties of dilations given by a center and a scale factor: -- a. A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged. -- b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.**

Grade: 9-12 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Geometry: Similarity, Right Triangles and Trigonometry Notes: POS not specific of verifying the properties of dilation.

MG: 9-12 GD: 0 KY.9-12.G.EU.4 Students will understand that similarity of figures and scale factors are used to analyze and solve problems.

MG: 9-12 GD: 0 KY.9-12.G.SC.14 Transformations of Shapes: Students will understand and represent transformations within a plane (translations, reflections, rotations and dilations) of figures by using sketches, coordinates, vectors, function notation, matrices and technology

MG: 9-12 GD: 0 KY.9-12.G.SC.4 Shapes and Relationships: Students will use the definitions, properties and theorems about congruent and similar triangles and other figures to prove additional theorems and apply these to solve real-world problems

Cluster: Understand similarity in terms of similarity transformations.

CCSS: **CC.9-12.G.SRT.2 Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.**

Grade: 9-12 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Geometry: Similarity, Right Triangles and Trigonometry Notes: POS not as specific

MG: 9-12 GD: 0 KY.9-12.G.EU.4 Students will understand that similarity of figures and scale factors are used to analyze and solve problems.

MG: 9-12 GD: 0 KY.9-12.G.SC.4 Shapes and Relationships: Students will use the definitions, properties and theorems about congruent and similar triangles and other figures to prove additional theorems and apply these to solve real-world problems

Cluster: Understand similarity in terms of similarity transformations.

CCSS: **CC.9-12.G.SRT.3 Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.**

Grade: 9-12 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Geometry: Similarity, Right Triangles and Trigonometry Notes: POS not as specific "to establish AA criterion"

MG: 9-12 GD: 0 KY.9-12.G.SC.4 Shapes and Relationships: Students will use the definitions, properties and theorems about congruent and similar triangles and other figures to prove additional theorems and apply these to solve real-world problems

Cluster: Prove theorems involving similarity.

CCSS: **CC.9-12.G.SRT.4 Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.**

Grade: 9-12 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Geometry: Similarity, Right Triangles and Trigonometry Notes: POS vague - CCSS specific

MG: 9-12 GD: 0 KY.9-12.G.SC.4 Shapes and Relationships: Students will use the definitions, properties and theorems about congruent and similar triangles and other figures to prove additional theorems and apply these to solve real-world problems

Geometry: Similarity, Right Triangles and Trigonometry

Cluster: Prove theorems involving similarity.

CCSS: **CC.9-12.G.SRT.5 Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.**

Grade: 9-12 DM: 3 = Excellent match between the two documents

Strand: Geometry: Similarity, Right Triangles and Trigonometry Notes:

MG: 9-12 GD: 0 KY.9-12.G.SC.4 Shapes and Relationships: Students will use the definitions, properties and theorems about congruent and similar triangles and other figures to prove additional theorems and apply these to solve real-world problems

Cluster: Define trigonometric ratios and solve problems involving right triangles.

CCSS: **CC.9-12.G.SRT.6 Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.**

Grade: 9-12 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Geometry: Similarity, Right Triangles and Trigonometry Notes: POS "will explore" CCSS "understand"

MG: 9-12 GD: 0 KY.9-12.M.SC.5 Measuring Physical Attributes: Students will explore the relationships between the right triangle trigonometric functions, using technology (e.g., graphing calculator) as appropriate

Cluster: Define trigonometric ratios and solve problems involving right triangles.

CCSS: **CC.9-12.G.SRT.7 Explain and use the relationship between the sine and cosine of complementary angles.**

Grade: 9-12 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Geometry: Similarity, Right Triangles and Trigonometry Notes: POS students are not required to explain

MG: 9-12 GD: 0 KY.9-12.M.SC.5 Measuring Physical Attributes: Students will explore the relationships between the right triangle trigonometric functions, using technology (e.g., graphing calculator) as appropriate

MG: 9-12 GD: 0 KY.9-12.M.SC.6 Measuring Physical Attributes: Students will apply definitions and properties of right triangle relationships (basic right triangle trigonometry and the Pythagorean theorem) to determine length and angle measures to solve realistic problems

Cluster: Define trigonometric ratios and solve problems involving right triangles.

CCSS: **CC.9-12.G.SRT.8 Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.**

Grade: 9-12 DM: 3 = Excellent match between the two documents

Strand: Geometry: Similarity, Right Triangles and Trigonometry Notes:

MG: 9-12 GD: 0 KY.9-12.M.SC.6 Measuring Physical Attributes: Students will apply definitions and properties of right triangle relationships (basic right triangle trigonometry and the Pythagorean theorem) to determine length and angle measures to solve realistic problems

MG: 9-12 GD: 0 KY.9-12.M.SC.7 Measuring Physical Attributes: Students will apply special right triangles and the converse of the Pythagorean theorem to solve realistic problems

Geometry: Similarity, Right Triangles and Trigonometry

Cluster: Apply trigonometry to general triangles

CCSS: **CC.9-12.G.SRT.9 (+) Derive the formula A = (1/2)ab sin(C) for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.**

Grade: 9-12 DM:

Strand: Geometry: Similarity, Right Triangles and Trigonometry Notes: Unmatched-Beyond CCSS

MG: GD:

Cluster: Apply trigonometry to general triangles

CCSS: **CC.9-12.G.SRT.10 (+) Prove the Laws of Sines and Cosines and use them to solve problems.**

Grade: 9-12 DM:

Strand: Geometry: Similarity, Right Triangles and Trigonometry Notes: Unmatched-Beyond CCSS

MG: GD:

Cluster: Apply trigonometry to general triangles

CCSS: **CC.9-12.G.SRT.11 (+) Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces).**

Grade: 9-12 DM:

Strand: Geometry: Similarity, Right Triangles and Trigonometry Notes: Unmatched-Beyond CCSS

MG: GD:

Number and Quantity: Quantities

Cluster: Use properties of rational and irrational numbers.

CCSS: **CC.9-12.N.Q.1 Reason quantitatively and use units to solve problems. Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.***

Grade: 9-12 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Number and Quantity: Quantities Notes: POS does not require students to interpret

MG: 9-12 GD: 0 KY.9-12.M.EU.1 Students will understand that measurable attributes of objects and the units, systems and processes of measurement are powerful tools for making sense of the world around them.

MG: 9-12 GD: 0 KY.9-12.M.EU.3 Students will understand that measurements are determined by using appropriate techniques, tools, formulas and degree of accuracy needed for the situation.

MG: 9-12 GD: 0 KY.9-12.M.SC.1 Measuring Physical Attributes: Students will apply units of measurements of physical quantities correctly in expressions, equations and problem solutions that involve measurement

MG: 9-12 GD: 0 KY.9-12.M.SC.11 Systems of Measurement: Students will make decisions about units and scales that are appropriate for problem solving situations involving measurement

Cluster: Use properties of rational and irrational numbers.

CCSS: **CC.9-12.N.Q.2 Define appropriate quantities for the purpose of descriptive modeling.***

Grade: 9-12 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Number and Quantity: Quantities Notes: POS did not require students to define appropriate quantities.

MG: 9-12 GD: 0 KY.9-12.M.EU.1 Students will understand that measurable attributes of objects and the units, systems and processes of measurement are powerful tools for making sense of the world around them.

MG: 9-12 GD: 0 KY.9-12.M.EU.2 Students will understand that numerical values associated with measurements of physical quantities must be assigned units of measurement or dimensions.

MG: 9-12 GD: 0 KY.9-12.M.SC.1 Measuring Physical Attributes: Students will apply units of measurements of physical quantities correctly in expressions, equations and problem solutions that involve measurement

MG: 9-12 GD: 0 KY.9-12.M.SC.11 Systems of Measurement: Students will make decisions about units and scales that are appropriate for problem solving situations involving measurement

Cluster: Use properties of rational and irrational numbers.

CCSS: **CC.9-12.N.Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.***

Grade: 9-12 DM: 3 = Excellent match between the two documents

Strand: Number and Quantity: Quantities Notes:

MG: 9-12 GD: 0 KY.9-12.M.EU.3 Students will understand that measurements are determined by using appropriate techniques, tools, formulas and degree of accuracy needed for the situation.

MG: 9-12 GD: 0 KY.9-12.M.SC.2 Measuring Physical Attributes: Students will analyze precision, accuracy and approximate error in measurement situations

MG: 9-12 GD: 0 KY.9-12.N.SC.17 Number Operations: Students will solve realistic problems to a specified degree of accuracy

Number and Quantity: The Complex Number System

Cluster: Perform arithmetic operations with complex numbers.

CCSS: **CC.9-12.N.CN.1 Know there is a complex number i such that i^2 = −1, and every complex number has the form a + bi with a and b real.**

Grade: 9-12 DM: 3 = Excellent match between the two documents

Strand: Number and Quantity: The Complex Number System Notes:

MG: 9-12 GD: 0 KY.9-12.N.SC.10 Number Operations: Students will add, subtract and multiply complex numbers

MG: 9-12 GD: 0 KY.9-12.N.SC.5 Number Sense: Students will compare and contrast number systems, including complex numbers as solutions to quadratic equations that do not have real solutions

Cluster: Perform arithmetic operations with complex numbers.

CCSS: **CC.9-12.N.CN.2 Use the relation i^2 = –1 and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.**

Grade: 9-12 DM: 3 = Excellent match between the two documents

Strand: Number and Quantity: The Complex Number System Notes:

MG: 9-12 GD: 0 KY.9-12.N.SC.10 Number Operations: Students will add, subtract and multiply complex numbers

Cluster: Perform arithmetic operations with complex numbers.

CCSS: **CC.9-12.N.CN.3 (+) Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers.**

Grade: 9-12 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Number and Quantity: The Complex Number System Notes: Beyond CCSS - POS does not specify conjugates

MG: 9-12 GD: 0 KY.9-12.N.SC.10 Number Operations: Students will add, subtract and multiply complex numbers

Cluster: Represent complex numbers and their operations on the complex plane.

CCSS: **CC.9-12.N.CN.4 (+) Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number represent the same number.**

Grade: 9-12 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Number and Quantity: The Complex Number System Notes: Beyond CCSS - POS not specific to complex plane and does not require students to explain

MG: 9-12 GD: 0 KY.9-12.G.SC.21 Coordinate Geometry: Students will use Cartesian coordinates and other coordinate systems (e.g., navigational, polar, spherical systems) to analyze geometric situations

Cluster: Represent complex numbers and their operations on the complex plane.

CCSS: **CC.9-12.N.CN.5 (+) Represent addition, subtraction, multiplication, and conjugation of complex numbers geometrically on the complex plane; use properties of this representation for computation. For example, (-1 + √3i)^3 = 8 because (-1 + √3i) has modulus 2 and argument 120°.**

Grade: 9-12 DM:

Strand: Number and Quantity: The Complex Number System Notes: Unmatched

MG: GD:

Number and Quantity: The Complex Number System

Cluster: Represent complex numbers and their operations on the complex plane.

CCSS: **CC.9-12.N.CN.6 (+) Calculate the distance between numbers in the complex plane as the modulus of the difference, and the midpoint of a segment as the average of the numbers at its endpoints.**

Grade: 9-12 DM:

Strand: Number and Quantity: The Complex Number System Notes: Unmatched-Beyond CCSS

MG: GD:

Cluster: Use complex numbers in polynomial identities and equations.

CCSS: **CC.9-12.N.CN.7 Solve quadratic equations with real coefficients that have complex solutions.**

Grade: 9-12 DM: 3 = Excellent match between the two documents

Strand: Number and Quantity: The Complex Number System Notes:

MG: 9-12 GD: 0 KY.9-12.N.SC.5 Number Sense: Students will compare and contrast number systems, including complex numbers as solutions to quadratic equations that do not have real solutions

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Cluster: Use complex numbers in polynomial identities and equations.

CCSS: **CC.9-12.N.CN.8 (+) Extend polynomial identities to the complex numbers. For example, rewrite x^2 + 4 as (x + 2i)(x – 2i).**

Grade: 9-12 DM:

Strand: Number and Quantity: The Complex Number System Notes: Unmatched-Beyond CCSS

MG: GD:

Cluster: Use complex numbers in polynomial identities and equations.

CCSS: **CC.9-12.N.CN.9 (+) Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials.**

Grade: 9-12 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Number and Quantity: The Complex Number System Notes: Beyond CCSS - POS not specific to FTA

MG: 9-12 GD: 0 KY.9-12.A.EU.3 Students will understand that algebra represents mathematical situations and structures for analysis and problem solving.

MG: 9-12 GD: 0 KY.9-12.A.SC.22 Variables, Expressions and Operations: Students will use symbolic algebra to represent and explain mathematical relationships

Number and Quantity: The Real Number System

Cluster: Extend the properties of exponents to rational exponents.

CCSS: **CC.9-12.N.RN.1 Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. For example, we define 5^(1/3) to be the cube root of 5 because we want [5^(1/3)]^3 = 5^[(1/3) x 3] to hold, so [5^(1/3)]^3 must equal 5.**

Grade: 9-12

DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Number and Quantity: The Real Number System

Notes:

MG: 9-12 GD: 0 KY.9-12.A.SC.25 Variables, Expressions and Operations: Students will understand the properties of integer exponents and roots and apply these properties to simplify algebraic expressions

Cluster: Extend the properties of exponents to rational exponents.

CCSS: **CC.9-12.N.RN.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents.**

Grade: 9-12

DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Number and Quantity: The Real Number System

Notes: POS is not specific to radicals and only includes integer exponents.

MG: 9-12 GD: 0 KY.9-12.A.SC.25 Variables, Expressions and Operations: Students will understand the properties of integer exponents and roots and apply these properties to simplify algebraic expressions

Cluster: Use properties of rational and irrational numbers.

CCSS: **CC.9-12.N.RN.3 Explain why the sum or product of rational numbers is rational; 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.**

Grade: 9-12

DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Number and Quantity: The Real Number System

Notes: POS more general than CCSS

MG: 9-12 GD: 0 KY.9-12.N.SC.27 Properties of Numbers and Operations: Students will compare and contrast the number systems according to their properties

Number and Quantity: Vectors and Matrix Quantities

Cluster: Represent and model with vector quantities.

CCSS: **CC.9-12.N.VM.1 (+) Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes (e.g., v(bold), |v|, ||v||, v(not bold)).**

Grade: 9-12 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Number and Quantity: Vectors and Matrix Quantities Notes: Beyond CCSS - POS just requires exploration of variables.

MG: 9-12 GD: 0 KY.9-12.N.SC.4 Number Sense: Students will explore vectors and matrices as systems that have some of the properties of the real number system

Cluster: Represent and model with vector quantities.

CCSS: **CC.9-12.N.VM.2 (+) Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point.**

Grade: 9-12 DM:

Strand: Number and Quantity: Vectors and Matrix Quantities Notes: Unmatched-Beyond CCSS

MG: GD:

Cluster: Represent and model with vector quantities.

CCSS: **CC.9-12.N.VM.3 (+) Solve problems involving velocity and other quantities that can be represented by vectors.**

Grade: 9-12 DM:

Strand: Number and Quantity: Vectors and Matrix Quantities Notes: Unmatched-Beyond CCSS

MG: GD:

Cluster: Perform operations on vectors.

CCSS: **CC.9-12.N.VM.4 (+) Add and subtract vectors.**

Grade: 9-12 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Number and Quantity: Vectors and Matrix Quantities Notes: Beyond CCSS - POS requires students to add and multiply CCSS -add and subtract.

MG: 9-12 GD: 0 KY.9-12.N.SC.19 Number Operations: Students will develop an understanding of the properties and representations for the addition and multiplication of vectors and matrices

Cluster: Perform operations on vectors.

CCSS: **CC.9-12.N.VM.4a (+) Add vectors end-to-end, component-wise, and by the parallelogram rule. Understand that the magnitude of a sum of two vectors is typically not the sum of the magnitudes.**

Grade: 9-12 DM:

Strand: Number and Quantity: Vectors and Matrix Quantities Notes: Unmatched-Beyond CCSS

MG: GD:

Number and Quantity: Vectors and Matrix Quantities

Cluster: Perform operations on vectors.

CCSS: **CC.9-12.N.VM.4b (+) Given two vectors in magnitude and direction form, determine the magnitude and direction of their sum.**

Grade: 9-12 DM:

Strand: Number and Quantity: Vectors and Matrix Quantities Notes: Unmatched-Beyond CCSS

MG: GD:

Cluster: Perform operations on vectors.

CCSS: **CC.9-12.N.VM.4c (+) Understand vector subtraction v – w as v + (–w), where (–w) is the additive inverse of w, with the same magnitude as w and pointing in the opposite direction. Represent vector subtraction graphically by connecting the tips in the appropriate order, and perform vector subtraction component-wise.**

Grade: 9-12 DM:

Strand: Number and Quantity: Vectors and Matrix Quantities Notes: Unmatched

MG: GD:

Cluster: Perform operations on vectors.

CCSS: **CC.9-12.N.VM.5 (+) Multiply a vector by a scalar.**

Grade: 9-12 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Number and Quantity: Vectors and Matrix Quantities Notes: Beyond CCSS - POS not specific to scalar multiplication

MG: 9-12 GD: 0 KY.9-12.N.SC.19 Number Operations: Students will develop an understanding of the properties and representations for the addition and multiplication of vectors and matrices

Cluster: Perform operations on vectors.

CCSS: **CC.9-12.N.VM.5a (+) Represent scalar multiplication graphically by scaling vectors and possibly reversing their direction; perform scalar multiplication component-wise, e.g., as c(v(sub x), v(sub y)) = (cv(sub x), cv(sub y)).**

Grade: 9-12 DM:

Strand: Number and Quantity: Vectors and Matrix Quantities Notes: Unmatched-Beyond CCSS

MG: GD:

Cluster: Perform operations on vectors.

CCSS: **CC.9-12.N.VM.5b (+) Compute the magnitude of a scalar multiple cv using ||cv|| = |c|v. Compute the direction of cv knowing that when |c|v 0, the direction of cv is either along v (for c > 0) or against v (for c < 0).**

Grade: 9-12 DM:

Strand: Number and Quantity: Vectors and Matrix Quantities Notes: Unmatched-Beyond CCSS

MG: GD:

Number and Quantity: Vectors and Matrix Quantities

Cluster: Perform operations on matrices and use matrices in applications.

CCSS: **CC.9-12.N.VM.6 (+) Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network.**

Grade: 9-12

DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Number and Quantity: Vectors and Matrix Quantities

Notes: Beyond CCSS - POS not specific to representing and manipulating data.

MG: 9-12 GD: 0 KY.9-12.N.SC.4 Number Sense: Students will explore vectors and matrices as systems that have some of the properties of the real number system

Cluster: Perform operations on matrices and use matrices in applications.

CCSS: **CC.9-12.N.VM.7 (+) Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled.**

Grade: 9-12

DM: 3 = Excellent match between the two documents

Strand: Number and Quantity: Vectors and Matrix Quantities

Notes: Beyond CCSS - although POS is not specific to scalar N.SC.20 states to develop fluency in operation ...

MG: 9-12 GD: 0 KY.9-12.N.SC.19 Number Operations: Students will develop an understanding of the properties and representations for the addition and multiplication of vectors and matrices

MG: 9-12 GD: 0 KY.9-12.N.SC.20 Number Operations: Students will develop fluency in operations with real numbers and matrices, using mental computation or paper-and-pencil calculations for simple cases and calculators and/or computers for more-complicated cases

Cluster: Perform operations on matrices and use matrices in applications.

CCSS: **CC.9-12.N.VM.8 (+) Add, subtract, and multiply matrices of appropriate dimensions.**

Grade: 9-12

DM: 3 = Excellent match between the two documents

Strand: Number and Quantity: Vectors and Matrix Quantities

Notes: Beyond CCSS

MG: 9-12 GD: 0 KY.9-12.N.SC.19 Number Operations: Students will develop an understanding of the properties and representations for the addition and multiplication of vectors and matrices

MG: 9-12 GD: 0 KY.9-12.N.SC.20 Number Operations: Students will develop fluency in operations with real numbers and matrices, using mental computation or paper-and-pencil calculations for simple cases and calculators and/or computers for more-complicated cases

Cluster: Perform operations on matrices and use matrices in applications.

CCSS: **CC.9-12.N.VM.9 (+) Understand that, unlike multiplication of numbers, matrix multiplication for square matrices is not a commutative operation, but still satisfies the associative and distributive properties.**

Grade: 9-12

DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Number and Quantity: Vectors and Matrix Quantities

Notes: Beyond CCSS - POS not clear that students are expected to understand commutative property does not work while other properties hold

MG: 9-12 GD: 0 KY.9-12.N.SC.4 Number Sense: Students will explore vectors and matrices as systems that have some of the properties of the real number system

Number and Quantity: Vectors and Matrix Quantities

Cluster: Perform operations on matrices and use matrices in applications.

CCSS: **CC.9-12.N.VM.10 (+) Understand that the zero and identity matrices play a role in matrix addition and multiplication similar to the role of 0 and 1 in the real numbers. The determinant of a square matrix is nonzero if and only if the matrix has a multiplicative inverse.**

Grade: 9-12 DM:

Strand: Number and Quantity: Vectors and Matrix Quantities Notes: Unmatched

MG: GD:

Cluster: Perform operations on matrices and use matrices in applications.

CCSS: **CC.9-12.N.VM.11 (+) Multiply a vector (regarded as a matrix with one column) by a matrix of suitable dimensions to produce another vector. Work with matrices as transformations of vectors.**

Grade: 9-12 DM:

Strand: Number and Quantity: Vectors and Matrix Quantities Notes: Unmatched-Beyond CCSS

MG: GD:

Cluster: Perform operations on matrices and use matrices in applications.

CCSS: **CC.9-12.N.VM.12 (+) Work with 2 X 2 matrices as transformations of the plane, and interpret the absolute value of the determinant in terms of area.**

Grade: 9-12 DM:

Strand: Number and Quantity: Vectors and Matrix Quantities Notes: Unmatched-Beyond CCSS

MG: GD:

Statistics and Probability: Conditional Probability and the Rules of Probability

Cluster: Understand independence and conditional probability and use them to interpret data

CCSS: **CC.9-12.S.CP.1 Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").***

Grade: 9-12

DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Statistics and Probability: Conditional Probability and the Rules of Probability

Notes: POS does not require students to describe

MG: 9-12 GD: 0 KY.9-12.D.SC.28 Probability: Students will apply the concepts of sample space and probability distribution to construct sample spaces and distributions in simple cases

MG: 9-12 GD: 0 KY.9-12.D.SC.31 Probability: Students will apply the concepts of conditional probability and independent events and be able to compute those probabilities

MG: 9-12 GD: 0 KY.9-12.D.SC.37 Probability: Students will determine the probability of an event and the probability of its complement

Cluster: Understand independence and conditional probability and use them to interpret data

CCSS: **CC.9-12.S.CP.2 Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.***

Grade: 9-12

DM: 3 = Excellent match between the two documents

Strand: Statistics and Probability: Conditional Probability and the Rules of Probability

Notes:

MG: 9-12 GD: 0 KY.9-12.D.SC.31 Probability: Students will apply the concepts of conditional probability and independent events and be able to compute those probabilities

Cluster: Understand independence and conditional probability and use them to interpret data

CCSS: **CC.9-12.S.CP.3 Understand the conditional probability of A given B as P(A and B)/P(B), and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.***

Grade: 9-12

DM: 3 = Excellent match between the two documents

Strand: Statistics and Probability: Conditional Probability and the Rules of Probability

Notes:

MG: 9-12 GD: 0 KY.9-12.D.SC.31 Probability: Students will apply the concepts of conditional probability and independent events and be able to compute those probabilities

Statistics and Probability: Conditional Probability and the Rules of Probability

Cluster: Understand independence and conditional probability and use them to interpret data

CCSS: **CC.9-12.S.CP.4 Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. For example, collect data from a random sample of students in your school on their favorite subject among math, science, and English. Estimate the probability that a randomly selected student from your school will favor science given that the student is in tenth grade. Do the same for other subjects and compare the results.***

Grade: 9-12 DM: 3 = Excellent match between the two documents

Strand: Statistics and Probability: Conditional Probability and the Rules of Probability Notes:

MG: 9-12 GD: 0 KY.9-12.D.EU.2 Students will understand that data analysis requires developing a plan for collecting, organizing and analyzing data in order to make decisions.

MG: 9-12 GD: 0 KY.9-12.D.SC.26 Experiments and Samples: Students will design and conduct simple experiments or investigations to collect data to answer student-generated questions

Cluster: Understand independence and conditional probability and use them to interpret data

CCSS: **CC.9-12.S.CP.5 Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer.***

Grade: 9-12 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Statistics and Probability: Conditional Probability and the Rules of Probability Notes: POS does not require students to explain. Implies in context due to nature of standard.

MG: 9-12 GD: 0 KY.9-12.D.SC.31 Probability: Students will apply the concepts of conditional probability and independent events and be able to compute those probabilities

Cluster: Use the rules of probability to compute probabilities of compound events in a uniform probability model

CCSS: **CC.9-12.S.CP.6 Find the conditional probability of A given B as the fraction of B's outcomes that also belong to A, and interpret the answer in terms of the model.***

Grade: 9-12 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Statistics and Probability: Conditional Probability and the Rules of Probability Notes: POS does not require students to interpret findings.

MG: 9-12 GD: 0 KY.9-12.D.SC.31 Probability: Students will apply the concepts of conditional probability and independent events and be able to compute those probabilities

Cluster: Use the rules of probability to compute probabilities of compound events in a uniform probability model

CCSS: **CC.9-12.S.CP.7 Apply the Addition Rule, P(A or B) = P(A) + P(B) – P(A and B), and interpret the answer in terms of the model.***

Grade: 9-12 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Statistics and Probability: Conditional Probability and the Rules of Probability Notes: POS is not specific to the addition rule and does not require interpretation of the findings

MG: 9-12 GD: 0 KY.9-12.D.SC.32 Probability: Students will compute the probability of a compound event

Statistics and Probability: Conditional Probability and the Rules of Probability

Cluster: Use the rules of probability to compute probabilities of compound events in a uniform probability model

CCSS: **CC.9-12.S.CP.8 (+) Apply the general Multiplication Rule in a uniform probability model, P(A and B) = [P(A)]x[P(B|A)] =[P(B)]x[P(A|B)], and interpret the answer in terms of the model.***

Grade: 9-12

DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Statistics and Probability: Conditional Probability and the Rules of Probability

Notes: Beyond CCSS - POS not specific and does not require interpretation

MG: 9-12 GD: 0 KY.9-12.D.SC.32 Probability: Students will compute the probability of a compound event

Cluster: Use the rules of probability to compute probabilities of compound events in a uniform probability model

CCSS: **CC.9-12.S.CP.9 (+) Use permutations and combinations to compute probabilities of compound events and solve problems.***

Grade: 9-12

DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Statistics and Probability: Conditional Probability and the Rules of Probability

Notes: Beyond CCSS

MG: 9-12 GD: 0 KY.9-12.D.SC.40 Probability: Students will recognize and identify the differences between combinations and permutations and use them to count discrete quantities

Statistics and Probability: Interpreting Categorical and Quantitative Data

Cluster: Summarize, represent, and interpret data on a single count or measurement variable

CCSS: **CC.9-12.S.ID.1 Represent data with plots on the real number line (dot plots, histograms, and box plots).***

Grade: 9-12 DM: 3 = Excellent match between the two documents

Strand: Statistics and Probability: Interpreting Categorical and Quantitative Data Notes:

MG: 7	GD: 2 to 5	KY.7.D.SC.4 Data Representations: Students will relate different representations of data (e.g., tables, graphs, diagrams, plots)
MG: 8	GD: 1 to 4	KY.8.D.SC.1 Data Representations: Students will collect, organize, construct, analyze and make inferences from data in a variety of graphical methods (e.g., drawings, tables/charts, pictographs, bar graphs, circle graphs, line plots, Venn diagrams, line graphs, stem-and-leaf plots, scatter plots, histograms, box-and-whiskers plots)
MG: 9-12	GD: 0	KY.9-12.D.SC.2 Data Representations: Students will apply histograms, parallel box plots and scatterplots to display data

Cluster: Summarize, represent, and interpret data on a single count or measurement variable

CCSS: **CC.9-12.S.ID.2 Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.***

Grade: 9-12 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Statistics and Probability: Interpreting Categorical and Quantitative Data Notes: No standard deviation or interquartile range specified - even box and whiskers is included in list.

MG: 8	GD: 1 to 4	KY.8.D.SC.1 Data Representations: Students will collect, organize, construct, analyze and make inferences from data in a variety of graphical methods (e.g., drawings, tables/charts, pictographs, bar graphs, circle graphs, line plots, Venn diagrams, line graphs, stem-and-leaf plots, scatter plots, histograms, box-and-whiskers plots)
MG: 8	GD: 1 to 4	KY.8.D.SC.7 Characteristics of Data: Students will determine and interpret the mean, median, mode and range of a set of data
MG: 9-12	GD: 0	KY.9-12.D.SC.9 Characteristics of Data Sets: Students will describe the shape and select and calculate summary statistics for univariate measurement data, using technological tools as necessary

Cluster: Summarize, represent, and interpret data on a single count or measurement variable

CCSS: **CC.9-12.S.ID.3 Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).***

Grade: 9-12 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Statistics and Probability: Interpreting Categorical and Quantitative Data Notes: POS no mention of accounting for outliers other than identifying in MS

MG: 8	GD: 1 to 4	KY.8.D.SC.5 Characteristics of Data: Students will determine and interpret clusters, quartiles, gaps and outliers in data
MG: 9-12	GD: 0	KY.9-12.D.SC.10 Characteristics of Data Sets: Students will recognize how linear transformations of univariate data affect shape, center and spread
MG: 9-12	GD: 0	KY.9-12.D.SC.9 Characteristics of Data Sets: Students will describe the shape and select and calculate summary statistics for univariate measurement data, using technological tools as necessary

Statistics and Probability: Interpreting Categorical and Quantitative Data

Cluster: Summarize, represent, and interpret data on a single count or measurement variable

CCSS: **CC.9-12.S.ID.4 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.***

Grade: 9-12

DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Statistics and Probability: Interpreting Categorical and Quantitative Data

Notes: POS not specific to method and does not include estimating areas under the curve.

MG: 9-12 GD: 0 KY.9-12.D.SC.18 Characteristics of Data Sets: Students will know the characteristics of the Gaussian normal distribution (bell-shaped curve)

MG: 9-12 GD: 0 KY.9-12.D.SC.6 Data Representations: Students will organize and display data using appropriate methods (e.g., spreadsheets and graphing calculators) to detect patterns and departures from patterns

Cluster: Summarize, represent, and interpret data on two categorical and quantitative variables

CCSS: **CC.9-12.S.ID.5 Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.***

Grade: 9-12

DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Statistics and Probability: Interpreting Categorical and Quantitative Data

Notes: POS not specific - loose link

MG: 8 GD: 1 to 4 KY.8.D.SC.4 Data Representations: Students will relate different representations of data (e.g., tables, graphs, diagrams, plots) and explain how misleading representations affect interpretations and conclusions about data

MG: 9-12 GD: 0 KY.9-12.D.SC.1 Data Representations: Students will be familiar with the definitions of measurement data and categorical data, univariate and bivariate data and the term variable

MG: 9-12 GD: 0 KY.9-12.D.SC.34 Probability: Students will explain how the relative frequency of a specified outcome of an event can be used to estimate the probability of the outcome

Cluster: Summarize, represent, and interpret data on two categorical and quantitative variables

CCSS: **CC.9-12.S.ID.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.***

Grade: 9-12

DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Statistics and Probability: Interpreting Categorical and Quantitative Data

Notes: Making inferences does not nec imply describing how the variables are related

MG: 8 GD: 1 to 4 KY.8.D.SC.1 Data Representations: Students will collect, organize, construct, analyze and make inferences from data in a variety of graphical methods (e.g., drawings, tables/charts, pictographs, bar graphs, circle graphs, line plots, Venn diagrams, line graphs, stem-and-leaf plots, scatter plots, histograms, box-and-whiskers plots)

Statistics and Probability: Interpreting Categorical and Quantitative Data

Cluster: Summarize, represent, and interpret data on two categorical and quantitative variables

CCSS: **CC.9-12.S.ID.6a Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models.***

Grade: 9-12 DM: 3 = Excellent match between the two documents

Strand: Statistics and Probability: Interpreting Categorical and Quantitative Data Notes:

MG: 9-12 GD: 0 KY.9-12.D.SC.14 Characteristics of Data Sets: Students will identify trends in bivariate data and find functions that model the data or transform the data, so that they can be modeled

Cluster: Summarize, represent, and interpret data on two categorical and quantitative variables

CCSS: **CC.9-12.S.ID.6b Informally assess the fit of a function by plotting and analyzing residuals.***

Grade: 9-12 DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Statistics and Probability: Interpreting Categorical and Quantitative Data Notes: POS does not require assessing the fit or analyzing residuals -

MG: 9-12 GD: 0 KY.9-12.D.SC.11 Characteristics of Data Sets: Students will determine regression coefficients, regression equations and correlation coefficients for bivariate data using technological tools

MG: 9-12 GD: 0 KY.9-12.D.SC.12 Characteristics of Data Sets: Students will apply line-of-best fit equations for a set of two-variable data to make predictions

MG: 9-12 GD: 0 KY.9-12.D.SC.13 Characteristics of Data Sets: Students will collect, organize and display bivariate data and use a curve of best fit as a model to make predictions

Cluster: Summarize, represent, and interpret data on two categorical and quantitative variables

CCSS: **CC.9-12.S.ID.6c Fit a linear function for a scatter plot that suggests a linear association.***

Grade: 9-12 DM: 3 = Excellent match between the two documents

Strand: Statistics and Probability: Interpreting Categorical and Quantitative Data Notes:

MG: 9-12 GD: 0 KY.9-12.D.SC.12 Characteristics of Data Sets: Students will apply line-of-best fit equations for a set of two-variable data to make predictions

Cluster: Interpret linear models

CCSS: **CC.9-12.S.ID.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.***

Grade: 9-12 DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Statistics and Probability: Interpreting Categorical and Quantitative Data Notes: POS does not require students to interpret slope and intercept

MG: 9-12 GD: 0 KY.9-12.A.SC.3 Patterns, Relations and Functions: Students will analyze functions by investigating rates of change, intercepts, zeros, asymptotes and local and global behavior

MG: 9-12 GD: 0 KY.9-12.A.SC.43 Equations and Inequalities: Students will relate the coefficients of a linear equation and the slope and x- and y-intercepts of its graph

MG: 9-12 GD: 0 KY.9-12.D.SC.6 Data Representations: Students will organize and display data using appropriate methods (e.g., spreadsheets and graphing calculators) to detect patterns and departures from patterns

Statistics and Probability: Interpreting Categorical and Quantitative Data

MG: 9-12 GD: 0 KY.9-12.N.SC.24 Ratios and Proportional Reasoning: Students will represent slope graphically, numerically and symbolically and relate it to a graph of an equation based on a realistic situation

Cluster: Interpret linear models

CCSS: **CC.9-12.S.ID.8 Compute (using technology) and interpret the correlation coefficient of a linear fit.***

Grade: 9-12

DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Statistics and Probability: Interpreting Categorical and Quantitative Data

Notes: POS does not require students to interpret correlation coefficient.

MG: 9-12 GD: 0 KY.9-12.D.SC.11 Characteristics of Data Sets: Students will determine regression coefficients, regression equations and correlation coefficients for bivariate data using technological tools

Cluster: Interpret linear models

CCSS: **CC.9-12.S.ID.9 Distinguish between correlation and causation.***

Grade: 9-12

DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Statistics and Probability: Interpreting Categorical and Quantitative Data

Notes: determining correlation does not imply that students understand causation and can therefore distinguish between the two.

MG: 9-12 GD: 0 KY.9-12.D.SC.11 Characteristics of Data Sets: Students will determine regression coefficients, regression equations and correlation coefficients for bivariate data using technological tools

Statistics and Probability: Making Inferences and Justifying Conclusions

Cluster: Understand and evaluate random processes underlying statistical experiments

CCSS: **CC.9-12.S.IC.1 Understand statistics as a process for making inferences about population parameters based on a random sample from that population.***

Grade: 9-12

DM: 3 = Excellent match between the two documents

Strand: Statistics and Probability: Making Inferences and Justifying Conclusions

Notes:

MG: 9-12 GD: 0 KY.9-12.D.EU.5 Students will understand that inferences and predictions from data are used to make critical and informed decisions.

MG: 9-12 GD: 0 KY.9-12.D.SC.15 Characteristics of Data Sets: Students will understand how simple statistics reflect the values of population parameters and use sampling distributions as the basis for informal inference

MG: 9-12 GD: 0 KY.9-12.D.SC.21 Experiments and Samples: Students will understand and explain the differences among various kinds of studies (e.g., randomized experiments and observational studies) and which types of inferences can be legitimately be drawn from each

Cluster: Understand and evaluate random processes underlying statistical experiments

CCSS: **CC.9-12.S.IC.2 Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. 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?***

Grade: 9-12

DM: 3 = Excellent match between the two documents

Strand: Statistics and Probability: Making Inferences and Justifying Conclusions

Notes: POS use to explore and to construct - CCSS decide

MG: 9-12 GD: 0 KY.9-12.D.SC.23 Experiments and Samples: Students will use simulations to explore the variability of sample statistics from a known population and to construct sampling distributions

Cluster: Make inferences and justify conclusions from sample surveys, experiments, and observational studies

CCSS: **CC.9-12.S.IC.3 Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.***

Grade: 9-12

DM: 3 = Excellent match between the two documents

Strand: Statistics and Probability: Making Inferences and Justifying Conclusions

Notes:

MG: 9-12 GD: 0 KY.9-12.D.SC.21 Experiments and Samples: Students will understand and explain the differences among various kinds of studies (e.g., randomized experiments and observational studies) and which types of inferences can be legitimately be drawn from each

MG: 9-12 GD: 0 KY.9-12.D.SC.22 Experiments and Samples: Students will know the characteristics of well-designed studies, including the role of randomization in surveys and experiments

MG: 9-12 GD: 0 KY.9-12.D.SC.23 Experiments and Samples: Students will use simulations to explore the variability of sample statistics from a known population and to construct sampling distributions

MG: 9-12 GD: 0 KY.9-12.D.SC.25 Experiments and Samples: Students will explain the impact of sampling methods, bias and the phrasing of questions asked during data collection and the conclusions that can be justified

Statistics and Probability: Making Inferences and Justifying Conclusions

Cluster: Make inferences and justify conclusions from sample surveys, experiments, and observational studies

CCSS: **CC.9-12.S.IC.4 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.***

Grade: 9-12

DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Statistics and Probability: Making Inferences and Justifying Conclusions

Notes: POS Data Analysis and Probability does not include population mean or proportion and is not specified to developing margin a error. Linked standard is found in measurement

MG: 9-12 GD: 0 KY.9-12.M.SC.2 Measuring Physical Attributes: Students will analyze precision, accuracy and approximate error in measurement situations

Cluster: Make inferences and justify conclusions from sample surveys, experiments, and observational studies

CCSS: **CC.9-12.S.IC.5 Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.***

Grade: 9-12

DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Statistics and Probability: Making Inferences and Justifying Conclusions

Notes: POS does not require students to compare treatments or use simulations related to stat sig.

MG: 9-12 GD: 0 KY.9-12.D.SC.15 Characteristics of Data Sets: Students will understand how simple statistics reflect the values of population parameters and use sampling distributions as the basis for informal inference

Cluster: Make inferences and justify conclusions from sample surveys, experiments, and observational studies

CCSS: **CC.9-12.S.IC.6 Evaluate reports based on data.***

Grade: 9-12

DM: 3 = Excellent match between the two documents

Strand: Statistics and Probability: Making Inferences and Justifying Conclusions

Notes:

MG: 9-12 GD: 0 KY.9-12.D.SC.19 Characteristics of Data Sets: Students will evaluate reports based on data published in the media by considering the source of the data, the design of the study and the way the data are displayed and analyzed

MG: 9-12 GD: 0 KY.9-12.D.SC.24 Experiments and Samples: Students will evaluate published reports that are based on interpretations of data by examining the design of the study, the appropriateness of the data analysis and the validity of the conclusions

Statistics and Probability: Using Probability to Make Decisions

Cluster: Calculate expected values and use them to solve problems

CCSS: **CC.9-12.S.MD.1 (+) Define a random variable for a quantity of interest by assigning a numerical value to each event in a sample space; graph the corresponding probability distribution using the same graphical displays as for data distributions.***

Grade: 9-12

DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Statistics and Probability: Using Probability to Make Decisions

Notes: Beyond CCSS - POS does not require graphing the distribution.

MG: 9-12 GD: 0 KY.9-12.D.SC.28 Probability: Students will apply the concepts of sample space and probability distribution to construct sample spaces and distributions in simple cases

MG: 9-12 GD: 0 KY.9-12.D.SC.30 Probability: Students will compute and interpret the expected value of random variables in simple cases

Cluster: Calculate expected values and use them to solve problems

CCSS: **CC.9-12.S.MD.2 (+) Calculate the expected value of a random variable; interpret it as the mean of the probability distribution.***

Grade: 9-12

DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Statistics and Probability: Using Probability to Make Decisions

Notes: Beyond CCSS - POS does not require the interpretation related to the mean prob distribution. There is a POS that requires reporting/interpreting results.

MG: 9-12 GD: 0 KY.9-12.D.SC.28 Probability: Students will apply the concepts of sample space and probability distribution to construct sample spaces and distributions in simple cases

MG: 9-12 GD: 0 KY.9-12.D.SC.29 Probability: Students will design simulations to construct empirical probability distributions and report/interpret the results

MG: 9-12 GD: 0 KY.9-12.D.SC.30 Probability: Students will compute and interpret the expected value of random variables in simple cases

Cluster: Calculate expected values and use them to solve problems

CCSS: **CC.9-12.S.MD.3 (+) Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; find the expected value. For example, find the theoretical probability distribution for the number of correct answers obtained by guessing on all five questions of a multiple-choice test where each question has four choices, and find the expected grade under various grading schemes.***

Grade: 9-12

DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Statistics and Probability: Using Probability to Make Decisions

Notes: Beyond CCSS - does not require students to develop however neither does the "for example" given in the CCSS. POS does require students to compare the theoretical to exp.

MG: 9-12 GD: 0 KY.9-12.D.SC.36 Probability: Students will determine and compare theoretical and experimental probabilities

Cluster: Calculate expected values and use them to solve problems

CCSS: **CC.9-12.S.MD.4 (+) Develop a probability distribution for a random variable defined for a sample space in which probabilities are assigned empirically; find the expected value. For example, find a current data distribution on the number of TV sets per household in the United States, and calculate the expected number of sets per household. How many TV sets would you expect to find in 100 randomly selected households?***

Grade: 9-12

DM: 3 = Excellent match between the two documents

Strand: Statistics and Probability: Using Probability to Make Decisions

Notes: Beyond CCSS

MG: 9-12 GD: 0 KY.9-12.D.SC.29 Probability: Students will design simulations to construct empirical probability distributions and report/interpret the results

Statistics and Probability: Using Probability to Make Decisions

Cluster: Use probability to evaluate outcomes of decisions

CCSS: **CC.9-12.S.MD.5 (+) Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values.***

Grade: 9-12

DM: 3 = Excellent match between the two documents

Strand: Statistics and Probability: Using Probability to Make Decisions

Notes: Beyond CCSS

MG: 9-12 GD: 0 KY.9-12.D.SC.34 Probability: Students will explain how the relative frequency of a specified outcome of an event can be used to estimate the probability of the outcome

Cluster: Use probability to evaluate outcomes of decisions

CCSS: **CC.9-12.S.MD.5a (+) Find the expected payoff for a game of chance. For example, find the expected winnings from a state lottery ticket or a game at a fast-food restaurant.***

Grade: 9-12

DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Statistics and Probability: Using Probability to Make Decisions

Notes: Beyond CCSS - POS not specific to games of chance but very likely would be included considering standard and math category -

MG: 9-12 GD: 0 KY.9-12.D.SC.34 Probability: Students will explain how the relative frequency of a specified outcome of an event can be used to estimate the probability of the outcome

Cluster: Use probability to evaluate outcomes of decisions

CCSS: **CC.9-12.S.MD.5b (+) Evaluate and compare strategies on the basis of expected values. For example, compare a high-deductible versus a low-deductible automobile insurance policy using various, but reasonable, chances of having a minor or a major accident.***

Grade: 9-12

DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Statistics and Probability: Using Probability to Make Decisions

Notes: Beyond CCSS - POS related but not specific to CCSS

MG: 9-12 GD: 0 KY.9-12.D.SC.23 Experiments and Samples: Students will use simulations to explore the variability of sample statistics from a known population and to construct sampling distributions

MG: 9-12 GD: 0 KY.9-12.D.SC.30 Probability: Students will compute and interpret the expected value of random variables in simple cases

Cluster: Use probability to evaluate outcomes of decisions

CCSS: **CC.9-12.S.MD.6 (+) Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).***

Grade: 9-12

DM: 2 = Good match, with minor aspects of the CCSS not addressed

Strand: Statistics and Probability: Using Probability to Make Decisions

Notes: Beyond CCSS - not specific to evaluating outcomes of decisions related to "fair"ness -- but students; are required to make informed decisions using probability

MG: 9-12 GD: 0 KY.9-12.D.EU.5 Students will understand that inferences and predictions from data are used to make critical and informed decisions.

MG: 9-12 GD: 0 KY.9-12.D.EU.6 Students will understand that probability can be used to make decisions or predictions or to draw conclusions.

MG: 9-12 GD: 0 KY.9-12.D.SC.38 Probability: Students will make predictions and draw inferences from probabilities. and apply probability concepts to practical situations to make informed decisions

Statistics and Probability: Using Probability to Make Decisions

Cluster: Use probability to evaluate outcomes of decisions

CCSS: **CC.9-12.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).***

Grade: 9-12

DM: 1 = Weak match, major aspects of the CCSS not addressed

Strand: Statistics and Probability: Using Probability to Make Decisions

Notes: Beyond CCSS - POS is not specific to this standard and does not require students to analyze

MG: 9-12 GD: 0 KY.9-12.D.EU.5 Students will understand that inferences and predictions from data are used to make critical and informed decisions.

MG: 9-12 GD: 0 KY.9-12.D.EU.6 Students will understand that probability can be used to make decisions or predictions or to draw conclusions.

MG: 9-12 GD: 0 KY.9-12.D.SC.38 Probability: Students will make predictions and draw inferences from probabilities. and apply probability concepts to practical situations to make informed decisions