

For the Nebraska Department of Education

Comparison of the Nebraska Mathematics Standards to the Common Core State Standards for the Mathematics, Grades K–12

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MREL

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Document Overview

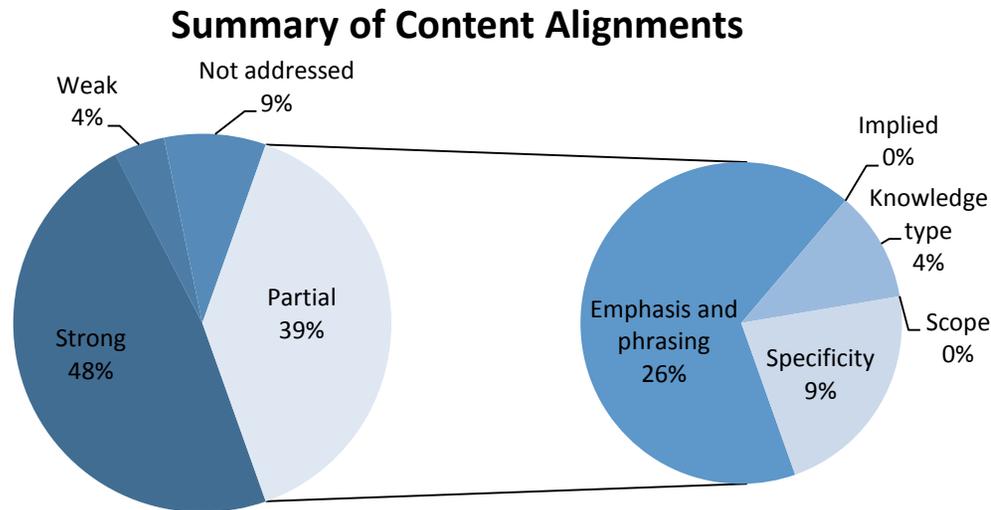
This document is a tool for understanding the relationship between the *Nebraska Mathematics Standards* and the *Common Core State Standards for Mathematics*. It is organized by the Nebraska standards and presents an analysis, done from the perspective of the Nebraska standards, of how content in the Nebraska standards is represented in the Common Core standards. A paired document is available that is organized by the Common Core standards, and the analysis in that document is presented from the Common Core perspective. Educators and others can use this document as a map from each Nebraska indicator to the specific standards in the Common Core that address the same or similar content, allowing users to track where particular student knowledge and skills in the Nebraska standards are addressed in the Common Core.

The analysis used two categories of criteria to compare the Nebraska and Common Core standards: content alignment and rigor. **Content alignment** characterizes the nature of the content match between the Common Core and Nebraska standards. The standards were also compared to identify relative **Rigor**. Descriptions of these criteria are provided with the introduction to each grade. Grade level graphs and a summary of findings provide a quick overview of how commonly the different types of alignments were found and how the documents differed in level of rigor.

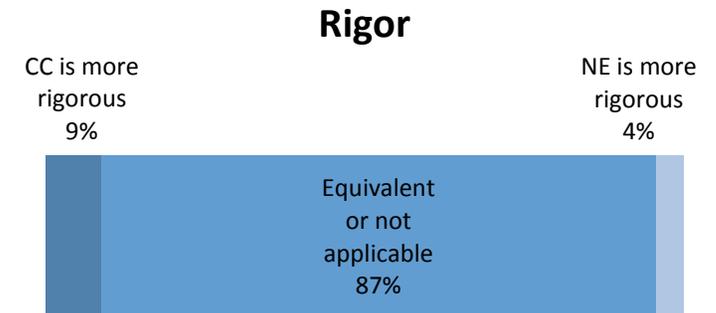
This comparison is the product of a careful review of both documents by content experts who have published guides on the Common Core. As with any such work, individuals may differ in their interpretation of content and some disagreement concerning specific matches and ratings are inevitable. The content description ratings and rigor designations are provided as a tool to help users understand general trends in the relationship between the two documents; they are not intended as a critique or evaluation of either document. As a tool, this comparison provides specific information that will help inform discussions about the Common Core as it relates to current expectations in Nebraska schools.

Kindergarten: How Nebraska content is addressed in the Common Core standards

How well Nebraska mathematics content is addressed in the Common Core standards at this grade is summarized in two categories, content alignment and rigor. The findings are depicted in the graphs below. **Content alignment** characterizes the nature of the content match between the Common Core and Nebraska standards. A *Strong* match indicates Common Core fully addresses the content of the Nebraska indicator. A *Partial* match is assigned when the Nebraska indicator either does not offer the same level of *Specificity* as the Common Core content, does not cover the complete *Scope* of the Common Core, differs importantly in its *Emphasis and Phrasing*, provides only an *Implied* coverage of the content, or focuses on a different *Knowledge type*, specifically, that Nebraska addresses a skill where Common Core addresses the related concept. If more than one of the issues just described characterizes the coverage of Common Core content by Nebraska, the alignment is identified as *Weak*. Finally, if the content in Nebraska is not found in the Common Core, it is marked as *Not Addressed*. The standards were also compared to identify relative **Rigor**. A indicator was counted more rigorous over the other when higher demands are made of students, either because mastery of content is expected at an earlier grade, or the expectations regarding the content are significantly more challenging, or both.



A summary of how well Common Core addressed content found in the Nebraska standards. See above for a discussion about the alignment categories.



Content in the documents was compared for the relative demands placed on students. The graph displays the percentage of indicators or standards that were more rigorous, by document. A significant percentage of the content was either equivalent in rigor between the two standards, or could not be rated for rigor, including when content was not addressed by either documents or when differences between the content made rigor comparisons invalid. See discussion above for more information.

Mathematics Alignment Study

Kindergarten Overview

Very few topics in the Nebraska Mathematics Standards are not addressed or weakly addressed by the Common Core Standards. The topics found to be missing in the Common Core are related to sequencing objects with ordinal numbers and creating rules for sorting. Many of alignments from Nebraska to the Common Core are strong because content was described in similar ways. For a variety of reasons, many alignments were rated as partial. In a majority of cases, alignments were rated as partial because the standards in each document differ in their emphasis and phrasing. For example, Nebraska emphasizes comparing the attributes of data, while Common Core emphasizes comparing measurable attributes of objects. In a few other cases, the Nebraska standards are more specific, and so it is unclear whether students must address the same details within the Common Core. For example, the Nebraska indicators include specific expectations related to identifying multiple equivalent representations for numbers that are not detailed in the Common Core. In regards to rigor, the majority of the Nebraska indicators were found to be equivalent, in terms of grade level expectation, to those of the Common Core standards. Very few Nebraska indicators were found to require specific expectations at an earlier grade level, and the same was true for the Common Core standards.

Of the 23 indicators in the Nebraska Mathematics Standards for Kindergarten, 21 are addressed and only 2 are not addressed by the Common Core State Standards. Of those addressed, 11 are strong alignments, 9 are partial alignments, and 1 is a weak alignment.

Mathematics Alignment Study

Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
Kindergarten					
MA 0.1 Students will communicate number sense concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.					
MA 0.1.1 Number System: Students will demonstrate, represent, and show relationships among whole numbers within the base-ten number system.					
0.1.1.a	Count, read and write numbers 0 – 20	Strong	CC	CC is more difficult.	K.CC.1 Count to 100 by ones and by tens. 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).
0.1.1.b	Count objects using one-to-one correspondence 0 – 20	Partial (knowledge type)	NE	NE content emphasizes the skill, while the CC content emphasizes the concept.	K.CC.4 Understand the relationship between numbers and quantities; connect counting to cardinality. <ul style="list-style-type: none"> a. 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. b. 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. c. Understand that each successive number name refers to a quantity

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Mathematics Alignment Study

Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				that is one larger.
		CC	CC is more difficult.	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.
0.1.1.c	Sequence objects using ordinal numbers (first through fifth)	Not addressed		
0.1.1. d	Match numerals to the quantities they represent 0 - 20, using a variety of models and representations	Strong		<p>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).</p> <p>K.CC.4 Understand the relationship between numbers and quantities; connect counting to cardinality.</p> <p>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.</p>
0.1.1.e	Demonstrate and identify multiple equivalent representations for numbers 1 - 10 (e.g., 10 is 1 and 9; 10	Partial (emphasis and	Content is similar, with some differences in emphasis and phrasing.	K.OA.3 Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or

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Mathematics Alignment Study

Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
is 6 and 4)	phrasing)			drawings, and record each decomposition by a drawing or equation (e.g., $5 = 2 + 3$ and $5 = 4 + 1$).
0.1.1.f	Demonstrate relative position of whole numbers 0 – 10 (e.g., 5 is between 2 and 10; 7 is greater than 3)	Partial (emphasis and phrasing)	Content is similar, with some difference in phrasing.	<p>K.CC.4c Understand that each successive number name refers to a quantity that is one larger.</p> <p>K.CC.7 Compare two numbers between 1 and 10 presented as written numerals.</p>
MA 0.1.2 Operations: Students will demonstrate the meaning of addition and subtraction with whole numbers.				
0.1.2.a	Use objects and words to explain the meaning of addition as a joining action (e.g., Two girls are sitting at a table. Two more girls join them. How many girls are sitting at the table?)	Strong		K.OA.1 Represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.
0.1.2.b	Use objects and words to explain the meaning of addition as parts of a whole (e.g., Three boys and two girls are going to the zoo. How many children are going to the zoo?)	Strong		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.

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Mathematics Alignment Study

Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
0.1.2.c	Use objects and words to explain the meaning of subtraction as a separation action (e.g., Five girls are sitting at a table. Two girls leave. How many girls are left sitting at the table?)	Strong		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.
0.1.2.d	Use objects and words to explain the meaning of subtraction as finding part of a whole (e.g., Jacob has 5 pencils. Three are blue and the rest are red. How many red pencils does Jacob have?)	Strong		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.
MA 0.1.3 Computation: Mastery not expected at this level.				
MA 0.1.4 Estimation: Mastery not expected at this level.				
MA 0.2 Students will communicate geometric concepts and measurement concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.				
MA 0.2.1 Characteristics: Students will identify two-dimensional geometric shapes.				
0.2.1.a	Sort and name two-dimensional shapes (e.g., square, circle, rectangle, triangle)	Partial (emphasis and phrasing)	Content is similar, with some difference in phrasing.	K.G.2 Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres). Correctly name shapes regardless of their orientations or overall size. K.MD.3 Classify objects and count the number of objects in each category. Classify objects into given categories; count the

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				numbers of objects in each category and sort the categories by count. (Limit category counts to be less than or equal to 10.)
MA 0.2.2 Coordinate Geometry: Mastery not expected at this level.				
MA 0.2.3 Transformations: Mastery not expected at this level.				
MA 0.2.4 Spatial Modeling: Students will communicate relative positions in space.				
0.2.4.a	Demonstrate positional words (e.g., above/below, near/far, over/ under, in/out, down/up, around/through)	Strong		K.G.1 Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres). 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.
MA 0.2.5 Measurement: Students will measure using nonstandard units and time.				
0.2.5.a	Identify the name and amount of a penny, nickel, dime, and quarter	Weak	CC content is in grade 2, but is more difficult. Content is similar, with significant differences in emphasis and phrasing.	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?
0.2.5.b	Identify time to the hour	Strong	CC content is in grade 1, but is more difficult.	1.MD.3 Tell and write time. Tell and write time in hours and half-hours using analog and digital clocks.

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Mathematics Alignment Study

Nebraska Mathematics Standards		Content Alignment	More Rigor*	Comments	Common Core Standards	
0.2.5.c	Measure using nonstandard units	Strong	NE	NE content is in kindergarten; CC content is in grade 1.	1.MD.2	Measure lengths indirectly and by iterating length units. 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.
0.2.5.d	Compare objects according to length	Partial (specificity)		NE is more specific.	K.MD.2	Describe and compare measurable attributes. 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.
<p>MA 0.3 Students will communicate algebraic concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.</p> <p>MA 0.3.1 Relationships: Students will sort, classify, and order objects by relationships.</p>						
0.3.1.a	Sort by color, shape, or size	Partial (specificity)		NE is more specific.	K.MD.3	Classify objects and count the number of objects in each category. Classify objects into given categories; count the

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				numbers of objects in each category and sort the categories by count. (Limit category counts to be less than or equal to 10.)
0.3.1.b	Create own rule for sorting other than color, shape, and size	Not Addressed		
MA 0.3.2 Modeling in Context: Students will use objects as models to represent mathematical situations.				
0.3.2.a	Model situations that involve the addition and subtraction of whole numbers 0 – 10 using objects	Strong		K.OA.2 Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from. Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.
MA 0.3.3 Procedures: Students will use concrete and verbal representations to solve number stories.				
0.3.3.a	Use objects to solve addition and subtraction of whole numbers 0 – 10	Strong		K.OA.1 Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from. 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.
MA 0.4 Students will communicate data analysis/probability concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.				

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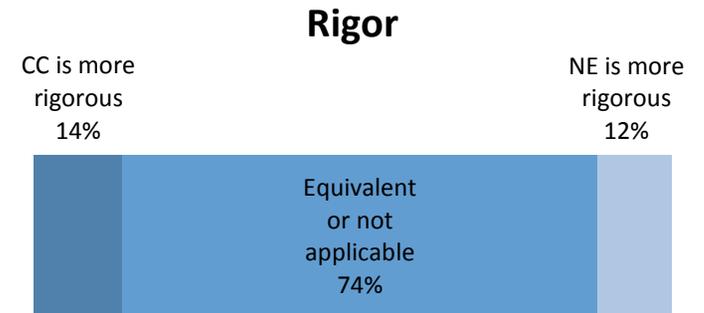
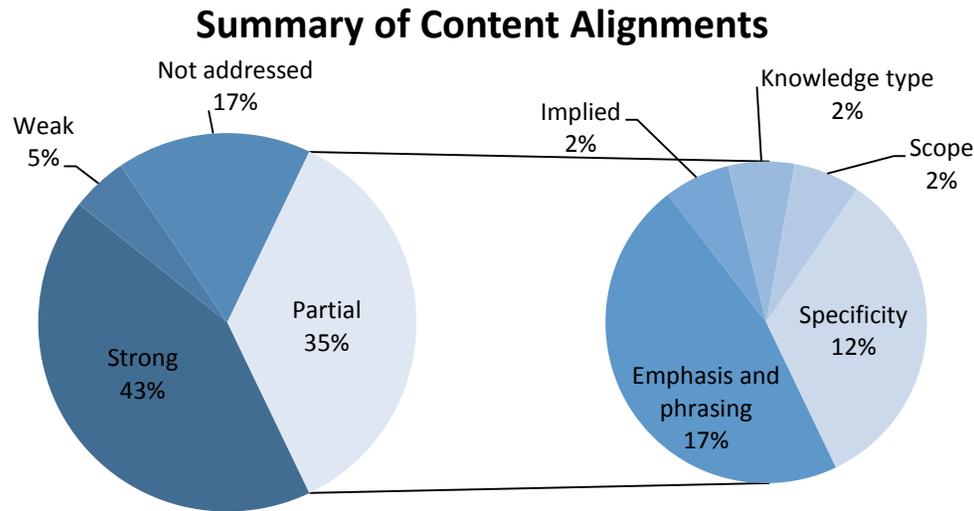
Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
MA 0.4.1 Display and Analysis: Students will sort, classify, represent, describe, and compare sets of objects.				
0.4.1.a	Sort and classify objects according to an attribute (e.g., size, color, shape)	Partial (emphasis and phrasing)	Content is similar, with some differences in emphasis and phrasing.	K.MD.3 Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.
0.4.1.b	Identify the attributes of sorted data	Partial (emphasis and phrasing)	NE emphasizes the different attributes of data, while CC emphasizes measurable attributes of objects.	K.MD.1 Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object. 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. <i>For example, directly compare the heights of two children and describe one child as taller/shorter.</i>
0.4.1.c	Compare the attributes of the data (e.g., most, least, same)	Partial (emphasis and phrasing)	NE emphasizes comparing the attributes of data, while CC emphasizes comparing measurable attributes of objects.	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. <i>For example, directly compare the heights of two children and describe one child as taller/shorter.</i>
MA 0.4.2 Predictions and Inferences: Mastery not expected at this level.				
MA 0.4.3 Probability: Mastery not expected at this level.				

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Mathematics Alignment Study

Grade 1: How Nebraska Content is addressed in the Common Core standards

How well Nebraska mathematics content is addressed in the Common Core standards at this grade is summarized in two categories, content alignment and rigor. The findings are depicted in the graphs below. **Content alignment** characterizes the nature of the content match between the Common Core and Nebraska standards. A *Strong* match indicates Common Core fully addresses the content of the Nebraska indicator. A *Partial* match is assigned when the Nebraska indicator either does not offer the same level of *Specificity* as the Common Core content, does not cover the complete *Scope* of the Common Core, differs importantly in its *Emphasis and Phrasing*, provides only an *Implied* coverage of the content, or focuses on a different *Knowledge type*, specifically, that Nebraska addresses a skill where Common Core addresses the related concept. If more than one of the issues just described characterizes the coverage of Common Core content by Nebraska, the alignment is identified as *Weak*. Finally, if the content in Nebraska is not found in the Common Core, it is marked as *Not Addressed*. The standards were also compared to identify relative **Rigor**. A indicator was counted more rigorous over the other when higher demands are made of students, either because mastery of content is expected at an earlier grade, or the expectations regarding the content are significantly more challenging, or both.



A summary of how well Common Core addressed content found in the Nebraska standards. See above for a discussion about the alignment categories.

Content in the documents was compared for the relative demands placed on students. The graph displays the percentage of indicators or standards that were more rigorous, by document. A significant percentage of the content was either equivalent in rigor between the two standards, or could not be rated for rigor, including when content was not addressed by either documents or when differences between the content made rigor comparisons invalid. See discussion above for more information.

Mathematics Alignment Study

Grade I Overview

A few topics in the Nebraska Mathematics Standards are not addressed or weakly addressed by the Common Core Standards. The topics found to be missing in the Common Core are related to specific aspects of counting (ordinal numbers, relative position of numbers, counting backwards), counting coins, orientation in time (past, present, future), and specific aspects of sorting. Nearly all of the alignments from Nebraska to the Common Core are strong because the documents describe content in similar ways. For a variety of reasons, some alignments were rated as partial. In a majority of cases, alignments were rated as partial because the standards in each document differed in their emphasis and phrasing. For example, Nebraska emphasizes skip counting, while Common Core emphasizes determining if a number of objects are odd or even by counting by 2s. In a few other cases, the Nebraska indicator was more specific, and so it was unclear whether students must address the same details within the Common Core. For example, the Nebraska standards include specific expectations related to using representations of the commutative property that are not detailed in the Common Core. In regards to rigor, the majority of the Nebraska indicators were found to be equivalent, in terms of grade level expectation, to those of the Common Core standards. Very few Nebraska indicators were found to require specific expectations at an earlier grade level, and the same was true for the Common Core standards. Overall, the rigor issues tended to be related to concepts about counting and characteristics of shapes.

Of the 42 indicators in the Nebraska Mathematics Standards for 1st grade, 35 are addressed and only 7 are not addressed by the Common Core State Standards. Of those addressed, 18 are strong alignments, 15 are partial alignments, and 2 are weak alignments.

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
Grade I					
MA 1.1 Students will communicate number sense concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.					
MA 1.1.1 Number System: Students will demonstrate, represent, and show relationships among whole numbers within the base-ten number system.					
1.1.1.a	Count, read, and write numbers 0 – 100	Strong	CC	CC content is more difficult because students are required to count to 120.	K.CC.1 Count to 100 by ones and by tens. 1.NBT.1 Extend the counting sequence. 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.
1.1.1.b	Count by multiples of 2 up to 50	Partial (emphasis and phrasing)	NE	NE emphasizes skip counting, while CC emphasizes determining if a number of objects are odd or even. NE content is in grade 1; CC content is in grade 2.	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.
1.1.1.c	Count by multiples of 5 up to 100	Strong	NE	NE content is in grade 1; CC content is in grade 2.	2.NBT.2 Count within 1000; skip-count by 5s, 10s, and 100s
1.1.1.d	Count by multiples of 10 up to 100	Partial (emphasis and phrasing)	CC	Content is similar, with some difference in phrasing. NE content is in grade 1; CC content is in kindergarten.	K.CC.1 Count to 100 by ones and by tens.
1.1.1.e	Sequence objects using ordinal numbers (first through tenth)	Not Addressed			

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Nebraska Mathematics Standards		Content Alignment	More Rigor*	Comments	Common Core Standards	
1.1.1.f	Count backwards from 10 – 0	Not Addressed				
1.1.1.g	Connect number words to the quantities they represent 0 – 20	Strong	CC	NE content is in grade 1; CC content is in kindergarten.	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).
1.1.1.h	Demonstrate and identify multiple equivalent representations for numbers 1 – 100 (e.g., 23 is 2 tens and 3 ones; 23 is 1 ten and 13 ones; 23 is 23 ones)	Partial (knowledge type)		The NE content emphasizes the skill, while the CC content emphasizes the concept.	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: <ul style="list-style-type: none"> 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).
				CC content is in kindergarten, but is less difficult.	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 $18 = 10 + 8$);

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.
1.1.1.i	Compare and order whole numbers 0 – 100	Partial (emphasis and phrasing)	Content is similar, with some difference in emphasis and phrasing.	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 $<$.
1.1.1.j	Demonstrate relative position of whole numbers 0 – 100 (e.g., 52 is between 50 and 60; 83 is greater than 77)	Not addressed		
MA 1.1.2 Operations: Students will demonstrate the meaning of addition and subtraction with whole numbers.				
1.1.2.a	Use objects, drawings, words, and symbols to explain addition as a joining action	Strong		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.
1.1.2.b	Use objects, drawings, words, and symbols to explain addition as parts of a whole	Partial (emphasis and phrasing)	Content is similar, with some difference in phrasing.	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

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				equations with a symbol for the unknown number to represent the problem.
1.1.2.c	Use objects, drawings, words, and symbols to explain subtraction as a separation action	Strong		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.
1.1.2.d	Use drawings, words, and symbols to explain subtraction as finding part of a whole	Partial (emphasis and phrasing)	Content is similar, with some difference in emphasis and phrasing. NE emphasizes subtraction as finding part of a whole.	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.
1.1.2.e	Use objects, drawings, words, and symbols to explain subtraction as a comparison (e.g., Nancy has 8 hair ribbons. Jane has 5 hair ribbons. How many more hair ribbons does Nancy have than Jane?)	Strong		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

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				problem.
MA 1.1.3 Computation: Students will compute fluently and accurately using appropriate strategies and tools.				
1.1.3.a	Fluently add whole number sums up to 10	Strong		1.OA.6 Add and subtract within 20. 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 $6 + 6 + 1 = 12 + 1 = 13$).
1.1.3.b	Fluently subtract whole number differences from 10	Strong		1.OA.6 Add and subtract within 20. 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

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				$+ 6 + 1 = 12 + 1 = 13$).
1.1.3.c	Add and subtract two-digit numbers without regrouping	Partial (scope)	CC includes content related to using concrete models or drawings and strategies for addition and subtraction.	<p>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.</p> <p>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.</p>
1.1.3.d	Use a variety of methods and tools to compute sums and differences (e.g., models, mental computation, paper-pencil)	Partial (emphasis and phrasing)	Content is similar, with some difference in emphasis and phrasing.	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., $8 + 6 = 8 + 2 + 4$

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				<p>= $10 + 4 = 14$); 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 $6 + 6 + 1 = 12 + 1 = 13$).</p>
				<p>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.</p>
				<p>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</p>

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards		
				between addition and subtraction; relate the strategy to a written method and explain the reasoning used.		
MA 1.1.4 Estimation: Mastery not expected at this level.						
MA 1.2 Students will communicate geometric concepts and measurement concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.						
MA 1.2.1 Characteristics: Students will identify characteristics of two-dimensional geometric shapes.						
1.2.1.a	Compare two-dimensional shapes (e.g., square, circle, rectangle, triangle)	Strong	CC	NE content is in grade 1; CC content is in kindergarten.	K.G.4	Analyze, compare, create, and compose shapes. 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).
1.2.1.b	Describe attributes of two-dimensional shapes (e.g., square, circle, rectangle, triangle)	Strong	CC	NE content is in grade 1; CC content is in kindergarten.	K.G.4	Analyze, compare, create, and compose shapes. 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

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
				<p>vertices/“corners”) and other attributes (e.g., having sides of equal length).</p> <p>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.</p>	
MA 1.2.2 Coordinate Geometry: Students will identify locations on a number line.					
1.2.2.a	Identify the position of a whole number on a horizontal number line.	Strong	NE	NE content is in grade 1; CC content is in grade 2.	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.
MA 1.2.3 Transformations: Students will identify a line of symmetry.					
1.2.3.a	Identify one line of symmetry in two-dimensional shapes (e.g., circle, square, rectangle, triangle)	Strong	NE	NE content is in grade 1; CC content is in grade 4.	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.

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
MA 1.2.4 Spatial Modeling: Students will communicate relative positions in space and create two-dimensional shapes.					
1.2.4.a	Demonstrate positional words (e.g., left/right)	Partial (emphasis and phrasing)	Content is similar, with some differences in emphasis and phrasing. CC is more specific. NE content is in grade 1; CC content is in kindergarten, but NE is more difficult.	K.G.1 Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres). 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.	
1.2.4.b	Sketch two-dimensional shapes (e.g., square, circle, rectangle, triangle)	Strong	CC	NE content is in grade 1; CC content is in kindergarten.	K.G.5 Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.
MA 1.2.5 Measurement: Students will measure using standard units, time, and money.					
1.2.5.a	Count like coins to \$1.00	Not addressed			
1.2.5.b	Identify time to the half hour	Strong		1.MD.3 Tell and write time in hours and half-hours using analog and digital clocks.	
1.2.5.c	Identify past, present, and future as orientation in time	Not addressed			
1.2.5.d	Select an appropriate tool for the attribute being measured (e.g., clock, calendar,	Strong		MP.5 Use appropriate tools strategically. [A more detailed description of this mathematical practice standard	

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
thermometer, scale, ruler)				is given in the CCSS Introduction]	
				2.MD.1 Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.	
1.2.5.e	Measure length using inches	Partial (specificity)	NE	NE is more specific. NE content is in grade 1; CC content is in grade 2.	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.
1.2.5.f	Compare and order objects according to length	Strong			1.MD.1 Order three objects by length; compare the lengths of two objects indirectly by using a third object.
MA 1.3 Students will communicate algebraic concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.					
MA 1.3.1 Relationships: Students will identify and describe relationships.					
1.3.1.a	Sort or order objects by their attributes (e.g., color, shape, size, number) then identify the classifying attribute	Partial (implied)		CC implies that students will be classifying using attributes of objects, and be able to identify the classifying attribute.	K.MD.3 Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.
1.3.1.b	Create multiple rules for sorting beyond color, shape, and size	Not addressed			
1.3.1.c	Identify, describe, and extend patterns (e.g., patterns with a repeating core)	Weak		NE includes describing and extending patterns.	MP.7 Look for and make use of structure [As defined by the CC, looking for and making use of structure

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				includes discerning patterns.]
				3.OA.9 Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. <i>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.</i>
1.3.1.d	Use $<$, $=$, $>$ to compare quantities	Strong		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 $<$.
MA 1.3.2 Modeling in Context: Students will use objects and pictures as models to represent mathematical situations.				
1.3.2.a	Model situations that involve the addition and subtraction of whole numbers 0 – 20, using objects and pictures	Partial (specificity)	CC is more specific.	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.
1.3.2.b	Describe and model quantitative change (e.g., a	Not addressed		

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
student growing taller)				
MA 1.3.3 Procedures: Students will use concrete, verbal, and visual representations to solve number sentences.				
1.3.3.a	Write number sentences to represent fact families	Weak	Content is similar, with significant differences in emphasis and phrasing.	<p>1.OA.3 Apply properties of operations as strategies to add and subtract.3</p> <p>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.)</p> <p>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.</p> <p>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</p>
1.3.3.b	Use concrete, pictorial, and verbal representations of the commutative property of addition	Partial (specificity)	NE specifies using concrete, pictorial, and verbal representations of the commutative property.	<p>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</p>

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				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.)
MA 1.4 Students will communicate data analysis/probability concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.				
MA 1.4.1 Display and Analysis: Students will sort, classify, organize, describe, and compare data.				
1.4.1.a	Sort and classify objects by more than one attribute	Partial (emphasis and phrasing)	NE emphasizes sorting and classifying objects, while CC emphasizes organizing data. CC content is in kindergarten, but is less difficult.	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. K.MD.3 Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.
1.4.1.b	Organize data by using concrete objects	Partial (specificity)	NE specifies concrete objects.	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.

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Nebraska Mathematics Standards		Content Alignment	More Rigor*	Comments	Common Core Standards
1.4.1.c	Represent data by using tally marks	Partial (specificity)		NE specifies that data should be represented using tally marks.	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.
1.4.1.d	Compare and interpret information from displayed data (e.g., more, less, fewer)	Strong			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.
MA 1.4.2 Predictions and Inferences: Mastery not expected at this level.					
MA 1.4.3 Probability: Mastery not expected at this level.					

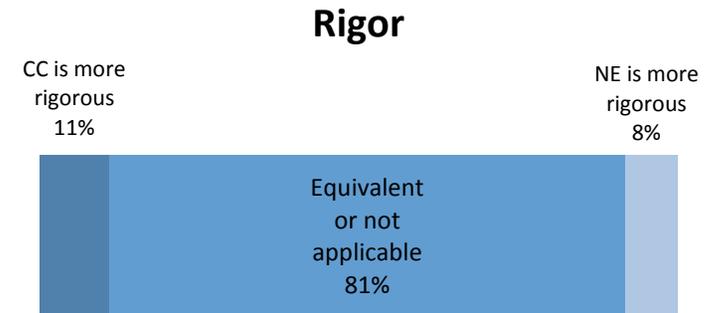
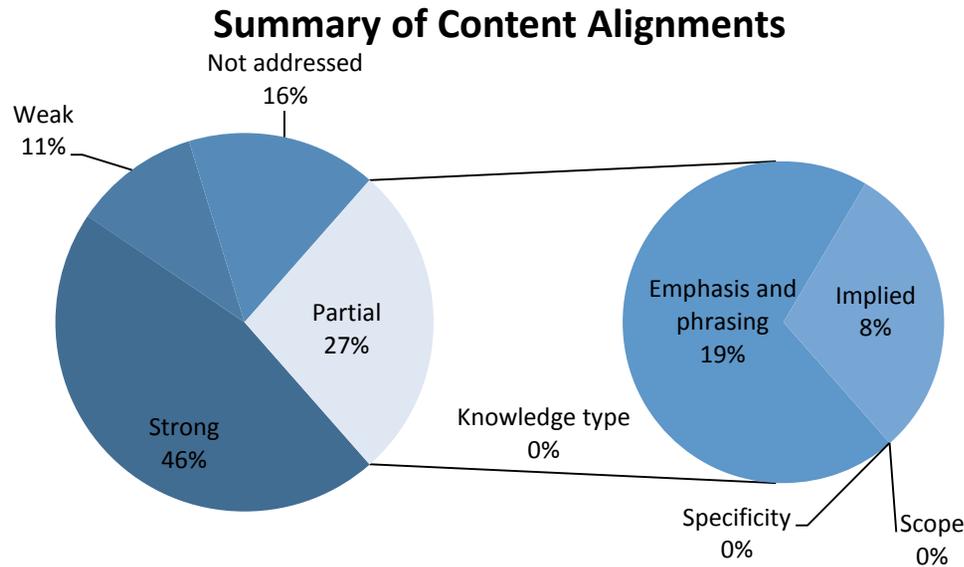
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Grade 2: How Nebraska Content is addressed in the Common Core standards

How well Nebraska mathematics content is addressed in the Common Core standards at this grade is summarized in two categories, content alignment and rigor. The findings are depicted in the graphs below. **Content alignment** characterizes the nature of the content match between the Common Core and Nebraska standards. A *Strong* match indicates Common Core fully addresses the content of the Nebraska indicator. A *Partial* match is assigned when the Nebraska indicator either does not offer the same level of *Specificity* as the Common Core content, does not cover the complete *Scope* of the Common Core, differs importantly in its *Emphasis and Phrasing*, provides only an *Implied* coverage of the content, or focuses on a different *Knowledge type*, specifically, that Nebraska addresses a skill where Common Core addresses the related concept. If more than one of the issues just described characterizes the coverage of Common Core content by Nebraska, the alignment is identified as *Weak*. Finally, if the content in Nebraska is not found in the Common Core, it is marked as *Not Addressed*. The standards were also compared to identify relative **Rigor**. A indicator was counted more rigorous over the other when higher demands are made of students, either because mastery of content is expected at an earlier grade, or the expectations regarding the content are significantly more challenging, or both.

A summary of how well Common Core addressed content found in the Nebraska standards. See above for a discussion about the alignment categories.



Content in the documents was compared for the relative demands placed on students. The graph displays the percentage of indicators or standards that were more rigorous, by document. A significant percentage of the content was either equivalent in rigor between the two standards, or could not be rated for rigor, including when content was not addressed by either documents or when differences between the content made rigor comparisons invalid. See discussion above for more information.

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Grade 2 Overview

Very few topics in the Nebraska Mathematics Standards are not addressed or weakly addressed by the Common Core Standards for Mathematics. The topics found to be missing in the Common Core are topics related to counting, modeling, creating patterns, and estimation. Many alignments of Nebraska standards to the Common Core are strong because the specific Nebraska content is fully addressed within a more expansive Common Core standard. For a variety of reasons, some alignments were rated as partial. In a majority of cases, alignments were rated as partial because the standards in each document differed in their emphasis and phrasing. For example, while both Nebraska and Common Core standards include operations on a number line, Nebraska emphasizes identifying the direction moved while performing the operation, while Common Core emphasizes representing numbers as lengths. In a few other cases, the Nebraska indicator was implied by the content in the Common Core standards. For example, the Nebraska standards include specific expectations related to comparing two-dimensional shapes that are implied in the Common Core standards. In regards to rigor, the majority of the Nebraska indicators were found to be equivalent, in terms of grade level expectation, to those of the Common Core standards. Very few Nebraska indicators were found to require specific expectations at an earlier grade level, and the same was true for the Common Core standards.

Of the 37 indicators in the Nebraska Mathematics Standards for 2nd grade, 31 are addressed and only 6 are not addressed by the Common Core State Standards. Of those addressed, 17 are strong alignments, 10 are partial alignments, and 4 are weak alignments.

Mathematics Alignment Study

Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
Grade 2					
MA 2.1 Students will communicate number sense concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.					
MA 2.1.1 Number System: Students will demonstrate, represent, and show relationships among whole numbers within the base-ten number system.					
2.1.1.a	Read and write numbers 0 – 1,000 (e.g., count numbers from 400 – 500; write numbers from 400 – 500)	Strong		2.NBT.3 Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.	
2.1.1.b	Count by multiples of 2 up to 100	Weak	NE includes skip-counting by 2 beyond 20. NE emphasizes skip counting, while CC emphasizes determining if a group of objects are odd or even.	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.	
2.1.1.c	Count backwards from 20 – 0	Not addressed			
2.1.1.d	Connect number words to the quantities they represent 0 – 100	Partial (implied)	CC	CC implies making the connection between the number words and the quantities difficult.	2.NBT.3 Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.
2.1.1.e	Demonstrate multiple	Strong		2.NBT.3 Read and write numbers to 1000	

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				using base-ten numerals, number names, and expanded form.
2.1.1.f	equivalent representations for numbers 1 – 1,000 (e.g., 423 is 4 hundreds, 2 tens and 3 ones; 423 is 3 hundreds 12 tens and 3 ones) Compare and order whole numbers 0 – 1,000	Strong		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.
2.1.1.g	Demonstrate relative position of whole numbers 0 – 1,000 (e.g., 624 is between 600 and 700; 593 is greater than 539)	Weak	NE emphasizes relative position, while CC emphasizes comparison.	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.
2.1.1.h	Use visual models to represent fractions of one-half as a part of a whole.	Strong		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.

MA 2.1.2 Operations: Students will demonstrate the meaning of addition and subtraction with whole numbers.

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
2.1.2.a	Use objects, drawings, words, and symbols to explain the relationship between addition and subtraction (e.g., if $2 + 3 = 5$ then $5 - 3 = 2$)	Strong		
		CC	CC is more difficult.	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.
		CC	NE content is in grade 2; CC content is in grade 1.	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.

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Nebraska Mathematics Standards		Content Alignment	More Rigor*	Comments	Common Core Standards	
2.1.2.b	Use objects, drawings, words, and symbols to explain the use of subtraction to find a missing addend (e.g., if $3 + \underline{\quad} = 7$, then $7 - 3 = \underline{\quad}$.)	Partial (emphasis and phrasing)		Content is similar, with some difference in phrasing.	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.
					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.
MA 2.1.3 Computation: Students will compute fluently and accurately using appropriate strategies and tools.						
2.1.3.a	Fluently add whole number facts with sums to 20	Strong			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.
2.1.3.b	Fluently subtract whole number facts with differences from 20	Strong			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.
2.1.3.c	Add and subtract three-digit	Partial (emphasis and		Content is similar, with some	2.NBT.7	Add and subtract within 1000, using concrete models or drawings

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
whole numbers with regrouping	phrasing)		difference in emphasis and phrasing.	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.
2.1.3.d	Use a variety of methods and tools to compute sums and differences (e.g., models, mental computation, paper-pencil)	Strong		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.

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Mathematics Alignment Study

Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
MA 2.1.4 Estimation: Students will estimate and check reasonableness of answers using appropriate strategies and tools.				
2.1.4.a	Estimate the results of two-digit whole number sums and differences and check the reasonableness of such results	Not addressed		
2.1.4.b	Estimate the number of objects in a group	Not addressed		
MA 2.2 Students will communicate geometric concepts and measurement concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.				
MA 2.2.1 Characteristics: Students will identify characteristics of two-dimensional geometric shapes.				
2.2.1.a	Describe attributes of two-dimensional shapes (e.g., trapezoid, parallelogram)	Partial (emphasis and phrasing)	Content is similar, with some difference in emphasis and phrasing.	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.)
2.2.1.b	Determine if two shapes are congruent	Weak	NE	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

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				sequence that exhibits the congruence between them.
2.2.1.c	Compare two-dimensional shapes (e.g., trapezoid, parallelogram)	Partial (Implied)	CC implies content related to comparing two-dimensional shapes.	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.)
2.2.1.d	Identify solid shapes (e.g., triangular prism, rectangular prisms, cones, cylinders, pyramids, spheres)	Weak	CC NE emphasizes identification of the shapes, while CC emphasizes the creation of the shapes, and does not require students to name them. NE content is in grade 2; CC content is in grade 1.	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. (Note: Students do not need to learn formal names such as “right rectangular prism.”)
MA 2.2.2 Coordinate Geometry: Students will identify locations on a number line.				
2.2.2.a	Identify numbers using location on a vertical number line	Strong		2.MD.6 Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
				corresponding to the numbers 0, 1, 2, ... , and represent whole-number sums and differences within 100 on a number line diagram.	
2.2.2.b	Compare whole numbers using location on a horizontal number line	Partial (Implied)	CC implies content related to comparing whole numbers on a number line.	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.	
2.2.2.c	Identify the direction moved for adding and subtracting using a horizontal number line	Partial (emphasis and phrasing)	NE emphasizes identifying the direction moved, while CC emphasizes representing numbers as lengths.	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.	
MA 2.2.3 Transformations: Students will identify a line of symmetry.					
2.2.3.a	Identify lines of symmetry in two-dimensional shapes	Strong	NE	NE content is in grade 2; CC content is in grade 4.	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

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards		
				into matching parts. Identify line-symmetric figures and draw lines of symmetry.		
2.2.3.b	Draw a line of symmetry in two-dimensional shapes	Strong	NE	NE content is in grade 2; CC content is in grade 4.	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.
MA 2.2.4 Spatial Modeling: Students will communicate relative positions in space and create two-dimensional shapes.						
2.2.4.a	Sketch two-dimensional shapes (e.g., trapezoid, parallelogram)	Strong			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.)
MA 2.2.5 Measurement: Students will measure using standard units, time, and money.						
2.2.5.a	Count mixed coins to \$1.00	Not addressed				
2.2.5.b	Identify time to 5 minute intervals	Strong			2.MD.7	Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.

* Rigor: CC: Common Core standards are more rigorous; NE: Nebraska Mathematics Standards are more rigorous

Mathematics Alignment Study

Nebraska Mathematics Standards		Content Alignment	More Rigor*	Comments	Common Core Standards	
2.2.5.c	Identify and use appropriate tools for the attribute being measured (e.g., clock, calendar, thermometer, scale, ruler)	Strong			MP.5	Use appropriate tools strategically [
					2.MD.1	Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.
2.2.5.d	Measure length using feet and yards	Strong			2.MD.1	Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.
					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.
2.2.5.e	Compare and order objects using inches, feet and yards	Partial (emphasis and phrasing)		Content is similar, with some difference in emphasis and phrasing.	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.

MA 2.3 Students will communicate algebraic concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

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Mathematics Alignment Study

Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
MA 2.3.1 Relationships: Students will identify and describe relationships.				
2.3.1.a	Create and describe patterns using concrete and pictorial representations	Not addressed		
MA 2.3.2 Modeling in Context: Students will use objects and pictures as models to represent mathematical situations.				
2.3.2.a	Model situations that involve the addition and subtraction of whole numbers 0 – 100, using objects and number lines	Partial (emphasis and phrasing)	CC Content is similar, with some difference in emphasis and phrasing. NE content is in grade 2; CC content is in grade 1.	<p>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..</p> <p>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</p>

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Mathematics Alignment Study

Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				diagram.
2.3.2.b	Describe and model quantitative change involving addition (e.g., a student grew 2 inches)	Not addressed		
MA 2.3.3 Procedures: Students will use concrete, verbal, and visual representations to solve number sentences.				
2.3.3.a	Use symbolic representations of the commutative property of addition (e.g., $2 + 3 = \Delta + 2$)	Partial (emphasis and phrasing)	Content is similar, with some difference in emphasis and phrasing.	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.
MA 2.4 Students will communicate data analysis/probability concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.				
MA 2.4.1 Display and Analysis: Students will organize, display, compare, and interpret data.				
2.4.1.a	Represent data using pictographs	Strong		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.

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Mathematics Alignment Study

Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
2.4.1.b	Interpret data using pictographs (e.g., 7 more; 2 less; 12 all together)	Strong		<p>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.</p> <p>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.</p>

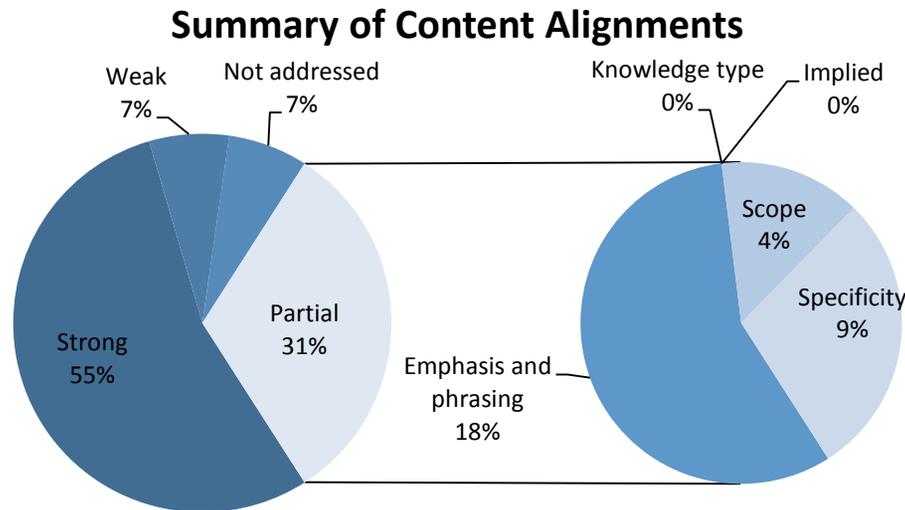
MA 2.4.2 Predictions and Inferences: Mastery not expected at this level.

MA 2.4.3 Probability: Mastery not expected at this level.

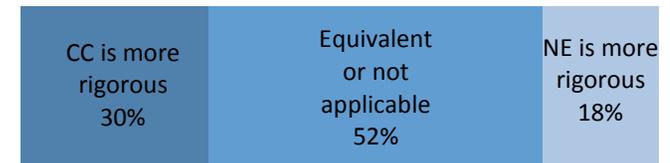
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Grade 3: How Nebraska Content is addressed in the Common Core standards

How well Nebraska mathematics content is addressed in the Common Core standards at this grade is summarized in two categories, content alignment and rigor. The findings are depicted in the graphs below. **Content alignment** characterizes the nature of the content match between the Common Core and Nebraska standards. A *Strong* match indicates Common Core fully addresses the content of the Nebraska indicator. A *Partial* match is assigned when the Nebraska indicator either does not offer the same level of *Specificity* as the Common Core content, does not cover the complete *Scope* of the Common Core, differs importantly in its *Emphasis and Phrasing*, provides only an *Implied* coverage of the content, or focuses on a different *Knowledge type*, specifically, that Nebraska addresses a skill where Common Core addresses the related concept. If more than one of the issues just described characterizes the coverage of Common Core content by Nebraska, the alignment is identified as *Weak*. Finally, if the content in Nebraska is not found in the Common Core, it is marked as *Not Addressed*. The standards were also compared to identify relative **Rigor**. A indicator was counted more rigorous over the other when higher demands are made of students, either because mastery of content is expected at an earlier grade, or the expectations regarding the content are significantly more challenging, or both.



Rigor



A summary of how well Common Core addressed content found in the Nebraska standards. See above for a discussion about the alignment categories.

Content in the documents was compared for the relative demands placed on students. The graph displays the percentage of indicators that were more rigorous, by document. A significant percentage of the content was either equivalent in rigor between the two standards, or could not be rated for rigor, including when content was not addressed by either documents or when differences between the content made rigor comparisons invalid. See discussion above for more information.

Mathematics Alignment Study

Grade 3 Overview

Very few topics in the Nebraska Mathematics Standards are not addressed or weakly addressed by the Common Core Standards for Mathematics. The topics found to be missing in the Common Core are related to counting coins, symbolic representation of the identity property of addition, and performing probability experiments. Many alignments of Nebraska standards to the Common Core are strong because the specific Nebraska content is fully addressed within a more expansive Common Core standard. For a variety of reasons, many alignments were rated as partial. In a majority of cases, alignments were rated as partial because the standards in each document differed in their emphasis and phrasing and specificity. For example, Nebraska indicators emphasize multiple two-dimensional shapes, while Common Core standards emphasize transformations. In a few other cases, the Nebraska indicator was more specific, and so it was unclear whether students must address the same details within the Common Core. For example, the Nebraska indicators specify building three-dimensional objects, which is not detailed in the Common Core. Very few of the partial alignments were related to scope. Examples of scope issues include identifying patterns. Nebraska tends to require students to identify non-numeric patterns or patterns in table or graphs, while Common Core standards require identifying arithmetic patterns. With regards to rigor, the Nebraska standards were found to require a few expectations at an earlier grade level than the Common Core standards, while the Common Core standards tended to place skills in earlier grades more often. Many of the Nebraska indicators were equivalent, in terms of grade level expectation, to those of the Common Core standards. Overall, grade level expectations differed by one or two grades. However, there was one Nebraska indicator expectation related to identifying congruent-two dimensional figures that was aligned with an 8th grade Common Core standard.

Of the 44 indicators in the Nebraska Mathematics Standards for 3rd grade, 41 are addressed and only 3 are not addressed by the Common Core State Standards. Of those addressed, 24 are strong alignments, 14 are partial alignments, and 3 are weak alignments.

Mathematics Alignment Study

Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
Grade 3				
MA 3.1 Students will communicate number sense concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.				
MA 3.1.1 Number System: Students will represent and show relationships among positive rational numbers within the base-ten number system.				
3.1.1.a	Read and write numbers to one-hundred thousand (e.g., 4,623 is the same as four thousand six hundred twenty three)	Strong		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.
3.1.1.b	Count by multiples of 5 to 200	Strong	CC	NE content is in grade 3; CC content is in grade 2. 2.NBT.2 Count within 1000; skip-count by 5s, 10s, and 100s.
3.1.1.c	Count by multiples of 10 to 400	Strong	CC	NE content is in grade 3; CC content is in grade 2. 2.NBT.2 Count within 1000; skip-count by 5s, 10s, and 100s.
3.1.1.d	Count by multiples of 100 to 1,000	Strong	CC	NE content is in grade 3; CC content is in grade 2. 2.NBT.2 Count within 1000; skip-count by 5s, 10s, and 100s.
3.1.1.e	Demonstrate multiple equivalent representations for numbers up to 10,000 (e.g., 10 tens is 1 hundred; 10 ten thousands is 1 hundred)	Strong	NE	NE content is in grade 3; CC content is in grade 4. 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

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Mathematics Alignment Study

Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards		
thousand; 2,350 is 235 tens; 2,350 is 2,000 + 300 + 50; 2,350 is 23 hundreds and 5 tens)				digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons.		
3.1.1.f	Demonstrate multiple equivalent representations for decimal numbers through the tenths place (e.g., 3 and 6 tenths is 3.6; 7.4 is 7 + .4)	Strong	NE	NE content is in grade 3; CC content is in grade 5.	5.NBT.3	Read, write, and compare decimals to thousandths. a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (1/10) + 9 \times (1/100) + 2 \times (1/1000)$.
			NE	NE content is in grade 3; CC content is in grade 4.	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.
3.1.1.g	Compare and order whole numbers through the thousands	Partial (emphasis and phrasing)	NE	Content is similar, with some difference in emphasis and phrasing. NE content is in grade 3; CC content is in grade 4.	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.

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Mathematics Alignment Study

Nebraska Mathematics Standards		Content Alignment	More Rigor*	Comments	Common Core Standards	
3.1.1.h	Find parts of whole and parts of a set for $\frac{1}{2}$, $\frac{1}{3}$, or $\frac{1}{4}$	Partial (emphasis and phrasing)		Content is similar, with some difference in emphasis and phrasing.	3.NF.1	Understand a fraction $\frac{1}{b}$ as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction $\frac{a}{b}$ as the quantity formed by a parts of size $\frac{1}{b}$.
					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 $\frac{1}{4}$ of the area of the shape.
3.1.1.i	Round a given number to tens, hundreds, or thousands	Partial (emphasis and phrasing)	NE	Content is similar, with some difference in emphasis and phrasing. NE content is in grade 3; CC content is in grade 4.	4.NBT.3	Use place value understanding to round multi-digit whole numbers to any place.
					3.NBT.1	Use place value understanding to round whole numbers to the nearest 10 or 100.
MA 3.1.2 Operations: Students demonstrate the meaning of multiplication with whole numbers.						
3.1.2.a	Represent multiplication as repeated addition using objects, drawings, words, and symbols (e.g., $3 \times 4 = 4 + 4 + 4$)	Strong			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

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Mathematics Alignment Study

Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				and equations with a symbol for the unknown number to represent the problem.
				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.
3.1.2.b	Use objects, drawings, words and symbols to explain the relationship between multiplication and division (e.g., if $3 \times 4 = 12$ then $12 \div 3 = 4$.)	Strong		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.
				3.OA.6 Understand division as an unknown-factor problem. For example, divide $32 \div 8$ by finding the number that makes 32 when multiplied by 8.

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
3.1.2.c	Use drawings, words, and symbols to explain the meaning of the factors and product in a multiplication sentence (e.g., in $3 \times 4 = 12$, 3 and 4 are factors and 12 is the total or product. The first factor (3) tells how many sets while the second factor tells how many are in each set. Another way to say this is that 3 groups of 4 equals 12 total.)	Strong		<p>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.</p> <p>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.</p>
3.1.2.d	Use drawings, words, and symbols to explain the meaning of multiplication using an array (e.g., an array with 3 rows and 4 columns represents the multiplication sentence $3 \times 4 =$	Strong		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

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
12)				the problem.
MA 3.1.3 Computation: Students will compute fluently and accurately using appropriate strategies and tools.				
3.1.3.a	Compute whole number multiplication facts 0 – 10 fluently	Strong		3.OA.7 Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By the end of grade 3, know from memory all products of one-digit numbers.
3.1.3.b	Add and subtract through four-digit whole numbers with regrouping	Partial (specificity)	NE specifies regrouping.	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.)
3.1.3.c	Select and apply the appropriate methods of computation when problem solving with four-digit whole numbers through the thousands (e.g., models, mental computation, paper-pencil)	Strong		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.)

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				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.
MA 3.1.4 Estimation: Students will estimate and check reasonableness of answers using appropriate strategies and tools.				
3.1.4.a Estimate the two-digit product of whole number multiplication and check the reasonableness	Strong			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.
MA 3.2 Students will communicate geometric concepts and measurement concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.				
MA 3.2.1 Characteristics: Students will identify characteristics and describe properties of two-dimensional shapes and three-dimensional objects.				
3.2.1.a Identify the number of sides, angles, and vertices of two-dimensional shapes	Strong			

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Mathematics Alignment Study

Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
				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.	
		CC	NE Content is in grade 3; CC content is in grade 2.	2.G.1 Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces.5 Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.	
3.2.1.b	Identify congruent two-dimensional figures given multiple two-dimensional shapes	Partial (emphasis and phrasing)	NE	NE emphasizes multiple two-dimensional shapes, while CC emphasizes transformations. NE content is in grade 3; CC content is in grade 8.	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.

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Nebraska Mathematics Standards		Content Alignment	More Rigor*	Comments	Common Core Standards	
3.2.1.c	Identify lines, line segments, rays, and angles	Strong	NE	NE content is in grade 3; CC content is in grade 4.	4.G.1	Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.
3.2.1.d	Describe attributes of solid shapes (e.g., triangular prism, rectangular prisms, cones, cylinders, pyramids, spheres)	Strong	CC	NE content is in grade 3; CC content is in kindergarten.	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).
MA 3.2.2 Coordinate Geometry: Students will identify locations on a number line.						
3.2.2.a	Draw a number line and plot points	Partial (emphasis and phrasing)		Content is similar, with some differences in emphasis.	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.
3.2.2.b	Determine the distance between two whole number points on a number line	Partial (emphasis and phrasing)	CC	Content is similar, with some differences in emphasis. NE content is in grade 3; CC content is in grade 2.	2.MD.6	Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points

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Mathematics Alignment Study

Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards		
				corresponding to the numbers 0, 1, 2, ... , and represent whole-number sums and differences within 100 on a number line diagram.		
MA 3.2.3 Transformations: Students will identify a line of symmetry.						
3.2.3.a	Draw all possible lines of symmetry in two-dimensional shapes	Strong	NE	NE content is in grade 3; CC content is in grade 4.	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.
MA 3.2.4 Spatial Modeling: Students will create two-dimensional shapes and three-dimensional objects.						
3.2.4.a	Sketch and label lines, rays, line segments, and angles	Strong	NE	NE content is in grade 3; CC content is in grade 4.	4.G.1	Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.
3.2.4.b	Build three-dimensional objects (e.g., using clay for rectangular prisms, cone, cylinder)	Partial (specificity)	CC	NE specifies building three-dimensional objects. NE content is in grade 3; CC content is in grade 1.	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

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				attributes. 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.
MA 3.2.5 Measurement: Students will apply appropriate procedures and tools to determine measurements using customary and metric units.				
3.2.5.a	Select and use appropriate tools to measure perimeter of simple two-dimensional shapes (e.g., triangle, square, rectangle)	Partial (emphasis and phrasing)	Content is similar, with some differences in emphasis.	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.
3.2.5.b	Count mixed coins and bills greater than \$1.00	Not addressed		
3.2.5.c	Identify time of day (e.g., am,	Weak	CC NE emphasizes time of day, while CC emphasizes telling time. NE content is	2.MD.7 Tell and write time from analog and digital clocks to the nearest

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
			pm, noon, midnight)	in grade 3; CC content is in grade 2.	five minutes, using a.m. and p.m.
3.2.5.d	State multiple ways for the same time using 15 minute intervals (e.g., 2:15, or quarter past 2, 2:45 or a quarter until 3)	Weak		NE emphasizes stating multiple ways for the same time using 15 minute intervals, while CC emphasizes telling time.	2.MD.7 Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.
3.2.5.e	Identify the appropriate customary unit for measuring length, weight, and capacity/volume	Strong	CC	NE content is in grade 3; CC content is in grade 2.	2.MD.3 Estimate lengths using units of inches, feet, centimeters, and meters. 3.MD.2 Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). 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.
3.2.5.f	Measure length to the nearest ½ inch and centimeter (e.g., requires rounding)	Partial (specificity)		NE specifies measure length to nearest ½ centimeter.	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

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
				quarters.	
3.2.5.g	Compare and order objects according to length using centimeters and meters	Partial (emphasis and phrasing)	CC	Content is similar, with some differences in emphasis and phrasing. NE content is in grade 3; CC content is in grade 2.	2.MD.3 Estimate lengths using units of inches, feet, centimeters, and meters.
			CC	NE content is in grade 3; CC content is in grade 2.	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.
MA 3.3 Students will communicate algebraic concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.					
MA 3.3.1 Relationships: Students will identify and describe relationships.					
3.3.1.a	Identify, describe, and extend numeric and non-numeric patterns	Partial (scope)		NE includes non-numeric patterns.	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

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				two equal addends.
3.3.1.b	Identify patterns using words, tables, and graphs	Partial (scope)	NE includes using tables, and graphs to identify patterns.	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.
MA 3.3.2 Modeling in Context: Students will use objects and pictures as models to represent mathematical situations.				
3.3.2.a	Model situations that involve the addition and subtraction of whole numbers using objects, number lines, and symbols	Strong	CC NE content is in grade 3; CC content is in grade 2.	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.
		CC	NE content is in grade 3; CC content	2.MD.6 Represent whole numbers as

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
			is in grade 2.	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.
3.3.2.b	Describe and model quantitative change involving subtraction (e.g., temperature dropped two degrees)	Strong		<p>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.</p> <p>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.</p> <p>3.MD.2 Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l).⁶ Add,</p>

* Rigor: CC: Common Core standards are more rigorous; NE: Nebraska Mathematics Standards are more rigorous

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
				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	
MA 3.3.3 Procedures: Students will identify and apply properties of whole numbers to solve equations involving addition and subtraction.					
3.3.3.a	Use symbolic representation of the identity property of addition (e.g., $3 = 0 + 3$)	Not addressed			
3.3.3.b	Solve simple one-step whole number equations involving addition and subtraction (e.g., $\Delta + 2 = 3$)	Strong	CC	NE content is in grade 3; CC content is in grade 1.	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 $8 + ? = 11$, $5 = _ - 3$, $6 + 6 = _$.
3.3.3.c	Explain the procedure(s) used in solving simple one-step whole number equations involving addition and subtraction	Partial (specificity)	CC	NE specifies solving one-step whole number equations. NE content is in grade 3; CC content is in grade 2.	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.)

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
MA 3.4 Students will communicate data analysis/probability concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.				
MA 3.4.1 Display and Analysis: Students will organize, display, compare, and interpret data.				
3.4.1.a	Represent data using horizontal and vertical bar graphs	Strong		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.
3.4.1.b	Use comparative language to describe the data (e.g., increasing, decreasing)	Weak	Content is similar, with significant differences in emphasis and phrasing.	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.
3.4.1.c	Interpret data using horizontal and vertical bar graphs	Strong		3.MD.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve

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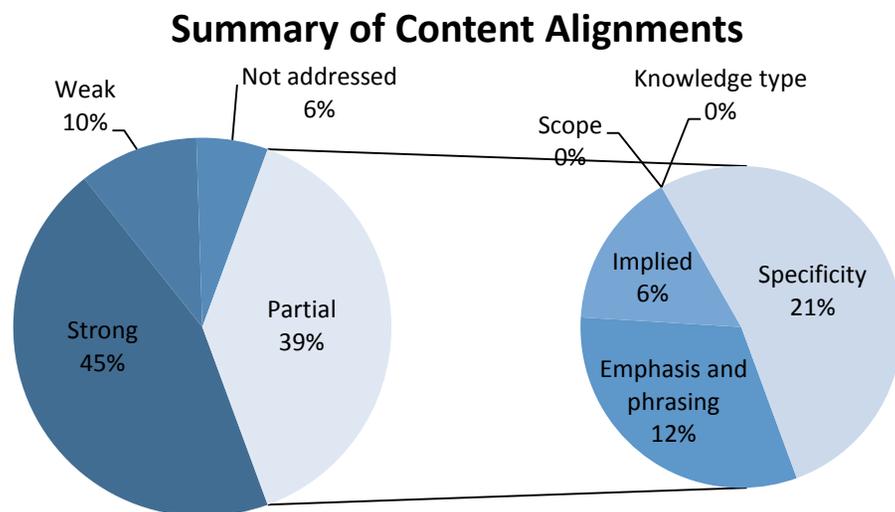
Mathematics Alignment Study

Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				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.
MA 3.4.2 Predictions and Inferences: Mastery not expected at this level.				
MA 3.4.3 Probability: Students will find and describe experimental probability.				
3.4.3.a	Perform simple experiments (e.g., flip a coin, toss a number cube, spin a spinner) and describe outcomes as possible, impossible, or certain	Not addressed		

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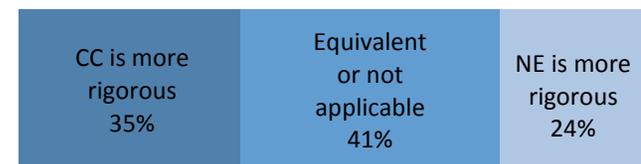
Grade 4: How Nebraska Content is addressed in the Common Core standards

How well Nebraska mathematics content is addressed in the Common Core standards at this grade is summarized in two categories, content alignment and rigor. The findings are depicted in the graphs below. **Content alignment** characterizes the nature of the content match between the Common Core and Nebraska standards. A *Strong* match indicates Common Core fully addresses the content of the Nebraska indicator. A *Partial* match is assigned when the Nebraska indicator either does not offer the same level of *Specificity* as the Common Core content, does not cover the complete *Scope* of the Common Core, differs importantly in its *Emphasis and Phrasing*, provides only an *Implied* coverage of the content, or focuses on a different *Knowledge type*, specifically, that Nebraska addresses a skill where Common Core addresses the related concept. If more than one of the issues just described characterizes the coverage of Common Core content by Nebraska, the alignment is identified as *Weak*. Finally, if the content in Nebraska is not found in the Common Core, it is marked as *Not Addressed*. The standards were also compared to identify relative **Rigor**. A indicator was counted more rigorous over the other when higher demands are made of students, either because mastery of content is expected at an earlier grade, or the expectations regarding the content are significantly more challenging, or both.



A summary of how well Common Core addressed content found in the Nebraska standards. See above for a discussion about the alignment categories.

Rigor



Content in the documents was compared for the relative demands placed on students. The graph displays the percentage of indicators that were more rigorous, by document. A significant percentage of the content was either equivalent in rigor between the two standards, or could not be rated for rigor, including when content was not addressed by either documents or when differences between the content made rigor comparisons invalid. See discussion above for more information.

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Grade 4 Overview

Very few topics in the Nebraska Mathematics Standards are not addressed or weakly addressed by the Common Core Standards for Mathematics. The topics found to be missing in the Common Core are related to identifying properties of congruency; identifying parallel, perpendicular, and intersecting lines; and explaining procedures in solving one-step problems. Many alignments of Nebraska standards to the Common Core are strong because the specific Nebraska content is fully addressed within a more expansive Common Core standard. For a variety of reasons, many alignments were rated as partial. In a majority of cases, alignments were rated as partial because the standards in each document differed in their emphasis and phrasing, specificity, and implied content. For example, Nebraska indicators emphasize using geometric models to solve problems, while Common Core standards emphasize composing larger shapes. In a few other cases, the Nebraska indicator was more specific, and so it was unclear whether students must address the same details within the Common Core. For example, the Nebraska indicators specify three-digit products and two-digit quotients of whole numbers that are not detailed in the Common Core. In regards to rigor, the Nebraska standards were found to require a few expectations at an earlier grade level than the Common Core standards, while the Common Core standards tended to place skills in earlier grades more often. Many of the Nebraska indicators were equivalent, in terms of grade level expectations, to those of the Common Core standards. Overall, grade level expectations differed by one or two grades. However, there was one Nebraska indicator expectation related to identifying two and three-dimensional figures that was aligned with a Kindergarten Common Core standard.

Of the 49 indicators in the Nebraska Mathematics Standards for 4th grade, 46 are addressed and only 3 are not addressed by the Common Core State Standards. Of those addressed, 22 are strong alignments, 19 are partial alignments, and 5 are weak alignments.

Mathematics Alignment Study

Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards		
Grade 4						
MA 4.1 Students will communicate number sense concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.						
MA 4.1.1 Number System: Students will represent and show relationships among positive rational numbers within the base-ten number system.						
4.1.1.a	Read and write numbers through the millions (e.g., 2,347,589 is the same as 2 million three hundred forty seven thousand five hundred eighty nine)	Strong	NE		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.
4.1.1.b	Demonstrate multiple equivalent representations for decimal numbers through the hundredths place (e.g., 2 and 5 hundredths is 2.05; 6.23 is $6 + .2 + .03$)	Partial (emphasis and phrasing)	NE	Content is similar, with some difference in emphasis. NE emphasizes multiple equivalent representations. NE content is in grade 4; CC content is in grade 5.	5.NBT.3 a	Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (1/10) + 9 \times (1/100) + 2 \times (1/1000)$.
4.1.1.c	Compare and order whole numbers and decimals through the hundredths place (e.g., money)	Partial (emphasis and phrasing)	NE	Content is similar, with some difference in emphasis and phrasing. NE emphasizes multiple equivalent representations. NE content is in grade 4; CC content is in grade 5.	5.NBT.3 b	Compare two decimals to thousandths based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons.

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Mathematics Alignment Study

Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
				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.	
4.1.1.d	Classify a number as even or odd	Strong	CC	NE content is in grade 4; CC content is in grade 4.	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.
4.1.1.e	Represent a fraction as parts of a whole and/or parts of a set	Strong	CC	NE content is in grade 4; CC content is in grade 4.	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 $1/b$.
4.1.1.f	Use visual models to find equivalent fractions (e.g., $\frac{2}{4} = \frac{1}{2}, \frac{2}{8} = \frac{1}{4}, 1 = \frac{2}{2} = \frac{5}{5}, \frac{3}{3}$	Strong			4.NF.1 Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ

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Mathematics Alignment Study

Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.
4.1.1.g	Determine the size of a fraction relative to one half using equivalent forms (e.g., Is $\frac{3}{8}$ more or less than one half?)	Partial (specificity)	NE specifies the size of the fraction.	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 $\frac{1}{2}$. 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.
4.1.1.h	Locate fractions on a number line	Strong	CC NE content is in grade 4; CC content is in grade 3.	3.NF.2b Represent a fraction $\frac{a}{b}$ on a number line diagram by marking off a lengths $\frac{1}{b}$ from 0. Recognize that the resulting interval has size $\frac{a}{b}$ and that its endpoint locates the number $\frac{a}{b}$ on the number line.
4.1.1.i	Round a whole number to millions	Partial (emphasis and	CC Content is similar, with some difference in emphasis and phrasing.	4.NBT.3 Generalize place value understanding for multi-digit

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
	phrasing)		NE emphasizes multiple equivalent representations. NE content is in grade 4; CC content is in grade 3.	whole numbers. Use place value understanding to round multi-digit whole numbers to any place.	
MA 4.1.2 Operations: Students will demonstrate the meaning of division with whole numbers.					
4.1.2.a	Use drawings, words, and symbols to explain the meaning of division [(e.g., as repeated subtraction: Sarah has 24 candies. She put them into bags of 6 candies each. How many bags did Sarah use?) (e.g., as equal sharing: Paul has 24 candies. He wants to share them equally among his 6 friends. How many candies will each friend receive?)]	Strong	CC	NE content is in grade 4; CC content is in grade 3.	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.
MA 4.1.3 Computation: Students will compute fluently and accurately using appropriate strategies and tools.					
4.1.3.a	Compute whole number division facts 0 – 10 fluently	Strong	CC	NE content is in grade 4; CC content is in grade 3.	3.OA.7 Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations.
4.1.3.b	Add and subtract decimals to the hundredths place (e.g., money)	Strong	NE	NE content is in grade 4; CC content is in grade 5.	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

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Nebraska Mathematics Standards		Content Alignment	More Rigor*	Comments	Common Core Standards
					the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.
4.1.3.c	Multiply two-digit whole numbers	Strong			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.
4.1.3.d	Divide a three-digit number with one digit divisor with and without a remainder	Partial (specificity)		NE specifies division without remainders.	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. 4.OA.3 Solve multistep word problems posed with whole numbers and

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
				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.	
4.1.3.e	Mentally compute multiplication and division involving powers of 10	Partial (emphasis and phrasing)	CC	Content is similar, with some difference in emphasis and phrasing. NE content is in grade 4; CC content is in grade 3.	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.
4.1.3.f	Select and apply the appropriate method of computation when problem solving (e.g., models, mental computation, paper-pencil)	Partial (implied)	NE	CC implies content related to selecting and applying appropriate method of computation. NE content is in grade 4; CC content is in grade 5.	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

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
				example, recognize an incorrect result $2/5 + 1/2 = 3/7$ by observing that $3/7 < 1/2$.	
MA 4.1.4 Estimation: Students will estimate and check reasonableness of answers using appropriate strategies and tools.					
4.1.4.a	Estimate the three-digit product and the two-digit quotient of whole number multiplication and division and check the reasonableness	Partial (specificity)	CC	NE specifies three-digit products and two-digit quotients of whole numbers. NE content is in grade 3; CC content is in grade 4.	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.
MA 4.2 Students will communicate geometric concepts and measurement concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.					
MA 4.2.1 Characteristics: Students will classify two-dimensional shapes and three-dimensional objects.					
4.2.1.a	Identify two- and three-dimensional shapes according to their sides and angle properties	Strong	CC	NE content is in grade 4; CC content is in kindergarten.	K.G.3 Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres). Identify shapes as two-dimensional (lying in a plane, “flat”) or three-dimensional (“solid”). 4.G.1 Draw and identify lines and angles, and classify shapes by properties of

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				their lines and angles. Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.
4.2.1.b	Classify an angle as acute, obtuse, and right	Partial (specificity)	NE specifies acute and obtuse angles.	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.
4.2.1.c	Identify parallel, perpendicular, and intersecting lines	Partial (specificity)	NE specifies intersecting lines.	4.G.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.
4.2.1.d	Identify the property of congruency when dealing with plane geometric shapes	Not addressed		
MA 4.2.2 Coordinate Geometry: Students will describe locations using coordinate geometry.				
4.2.2.a	Identify the ordered pair of a plotted point in first quadrant by its location (e.g., (2, 3) is a point two right and	Strong	NE NE content is in grade 4; CC content is in grade 5.	5.G.1 Graph points on the coordinate plane to solve real-world and mathematical problems. Use a pair

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
three up from the origin)				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).

MA 4.2.3 Transformations: Students will identify simple transformations.

4.2.3.a	Given two congruent geometric shapes, identify the transformation (e.g., translation, rotation, reflection) applied to an original shape to create a transformed shape	Not addressed			
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MA 4.2.4 Spatial Modeling: Student will use geometric models to solve problems.

4.2.4.a	Given a geometric model, use it to	Weak	CC	NE emphasizes using geometric	.K.G.6	Compose simple shapes to form
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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
solve a problem (e.g., what shapes make a cylinder; streets run parallel and perpendicular)			models to solve problems, while CC emphasizes composing larger shapes. NE content is in grade 4; CC content is in kindergarten.	larger shapes. For example, "can you join these two triangles with full sides touching to make a rectangle?"	
MA 4.2.5 Measurement: Students will apply appropriate procedures and tools to determine measurements using customary and metric units.					
4.2.5.a	Select and use appropriate tools to measure perimeter of polygons	Partial (specificity)	CC	NE specifies selecting and using appropriate tools. NE content is in grade 4; CC content is in grade 3.	.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.
4.2.5.b	Identify time to the minute on an analog clock	Strong	CC	NE content is in grade 4; CC content is in grade 3.	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.
4.2.5.c	Solve problems involving elapsed time	Strong	CC	NE content is in grade 4; CC content is in grade 3.	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.,

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
				by representing the problem on a number line diagram.	
4.2.5.d	Identify the appropriate metric unit for measuring length, weight, and capacity/volume (e.g., cm, m, Km; g, Kg; mL, L)	Strong			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),
4.2.5.e	Estimate and measure length using customary (nearest 1/2 inch) and metric (nearest centimeter) units	Strong	CC	NE content is in grade 4; CC content is in grade 2.	2.MD.3 Estimate lengths using units of inches, feet, centimeters, and meters.
4.2.5.f	Measure weight and temperature using customary units	Partial (specificity)		NE specifies weight and temperature.	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

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
4.2.5.g	Compute simple unit conversions for length within a system of measurement	Strong		<p>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),</p> <hr/> <p>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),</p>

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
MA 4.3 Students will communicate algebraic concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.				
MA 4.3.1 Relationships: Students will represent and analyze relationships.				
4.3.1.a	Describe, extend, and apply rules about numeric patterns	Strong		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.
4.3.1.b	Represent and analyze a variety of patterns using words, tables, and graphs	Partial (specificity)	NE	NE specifies use of tables. NE content is in grade 4; CC content is in grade 5. 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

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				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.
4.3.1.c	Use \geq, \leq symbols to compare quantities	Partial (emphasis and phrasing)	NE content is similar, with some differences in emphasis and phrasing.	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.
4.3.1.d	Select appropriate operational and relational symbols to make a number sentence true	Weak	NE emphasizes making a number sentence true.	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.
MA 4.3.2 Modeling in Context: Students will create and use models to represent mathematical situations.				
4.3.2.a	Model situations that involve the multiplication of whole numbers	Weak	NE emphasizes using number lines and symbols to model multiplication	6.NS.6c Find and position integers and other rational numbers on a

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
	using number lines and symbols		situations, while CC emphasizes finding numbers on a coordinate plane.	horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.
4.3.2.b	Describe and model quantitative change involving multiplication (e.g., money doubling)	Partial (emphasis and phrasing)	NE content is similar, with some differences in emphasis and phrasing.	5.NF.5 Interpret multiplication as scaling (resizing) by: <ul style="list-style-type: none"> -- 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 $a/b = (n \times a) / (n \times b)$ to the effect of multiplying a/b by 1.

MA 4.3.3 Procedures: Students will identify and apply properties of whole numbers to solve equations involving multiplication and division.

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Nebraska Mathematics Standards		Content Alignment	More Rigor*	Comments	Common Core Standards	
4.3.3.a	Represent the idea of a variable as an unknown quantity using a letter or a symbol (e.g., $n + 3$, $b - 2$)	Strong	NE	NE content is in grade 4; CC content is in grade 6.	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.
4.3.3.b	Use symbolic representation of the identity property of multiplication (e.g., $5 * 1 = 5$)	Partial (specificity)	CC	NE specifies the identity property. NE content is in grade 4; CC content is in grade 3.	3.OA.5	Apply properties of operations as strategies to multiply and divide. Examples: If $6 \times 4 = 24$ is known, then $4 \times 6 = 24$ is also known. (Commutative property of multiplication.) $3 \times 5 \times 2$ can be found by $3 \times 5 = 15$ then $15 \times 2 = 30$, or by $5 \times 2 = 10$ then $3 \times 10 = 30$. (Associative property of multiplication.) Knowing that $8 \times 5 = 40$ and $8 \times 2 = 16$, one can find 8×7 as $8 \times (5 + 2) = (8 \times 5) + (8 \times 2) = 40 + 16 = 56$. (Distributive property.)
4.3.3.c	Use symbolic representations of the commutative property of multiplication (e.g., $2 * 3 = \Delta * 2$)	Strong	CC	NE content is in grade 4; CC content is in grade 3.	3.OA.5	Apply properties of operations as strategies to multiply and divide. Examples: If $6 \times 4 = 24$ is known, then $4 \times 6 = 24$ is also known. (Commutative property of

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
				<p>multiplication.) $3 \times 5 \times 2$ can be found by $3 \times 5 = 15$ then $15 \times 2 = 30$, or by $5 \times 2 = 10$ then $3 \times 10 = 30$. (Associative property of multiplication.) Knowing that $8 \times 5 = 40$ and $8 \times 2 = 16$, one can find 8×7 as $8 \times (5 + 2) = (8 \times 5) + (8 \times 2) = 40 + 16 = 56$. (Distributive property.)</p>	
4.3.3.d	Solve simple one-step whole number equations (e.g., $x + 2 = 3$, $3 * y = 6$)	Strong	CC	NE content is in grade 4; CC content is in grade 3.	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 $8 \times ? = 48$, $5 = _ \div 3$, $6 \times 6 = ?$.
4.3.3.e	Explain the procedure(s) used in solving simple one-step whole number equations	Not addressed			
MA 4.4 Students will communicate data analysis/probability concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.					
MA 4.4.1 Display and Analysis: Students will organize, display, compare, and interpret data.					
4.4.1.a	Represent data using dot/line plots	Strong			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

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				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.
4.4.1.b	Compare different representations of the same data	Weak	NE emphasizes comparing different representations of data, while CC emphasizes solving problems using data in line plots.	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.
4.4.1.c	Interpret data and draw conclusions using dot/line plots	Partial (implied)	CC implies content related to drawing conclusions from data.	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

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
4.4.1.d	Find the mode and range for a set of whole numbers	Weak	NE	NE includes mode. CC implies an understanding of range. NE content is in grade 4; CC content is in grade 6.	<p>length between the longest and shortest specimens in an insect collection.</p> <p>6.SP.5 Summarize numerical data sets in relation to their context, such as by:</p> <ul style="list-style-type: none"> 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

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
4.4.1.e	Find the whole number mean for a set of whole numbers	Strong	NE	NE content is in grade 4; CC content is in grade 6.	gathered. 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.

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
MA 4.4.2 Predictions and Inferences: Students will construct predictions based on data.					
4.4.2.a	Make predictions based on data to answer questions from tables and bar graphs	Partial (specificity)	NE	NE specifies answering questions from tables and bar graphs. NE content is in grade 4; CC content is in grade 7.	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.
MA 4.4.3 Probability: Students will find, describe, and compare experimental probabilities.					
4.4.3.a	Perform simple experiments and compare the degree of likelihood (e.g., more likely, equally likely, or less likely)	Partial (implied)	NE	CC implies being able to compare the degree of likelihood from simple experiments. NE content is in grade 4; CC content is in grade 7.	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

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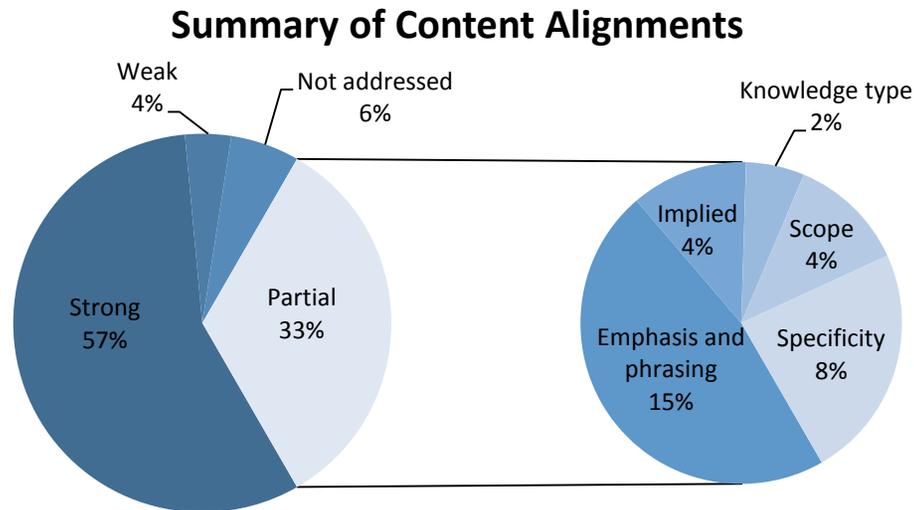
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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				indicates a likely event.
				7.SP.7
				Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.
				b. 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?

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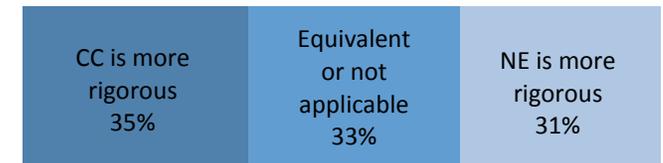
Grade 5: How Nebraska Content is addressed in the Common Core standards

How well Nebraska mathematics content is addressed in the Common Core standards at this grade is summarized in two categories, content alignment and rigor. The findings are depicted in the graphs below. **Content alignment** characterizes the nature of the content match between the Common Core and Nebraska standards. A *Strong* match indicates Common Core fully addresses the content of the Nebraska indicator. A *Partial* match is assigned when the Nebraska indicator either does not offer the same level of *Specificity* as the Common Core content, does not cover the complete *Scope* of the Common Core, differs importantly in its *Emphasis and Phrasing*, provides only an *Implied* coverage of the content, or focuses on a different *Knowledge type*, specifically, that Nebraska addresses a skill where Common Core addresses the related concept. If more than one of the issues just described characterizes the coverage of Common Core content by Nebraska, the alignment is identified as *Weak*. Finally, if the content in Nebraska is not found in the Common Core, it is marked as *Not Addressed*. The standards were also compared to identify relative **Rigor**. A indicator was counted more rigorous over the other when higher demands are made of students, either because mastery of content is expected at an earlier grade, or the expectations regarding the content are significantly more challenging, or both.



A summary of how well Common Core addressed content found in the Nebraska standards. See above for a discussion about the alignment categories.

Rigor



Content in the documents was compared for the relative demands placed on students. The graph displays the percentage of indicators or standards that were more rigorous, by document. A significant percentage of the content was either equivalent in rigor between the two standards, or could not be rated for rigor, including when content was not addressed by either documents or when differences between the content made rigor comparisons invalid. See discussion above for more information.

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Grade 5 Overview

Very few topics in the Nebraska Mathematics Standards are not addressed or weakly addressed by the Common Core Standards for Mathematics. The topics found to be missing in the Common Core are related to sketching congruent shapes and explaining the addition property of equality. Many alignments of Nebraska standards to the Common Core are strong because the specific Nebraska content is fully addressed within a more expansive Common Core standard. For a variety of reasons, many alignments were rated as partial. In most cases, alignments were rated as partial because the standards in each document differed in their emphasis and phrasing and specificity. For example, Nebraska indicators emphasize commonly used fractions, while Common Core standards emphasize understanding equivalence in terms of rate reasoning and differing notations. In a few other cases, the Nebraska indicator was more specific, and so it was unclear whether students must address the same details within the Common Core. For example, the Nebraska indicators specify answering questions from tables, bar graphs, and line plots. In regards to rigor, the Nebraska standards were found to require some expectations at an earlier grade level than the Common Core standards, and some of the Common Core standards were found to require some expectations at an earlier grade level than the Nebraska standards. Some of the Nebraska indicators are equivalent, in terms of grade level expectation, to those of the Common Core standards. Overall, grade level expectations differed by one or two grades. However, there was one Nebraska indicator expectation related to building or sketching a geometric model to solve a problem aligned to a high school Common Core standard.

Of the 51 indicators in the Nebraska Mathematics Standards for 5th grade, 48 are addressed and only 3 are not addressed by the Common Core State Standards. Of those addressed, 29 are strong alignments, 17 are partial alignments, and 2 are weak alignments.

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
Grade 5				
MA 5.1 Students will communicate number sense concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.				
MA 5.1.1 Number System: Students will represent and show relationships among positive rational numbers.				
5.1.1.a	Demonstrate multiple equivalent representations for whole numbers and decimals through the thousandths place (e.g., 3.125 is $3 + .1 + .02 + .005$)	Strong		5.NBT.3 Understand the place value system. Read, write, and compare decimals to thousandths. a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (1/10) + 9 \times (1/100) + 2 \times (1/1000)$.
5.1.1.b	Compare and order whole numbers, fractions, and decimals through the thousandths place	Strong		5.NBT.3 b Compare two decimals to thousandths based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons.
			CC	NE content is in grade 5; CC content is in grade 3. 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.

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Nebraska Mathematics Standards		Content Alignment	More Rigor*	Comments	Common Core Standards	
5.1.1.c	Identify and name fractions in their simplest form and find common denominators for fractions	Partial (emphasis and phrasing)	CC	NE emphasizes identifying and naming fractions, while CC emphasizes comparing fractions. NE content is in grade 5; CC content is in grade 4.	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 $\frac{1}{2}$. 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.
			CC	NE content is in grade 5; CC content is in grade 3.	3.NF.1	Develop understanding of fractions as numbers. Understand a fraction $\frac{1}{b}$ as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction $\frac{a}{b}$ as the quantity formed by a parts of size $\frac{1}{b}$.
5.1.1.d	Recognize and generate equivalent forms of commonly used fractions, decimals, and percents (e.g., one third, one fourth, one half, two thirds, three fourths)	Partial (emphasis and phrasing)	NE	NE emphasizes commonly used fractions, while CC emphasizes understanding equivalence in terms of rate reasoning and differing notations. NE content is in grade 5; CC content is in grade 6.	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. c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means $\frac{30}{100}$ times the quantity); solve problems involving finding the whole, given a part and

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
		CC	NE content is in grade 5; CC content is in grade 4.	4.NF.6 the percent. Understand decimal notation for fractions, and compare decimal fractions. Use decimal notation for fractions with denominators 10 or 100. <i>For example, rewrite 0.62 as 62/100 ; describe a length as 0.62 meters; locate 0.62 on a number line diagram.</i>	
5.1.1.e	Classify a number as prime or composite	Strong	CC	NE content is in grade 5; CC content is in grade 4.	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
5.1.1.f	Identify factors and multiples of any whole number	Strong	CC	NE content is in grade 5; CC content is in grade 4.	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
5.1.1.g	Round whole numbers and decimals to any given place	Strong			5.NBT.4 Understand the place value system. Use place value understanding to

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
				round decimals to any place.	
MA 5.1.2 Operations: Students will demonstrate the meaning of arithmetic operations with whole numbers.					
5.1.2.a	Use words and symbols to explain the meaning of the identity properties for addition and multiplication	Weak	CC	NE emphasizes using words and symbols to explain the identity properties for addition and multiplication, while CC emphasizes using strategies based on place value and the properties of operations. NE content is grade 5; CC content is in grade 4.	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.
5.1.2.b	Use words and symbols to explain the meaning of the commutative and associative properties of addition and multiplication	Partial (emphasis and phrasing)	CC	Content is similar, with some differences in emphasis and phrasing. NE content is in grade 5; CC content is in grade 1 and 3.	<p>3.OA.5 Apply properties of operations as strategies to multiply and divide. Examples: If $6 \times 4 = 24$ is known, then $4 \times 6 = 24$ is also known. (Commutative property of multiplication.) $3 \times 5 \times 2$ can be found by $3 \times 5 = 15$ then $15 \times 2 = 30$, or by $5 \times 2 = 10$ then $3 \times 10 = 30$. (Associative property of multiplication.) Knowing that $8 \times 5 = 40$ and $8 \times 2 = 16$, one can find 8×7 as $8 \times (5 + 2) = (8 \times 5) + (8 \times 2) = 40 + 16 = 56$. (Distributive property.)</p> <p>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</p>

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
				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.)	
5.1.2.c	Use words and symbols to explain the distributive property of multiplication over addition (e.g., $5(y + 2) = 5y + 5 \times 2$)	Partial (emphasis and phrasing)	CC	Content is similar, with some differences in emphasis and phrasing. NE content is in grade 5; CC content is in grades 1 and 3.	<p>3.OA.5 Apply properties of operations as strategies to multiply and divide. Examples: If $6 \times 4 = 24$ is known, then $4 \times 6 = 24$ is also known. (Commutative property of multiplication.) $3 \times 5 \times 2$ can be found by $3 \times 5 = 15$ then $15 \times 2 = 30$, or by $5 \times 2 = 10$ then $3 \times 10 = 30$. (Associative property of multiplication.) Knowing that $8 \times 5 = 40$ and $8 \times 2 = 16$, one can find 8×7 as $8 \times (5 + 2) = (8 \times 5) + (8 \times 2) = 40 + 16 = 56$. (Distributive property.)</p> <p>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.)</p>
MA 5.1.3 Computation: Students will compute fluently and accurately using appropriate strategies and tools.					
5.1.3.a	Add and subtract positive rational numbers (e.g., proper	Strong		5.NBT.7 Add, subtract, multiply, and divide decimals to hundredths, using	

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
and improper fractions, mixed numbers, fractions with common and uncommon denominators, decimals through the thousandths place)				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.	
				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, $\frac{2}{3} + \frac{5}{4} = \frac{8}{12} + \frac{15}{12} = \frac{23}{12}$. (In general, $\frac{a}{b} + \frac{c}{d} = \frac{ad + bc}{bd}$.)	
				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.	
5.1.3.b	Select, apply and explain the appropriate method of computation when problem solving (e.g., models, mental computation, paper-pencil, technology)	Partial (emphasis and phrasing)	NE	Content is similar, with some differences in emphasis and phrasing. NE content is in grade 5; CC content is in grade 6.	MP.5 Use appropriate tools strategically. [A more detailed description of this mathematical practice standard is given in the CCSS Introduction]
				6.NS.3 Compute fluently with multi-digit numbers and find common factors	

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				and multiples. Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
5.1.3.c	Multiply decimals	Strong		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.
5.1.3.d	Divide a decimal by a whole number	Partial (specificity)	NE	NE specifies dividing decimals by whole numbers. NE content is in grade 5; CC content is in grade 6.
				6.NS.3 Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
				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.
MA 5.1.4 Estimation: Students will estimate and check reasonableness of answers using appropriate strategies and tools.				
5.1.4.a	Estimate the sums and differences of positive rational numbers to check the	Partial (specificity)	NE specifies sums and differences of positive rational numbers.	5.NF.2 Solve word problems involving addition and subtraction of fractions referring to the same

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
	reasonableness of such results			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 $3/7 < 1/2$.
MA 5.2 Students will communicate geometric concepts and measurement concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.				
MA 5.2.1 Characteristics: Students will describe relationships among two-dimensional shapes and three-dimensional objects.				
5.2.1.a	Identify the number of edges, faces, and vertices of triangular and rectangular prisms	Weak	NE	NE emphasizes identifying the number of edges, faces, and vertices of prisms, while CC emphasizes finding the volume and drawing geometric shapes. CC implies identifying the number of edges. NE content is in grade 5; CC is in grade 6 and 7.
				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.
				7.G.2 Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
				<p>triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.</p> <p>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.</p>	
5.2.1.b	Justify congruence of two-dimensional shapes	Partial (knowledge type)	NE	The NE content emphasizes the skill, while the CC content emphasizes the concept. NE content is in grade 5; CC is in grade 8.	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.
5.2.1.c	Justify the classification of two-dimensional shapes (e.g., triangles by angles and sides)	Strong		CC content is in grade 4, but is less difficult. Justifying a classification is more rigorous than performing a classification.	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.
5.2.1.d	Identify degrees on a circle (e.g., 45, 90, 180, 270, 360)	Strong	CC	NE content is in grade 5; CC content is in grade 4.	4.MD.5 Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				<p>of angle measurement:</p> <p>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.</p> <p>b. An angle that turns through n one-degree angles is said to have an angle measure of n degrees.</p>
MA 5.2.2 Coordinate Geometry: Students will identify locations using coordinate geometry.				
5.2.2.a	Plot the location of an ordered pair in the first quadrant	Strong		<p>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</p>

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
				and x-coordinate, y-axis and y-coordinate).	
MA 5.2.3 Transformations: Students will identify and use simple transformations.					
5.2.3.a	Perform one-step transformations on two dimensional shapes (e.g., translation, rotation, reflection, of 90, 180, and 270)	Strong	NE	NE content is in grade 5; CC content is in grade 8.	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.
MA 5.2.4 Spatial Modeling: Students will create and use geometric models to solve problems.					
5.2.4.a	Build or sketch a geometric model to solve a problem	Strong		NE emphasizes building or sketching geometric models, while CC emphasizes relating volume to multiplication and addition.	MP.4 Model with mathematics. [A more detailed description of this Mathematical Practice standard is given in the CCSS Introduction]
			NE	NE content is in grade 5; CC content is in high school.	HS.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).
					5.MD.5 Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.

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Nebraska Mathematics Standards		Content Alignment	More Rigor*	Comments	Common Core Standards	
5.2.4.b	Sketch congruent shapes	Not addressed				
5.2.4.c	Build rectangular prisms using cubes	Strong	CC	NE content is in grade 5; CC content is in grade 1.	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
MA 5.2.5 Measurement: Students will apply appropriate procedures and tools to determine measurements using customary and metric units.						
5.2.5.a	Select and use appropriate tools to measure perimeter and angles	Strong	CC	NE content is in grade 5; CC content is in grade 4.	4.MD.6	Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.
			CC	NE content is in grade 5; CC content is in grade 3.	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.
			CC	NE content is in grade 5; CC content is in grade 3.	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

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
				scale is marked off in appropriate units—whole numbers, halves, or quarters.	
5.2.5.b	Identify correct unit (customary or metric) to the measurement situation (e.g., distance from home to school; measure length of a room)	Strong	CC	NE content is in grade 5; CC content is in grade 3.	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.
5.2.5.c	Estimate and measure length with customary units to the nearest $\frac{1}{4}$ inch	Strong	CC	NE content is in grade 5; CC content is in grade 3.	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.
5.2.5.d	Measure capacity/volume with customary units	Strong			5.MD.4 Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.
5.2.5.e	Measure weight (mass) and temperature using metric units	Partial (scope)	CC	NE includes measuring temperature. NE content is in grade 5; CC content is in grade 3.	3.MD.2 Measure and estimate liquid volumes and masses of objects using standard units of grams (g),

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				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.
5.2.5.f	Determine the area of rectangles and squares	Strong	CC	NE content is in grade 5; CC content is in grade 3.
				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.
				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.

MA 5.3 Students will communicate algebraic concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
MA 5.3.1 Relationships: Students will represent, analyze, and generalize relationships.					
5.3.1.a	Describe, extend, apply rules, and make generalizations about numeric, and geometric patterns	Partial (emphasis and phrasing)	CC	Content is similar, with some differences in emphasis and phrasing. NE content is in grade 5; CC content is in grade 4.	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.
5.3.1.b	Create and analyze numeric patterns using words, tables, and graphs	Strong			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.

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Nebraska Mathematics Standards		Content Alignment	More Rigor*	Comments	Common Core Standards
5.3.1.c	Communicate relationships using expressions and equations	Strong			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 $2 \times (8 + 7)$. Recognize that $3 \times (18932 + 921)$ is three times as large as $18932 + 921$, without having to calculate the indicated sum or product.
MA 5.3.2 Modeling in Context: Students will create, use, and compare models representing mathematical situations.					
5.3.2.a	Model situations that involve the addition, subtraction, and multiplication of positive rational numbers using words, graphs, and tables	Partial (specificity)		NE specifies using graphs and tables.	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 $3/7 < 1/2$. 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.

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Nebraska Mathematics Standards		Content Alignment	More Rigor*	Comments	Common Core Standards
5.3.2.b	Represent a variety of quantitative relationships using tables and graphs	Strong			<p>5.OA.3 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.</p> <p>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),</p>

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Nebraska Mathematics Standards		Content Alignment	More Rigor*	Comments	Common Core Standards	
5.3.2.c	Compare different models to represent mathematical situations	Partial (emphasis and phrasing)		Content is similar, with some differences in emphasis and phrasing.	MP.4	Model with mathematics. [A more detailed description of this Mathematical Practice standard is given in the CCSS Introduction]
					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.
MA 5.3.3 Procedures: Students will apply properties of simple positive rational numbers to solve one-step equations.						
5.3.3.a	Explain the addition property of equality (e.g., if $a = b$, then $a + c = b + c$)	Not addressed		CC refers to the properties of equality, including the addition property, both in the introduction to the 8 th grade and the introduction to HS Algebra, and has a table of them in the glossary, but never implicitly or explicitly in the standards themselves.		
5.3.3.b	Use symbolic representations of the associative property (e.g., $(2 + 3) + 4 = 2 + (3 + n)$, $(2 * 3) * 4 = 2 * (3 * n)$)	Strong	CC	NE content is in grade 5; CC content is in grade 3.	3.OA.5	Apply properties of operations as strategies to multiply and divide. Examples: If $6 \times 4 = 24$ is known, then $4 \times 6 = 24$ is also known. (Commutative property of multiplication.) $3 \times 5 \times 2$ can be found by $3 \times 5 = 15$ then $15 \times 2 = 30$, or by $5 \times 2 = 10$ then $3 \times 10 = 30$. (Associative property of multiplication.) Knowing that $8 \times 5 = 40$ and $8 \times 2 = 16$, one can find 8×7 as $8 \times (5 + 2) = (8 \times 5) + (8 \times 2) = 40 + 16 = 56$.

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				(Distributive property.)
5.3.3.c	Evaluate numerical expressions by using parentheses with respect to order of operations (e.g., $6 + (3 * 5)$)	Strong		5.OA.1 Write and interpret numerical expressions. Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.
5.3.3.d	Evaluate simple algebraic expressions involving addition and subtraction	Strong	NE	NE content is in grade 5; CC content is in grade 6 and 7.
				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 $\frac{1}{10}$ of her salary an hour, or \$2.50, for a new salary of \$27.50. If you want to place a towel bar $9\frac{3}{4}$ inches long in the center of a door that is $27\frac{1}{2}$ 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.
				6.EE.2 Apply and extend previous

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards		
5.3.3.e	Solve one-step addition and subtraction equations involving common positive rational numbers	Strong	NE	NE content is in grade 5; CC content is in grade 7.	7.EE.3	understandings of arithmetic to algebraic expressions. Write, read, and evaluate expressions in which letters stand for numbers. 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.
5.3.3.f	Identify and explain the properties of equality used in solving one-step equations involving common positive	Not addressed		CC refers to the properties of equality, both in the introduction to the 8 th grade and the introduction to HS Algebra, and has a table of them in		

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
rational numbers			the glossary, but never implicitly or explicitly in the standards themselves.		
MA 5.4 Students will communicate data analysis/probability concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.					
MA 5.4.1 Display and Analysis: Students will organize, display, compare, and interpret data.					
5.4.1.a	Represent data using line plots	Strong	CC	NE content is in grade 5; CC content is in grade 4.	4.MD.4 Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). 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.
5.4.1.b	Represent the same set of data in different formats (e.g., table, pictographs, bar graphs, line plots)	Partial (implied)	NE	CC implies representing the same set of data. NE content is in grade 5; CC content is in grade 7.	7.RP.2b Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. 5.MD.2 Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). 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

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
				each beaker would contain if the total amount in all the beakers were redistributed equally.	
5.4.1.c	Draw conclusions based on a set of data	Strong	NE	NE content is in grade 5; CC content is in grade 7.	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.
5.4.1.d	Find the mean, median, mode, and range for a set of whole numbers	Partial (scope)	NE	NE includes mode. CC implies finding the range. NE content is in grade 5; CC content is in grade 6.	6.SP.5 Summarize numerical data sets in relation to their context, such as by: <ul style="list-style-type: none"> 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),

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
				<p>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.</p> <p>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.</p>	
5.4.1.e	Generate questions and answers from data sets and their graphical representations	Partial (implied)	NE	CC implies generating questions and answers from data sets. NE content is in grade 5; CC content is in grade 7.	7.SP.1 Use random sampling to draw inferences about a population. 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.
MA 5.4.2 Predictions and Inferences: Students will construct predictions based on data.					
5.4.2.a	Make predictions based on data to answer questions from tables, bar graphs, and line plots	Partial (specificity)	NE	NE specifies answering questions from tables, bar graphs, and line plots. NE content is in grade 5; CC content is in grade 7.	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

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
				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.	
MA 5.4.3 Probability: Students will determine theoretical probabilities.					
5.4.3.a	Perform and record results of probability experiments	Partial (emphasis and phrasing)	NE	Content is similar, with some differences in emphasis and phrasing. NE content is in grade 5; CC content is in grade 7.	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. b. 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?
5.4.3.b	Generate a list of possible outcomes for a simple event	Strong	NE	NE content is in grade 5; CC content is in grade 7.	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

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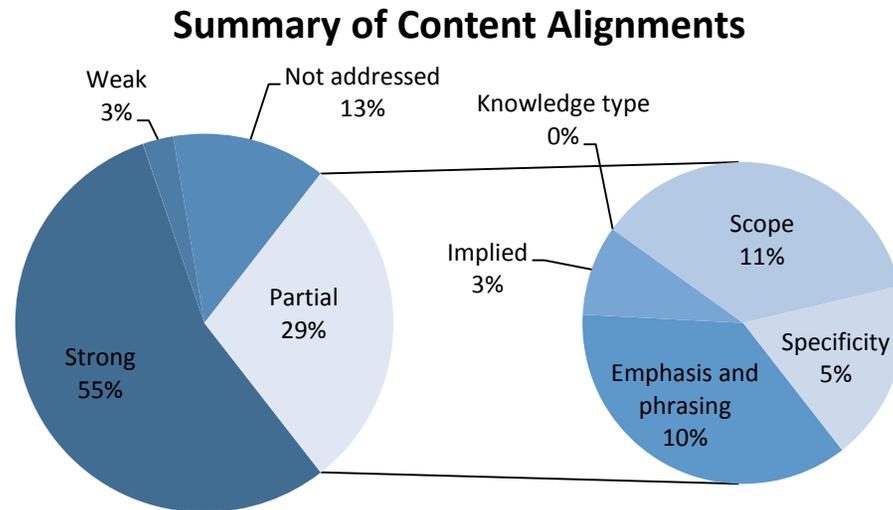
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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards		
				(e.g., “rolling double sixes”), identify the outcomes in the sample space which compose the event.		
5.4.3.c	Explain that the likelihood of an event that can be represented by a number from 0 (impossible) to 1 (certain)	Strong	NE	NE content is in grade 5; CC content is in grade 7.	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.

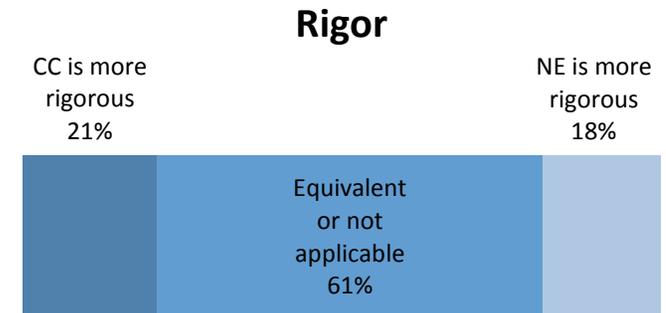
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Grade 6: How Nebraska Content is addressed in the Common Core standards

How well Nebraska mathematics content is addressed in the Common Core standards at this grade is summarized in two categories, content alignment and rigor. The findings are depicted in the graphs below. **Content alignment** characterizes the nature of the content match between the Common Core and Nebraska standards. A *Strong* match indicates Common Core fully addresses the content of the Nebraska indicator. A *Partial* match is assigned when the Nebraska indicator either does not offer the same level of *Specificity* as the Common Core content, does not cover the complete *Scope* of the Common Core, differs importantly in its *Emphasis and Phrasing*, provides only an *Implied* coverage of the content, or focuses on a different *Knowledge type*, specifically, that Nebraska addresses a skill where Common Core addresses the related concept. If more than one of the issues just described characterizes the coverage of Common Core content by Nebraska, the alignment is identified as *Weak*. Finally, if the content in Nebraska is not found in the Common Core, it is marked as *Not Addressed*. The standards were also compared to identify relative **Rigor**. A indicator was counted more rigorous over the other when higher demands are made of students, either because mastery of content is expected at an earlier grade, or the expectations regarding the content are significantly more challenging, or both.



A summary of how well Common Core addressed content found in the Nebraska standards. See above for a discussion about the alignment categories.



Content in the documents was compared for the relative demands placed on students. The graph displays the percentage of indicators that were more rigorous, by document. A significant percentage of the content was either equivalent in rigor between the two standards, or could not be rated for rigor, including when content was not addressed by either documents or when differences between the content made rigor comparisons invalid. See discussion above for more information.

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Grade 6 Overview

Very few topics in the Nebraska Mathematics Standards are not addressed or weakly addressed by the Common Core Standards for Mathematics. The topics found to be missing in the Common Core are related to the properties of equality, classifying three-dimensional objects, classifying numbers, and measuring to the nearest $\frac{1}{16}$ of an inch and millimeter. Many alignments of Nebraska standards to the Common Core are strong because the specific Nebraska content is fully addressed within a more expansive Common Core standard. A large number of partial alignments are due to scope, when the Common Core standards include some but not all of the content found in the Nebraska standards. Examples of scope differences include instances in which the Nebraska standards address specific aspects of statistical concepts, such as finding the mode of a set of data, or creating stem and leaf plots, which were not found in the Common Core. In some other cases, alignments were rated as partial because the standards in each document differ in their emphasis and phrasing. For example, Nebraska emphasizes prime factorization of numbers, while the Common Core emphasizes finding the greatest common factor and the least common multiple of numbers. In a few other cases, the Nebraska indicator was more specific, and so it was unclear whether students must address the same details within the Common Core. In regards to rigor, the majority of the Nebraska standards were found to be at the same level of rigor as the Common Core standards. A few expectations were found to be required at an earlier grade level in the Nebraska standards, and approximately the same amount were found to be required at an earlier grade in the Common Core standards. In a few cases, differences in rigor were found with for one specific aspect of a standard, while other aspects of the standard were found to be at the same level of rigor. For example, showing equivalence among common fractions, decimals, and percents is aligned to both a grade 6 standard and a grade 4 standard, as the Common Core standards include finding percents at grade 6, but include fraction/decimal equivalence at grade 4. In the majority of cases of grade discrepancy, the difference is only one grade (e.g., Nebraska content is in grade 6; Common Core content is in grade 7). Very few topics were found two or more grades apart, and they were specific aspects of topics also found at the same grade level, as previously described.

Of the 38 indicators in the Nebraska Mathematics Standards for 6th grade, 33 are addressed and 5 are not addressed by the Common Core State Standards. Of those addressed, 21 are strong alignments, 11 are partial alignments, and 1 is a weak alignment.

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
Grade 6				
MA 6.I Students will communicate number sense concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.				
MA 6.I.1 Number System: Students will represent and show relationships among positive rational numbers and integers.				
6.1.1.a	Show equivalence among common fractions, decimals and percents	Partial (emphasis and phrasing)	NE emphasizes showing equivalence and common fractions, while CC emphasizes using ratio reasoning.	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. c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.
		CC	NE content is in grade 6; CC content is in grade 4.	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.
6.1.1.b	Compare and order positive and negative integers	Strong		6.NS.7 Understand ordering and absolute value of rational numbers. a. 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

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				<p>statement that -3 is located to the right of -7 on a number line oriented from left to right.</p> <p>b. Write, interpret, and explain statements of order for rational numbers in real-world contexts. <i>For example, write $-3^{\circ}C > -7^{\circ}C$ to express the fact that $-3^{\circ}C$ is warmer than $-7^{\circ}C$.</i></p> <p>c. 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. <i>For example, for an account balance of -30 dollars, write $-30 = 30$ to describe the size of the debt in dollars.</i></p> <p>d. 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.</p>
6.1.1.c	Identify integers less than 0 on a number line	Strong		<p>6.NS.7 Understand ordering and absolute value of rational numbers.</p> <p>a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. For</p>

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
				<p>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.</p> <p>c. 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. <i>For example, for an account balance of -30 dollars, write $-30 = 30$ to describe the size of the debt in dollars.</i></p>	
6.1.1.d	Represent large numbers using exponential notation (e.g., $1,000 = 10^3$)	Partial (emphasis and phrasing)	CC	NE emphasizes representing large numbers, while CC emphasizes understanding powers of tens as part of a pattern. NE content is in grade 6; CC content is in grade 5.	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.
6.1.1.e	Identify the prime factorization of numbers (e.g., $12 = 2 \times 2 \times 3$ or $2^2 \times 3$)	Partial (emphasis and phrasing)		NE emphasizes prime factorization, while CC emphasizes greatest common factors and least common multiples.	6.NS.4 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

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
				with no common factor. <i>For example, express $36 + 8$ as $4(9 + 2)$.</i>	
		CC	NE content is in grade 6; CC content is in grade 4.	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.	
6.1.1.f	Classify numbers as natural, whole, or integer	Not addressed			
MA 6.1.2 Operations: Students will demonstrate the meaning of arithmetic operations with positive fractions and decimals.					
6.1.2.a	Use drawings, words, and symbols to explain the meaning of addition and subtraction of fractions	Strong	CC	NE content is in grade 6; CC content is in grade 5.	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. <i>For example, recognize an incorrect result $2/5 + 1/2 = 3/7$, by observing that $3/7 < 1/2$.</i>
6.1.2.b	Use drawings, words, and symbols to explain the meaning	Strong	CC	NE content is in grade 6; CC content is in grade 5.	5.NBT.7 Add, subtract, multiply, and divide decimals to hundredths, using

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
	of addition and subtraction of decimals			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.
MA 6.1.3 Computation: Students will compute fluently and accurately using appropriate strategies and tools.				
6.1.3.a	Multiply and divide positive rational numbers	Strong		6.NS.3 Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
6.1.3.b	Select and apply the appropriate method of computation when problem solving (e.g., models, mental computation, paper-pencil, technology, divisibility rules)	Strong		MP.5 Use appropriate tools strategically. [A more detailed description of this mathematical practice standard is given in the CCSS Introduction]
MA 6.1.4 Estimation: Students will estimate and check reasonableness of answers using appropriate strategies and tools.				
6.1.4.a	Use appropriate estimation methods to check the reasonableness of solutions for problems involving positive rational numbers	Strong	NE	NE content is in grade 6; CC content is in grade 7. 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 to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. <i>For example: If</i>

* Rigor: CC: Common Core standards are more rigorous; NE: Nebraska Mathematics Standards are more rigorous

Mathematics Alignment Study

Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				<i>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.</i>
MA 6.2 Students will communicate geometric concepts and measurement concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.				
MA 6.2.1 Characteristics: Students will compare and contrast properties among two-dimensional shapes and among three-dimensional objects.				
6.2.1.a	Justify the classification of three dimensional objects	Not addressed		
MA 6.2.2 Coordinate Geometry: Students will label points using coordinate geometry.				
6.2.2.a	Identify the ordered pair of a plotted point in the coordinate plane	Partial (specificity)	NE specifies ordered pairs of a plotted point.	6.NS.6 Apply and extend previous understandings of numbers to the system of rational numbers. 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.
MA 6.2.3 Transformations: Students will use and describe results of transformations on geometric shapes.				
6.2.3.a	Perform and describe positions and orientation of shapes under	Partial (emphasis and	NE emphasizes transformations not on a coordinate plane, while CC	8.G.3 Describe the effect of dilations, translations, rotations, and

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards		
single transformations (translation, rotation, reflection) not on a coordinate plane	phrasing)		emphasizes transformations on a coordinate plane. CC content is in grade 8, but is more difficult.	reflections on two-dimensional figures using coordinates.		
MA 6.2.4 Spatial Modeling: Students will use visualization of geometric models to solve problems.						
6.2.4.a	Identify two-dimensional drawings of three-dimensional objects	Strong		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.	
			CC	NE content is in grade 6; CC content is in kindergarten.	K.G.3	Identify shapes as two-dimensional (lying in a plane, “flat”) or three-dimensional (“solid”).
MA 6.2.5 Measurement: Students will apply appropriate procedures, tools, and formulas to determine measurements.						
6.2.5.a	Estimate and measure length with customary and metric units to the nearest 1/16 inch and mm	Not addressed				
6.2.5.b	Measure volume/capacity using the metric system	Strong	CC	NE content is in grade 6; CC content is in grade 5.	5.MD.4	Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.
6.2.5.c	Convert length, weight (mass), and liquid capacity from one unit to another within the same system	Partial (specificity)		NE specifies length, weight, and liquid capacity units.	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. d. Use ratio reasoning to convert

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.
6.2.5.d	Determine the perimeter of polygons	Partial (scope)	CC content is in grade 4, but is less difficult. NE includes all polygons, while CC requires only rectangles.	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.
6.2.5.e	Determine the area of parallelograms and triangles	Strong		6.G.1 Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.
6.2.5.f	Determine the volume of rectangular prisms	Strong		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 $V = lwh$ and $V = bh$ to find volumes of right rectangular prisms with fractional

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				edge lengths in the context of solving real-world and mathematical problems.
MA 6.3 Students will communicate algebraic concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.				
MA 6.3.1 Relationships: Students will represent, analyze, and use relationships to make generalizations.				
6.3.1.a	Describe and create simple algebraic expressions (e.g., one operation, one variable) from words and tables	Strong		<p>6.EE.2 Write, read, and evaluate expressions in which letters stand for numbers.</p> <p style="padding-left: 20px;">a. Write expressions that record operations with numbers and with letters standing for numbers. <i>For example, express the calculation “Subtract y from 5” as $5 - y$.</i></p> <p>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.</p> <p>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</p>

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Mathematics Alignment Study

Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
				the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. <i>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.</i>	
6.3.1.b	Use a variable to describe a situation with an equation (e.g., one-step, one variable)	Strong		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. <i>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.</i>	
6.3.1.c	Identify relationships as increasing, decreasing, or constant	Partial (implied)	NE	CC implies content related to identifying how a relationship is changing. NE content is in grade 6; CC content is in grade 7.	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. <i>For</i>

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				<p><i>example, $a + 0.05a = 1.05a$ means that “increase by 5%” is the same as “multiply by 1.05.”</i></p>
				<p>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. <i>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.</i></p>
MA 6.3.2 Modeling in Context: Students will create, use, and interpret models of quantitative relationships.				
6.3.2.a	Model contextualized problems using various representations (e.g., graphs, tables)	Strong		<p>MP.4 Model with mathematics. [A more detailed description of this Mathematical Practice standard is given in the CCSS Introduction]</p> <p>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</p>

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				<p>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.</p> <p><i>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.</i></p>
6.3.2.b	Represent a variety of quantitative relationships using symbols and words	Strong		<p>6.EE.7 Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q and x are all nonnegative rational numbers.</p> <p>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.</p> <p><i>For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and</i></p>

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Mathematics Alignment Study

Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				<i>write the equation $d = 65t$ to represent the relationship between distance and time.</i>
MA 6.3.3 Procedures: Students will apply properties to solve equations.				
6.3.3.a	Explain the multiplication property of equality (e.g., if $a = b$, then $ac = bc$)	Not addressed	CC refers to the properties of equality, including the multiplication property of equality, both in the introduction to the 8 th grade and the introduction to HS Algebra, and has a table of them in the glossary, but never implicitly or explicitly in the standards themselves.	
6.3.3.b	Evaluate numerical expressions containing multiple operations with respect to order of operations (e.g., $2 + 4 \times 5$)	Strong		<p>6.EE.2 Write, read, and evaluate expressions in which letters stand for numbers.</p> <p>c. Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used 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). <i>For example, use the formulas $V = s^3$ and $A = 6s^2$ to find the volume and surface area of a cube with sides of length $s = 1/2$.</i></p>
			CC NE content is in grade 6; CC content	3.OA.8 Solve two-step word problems using the four operations.

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
			is in grade 3.	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. [Note: 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)].
6.3.3.c	Evaluate simple algebraic expressions involving multiplication and division	Strong		<p>6.EE.2 Write, read, and evaluate expressions in which letters stand for numbers.</p> <p>b. 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. <i>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.</i></p> <p>c. Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic</p>

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				operations, including those involving whole number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). <i>For example, use the formulas $V = s^3$ and $A = 6s^2$ to find the volume and surface area of a cube with sides of length $s = 1/2$.</i>
				6.EE.7 Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q and x are all nonnegative rational numbers.
6.3.3.d	Solve one-step equations involving positive rational numbers	Strong		6.EE.7 Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q and x are all nonnegative rational numbers.
6.3.3.e	Identify and explain the properties of equality used in solving one-step equations (e.g., addition, subtraction, division)	Not addressed	CC refers to the properties of equality both in the introduction to the 8 th grade and the introduction to HS Algebra, and has a table of them in the glossary, but never implicitly or explicitly in the standards themselves.	

MA 6.4 Students will communicate data analysis/probability concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
MA 6.4.1 Display and Analysis: Students will organize, display, compare, and interpret data.				
6.4.1.a	Represent data using stem and leaf plots, histograms, and frequency charts	Partial (scope)	NE includes stem and leaf plots.	6.SP.4 Display numerical data in plots on a number line, including dot plots, histograms, and box plots.
6.4.1.b	Compare and interpret data sets and their graphical representations	Strong		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. 6.SP.5 Summarize numerical data sets in relation to their context, such as by: <ul style="list-style-type: none"> 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 were gathered. d. Relating the choice of measures of center and variability to the shape of the data distribution and

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				the context in which the data were gathered.
6.4.1.c	Find the mean, median, mode, and range for a set of data	Partial (scope)	NE includes mode.	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 were 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 were gathered.
6.4.1.d	Compare the mean, median, mode, and range from two sets of data	Strong	NE	NE content is in grade 6; CC content is in grade 7. 7.SP.4 Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
<i>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.</i>					
MA 6.4.2 Predictions and Inferences: Students will construct predictions based on data.					
6.4.2.a	Make predictions based on data and create questions to further investigate the quality of the predictions	Partial (scope)	NE	NE includes creating questions to further investigate the quality of the predictions. NE content is in grade 6; CC content is in grade 7.	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. <i>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.</i>
MA 6.4.3 Probability: Students will apply basic concepts of probability.					
6.4.3.a	Describe the theoretical probability of an event using a fraction, percentage, decimal, or ratio	Weak	NE	NE includes the use of decimals and ratios to describe the theoretical probability of an event. CC implies the use of percentages to describe the theoretical probability of an event. NE content is in grade 6; CC content is in grade 7.	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.

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
				7.SP.8 Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation. c. Design and use a simulation to generate frequencies for compound events. For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood?	
6.4.3.b	Compute theoretical probabilities for independent events	Strong	NE	NE content is in grade 6; CC content is in grade 7.	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. a. Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. <i>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.</i>
6.4.3.c	Find experimental probability for independent events	Strong	NE	NE content is in grade 6; CC content is in grade 7.	7.SP.6 Approximate the probability of a chance event by collecting data on

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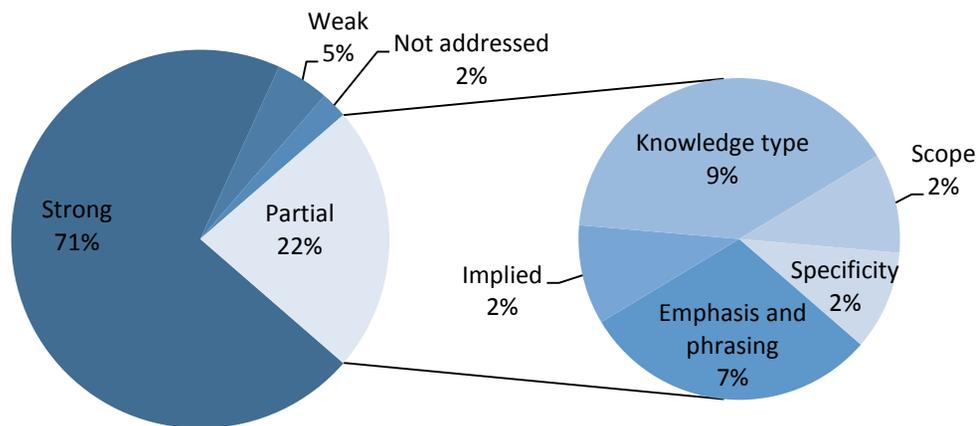
Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. <i>For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.</i>

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Grade 7: How Nebraska Content is addressed in the Common Core standards

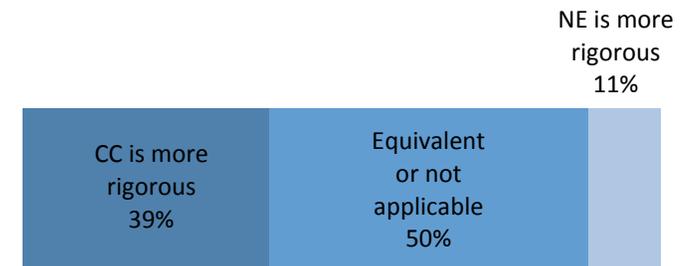
How well Nebraska mathematics content is addressed in the Common Core standards at this grade is summarized in two categories, content alignment and rigor. The findings are depicted in the graphs below. **Content alignment** characterizes the nature of the content match between the Common Core and Nebraska standards. A *Strong* match indicates Common Core fully addresses the content of the Nebraska indicator. A *Partial* match is assigned when the Nebraska indicator either does not offer the same level of *Specificity* as the Common Core content, does not cover the complete *Scope* of the Common Core, differs importantly in its *Emphasis and Phrasing*, provides only an *Implied* coverage of the content, or focuses on a different *Knowledge type*, specifically, that Nebraska addresses a skill where Common Core addresses the related concept. If more than one of the issues just described characterizes the coverage of Common Core content by Nebraska, the alignment is identified as *Weak*. Finally, if the content in Nebraska is not found in the Common Core, it is marked as *Not Addressed*. The standards were also compared to identify relative **Rigor**. A indicator was counted more rigorous over the other when higher demands are made of students, either because mastery of content is expected at an earlier grade, or the expectations regarding the content are significantly more challenging, or both.

Summary of Content Alignments



A summary of how well Common Core addressed content found in the Nebraska standards. See above for a discussion about the alignment categories.

Rigor



Content in the documents was compared for the relative demands placed on students. The graph displays the percentage of indicators that were more rigorous, by document. A significant percentage of the content was either equivalent in rigor between the two standards, or could not be rated for rigor, including when content was not addressed by either documents or when differences between the content made rigor comparisons invalid. See discussion above for more information.

Mathematics Alignment Study

Grade 7 Overview

Only one topic in the Nebraska Mathematics Standards is not also addressed or weakly addressed by the Common Core Standards for Mathematics. The topic found to be missing in the Common Core is the classification of numbers as natural, whole, integer, or rational. Many alignments of Nebraska standards to the Common Core are strong because the specific Nebraska content is fully addressed within a more expansive Common Core standard. For example, one Nebraska standard asks students to represent large numbers using scientific notation. This is a small aspect of the Common Core standard asking students to use scientific notation to estimate and to express how many times larger one quantity is from another. For a variety of reasons, many alignments were rated as partial. In a majority of cases, alignments were rated as partial because the standards in each document differ in their knowledge type. For example, Nebraska standards describe that students understand the properties used in solving two-step equations, while Common Core states that students apply those properties as strategies while working with expressions and equations. Similarly, in a few other cases, the standards in each document differ in their emphasis and phrasing. For example, while both documents address the distributive property, Nebraska emphasizes the symbolic representation of it, and the Common Core emphasizes the application of it. In regards to rigor, the Nebraska standards were found to require a few expectations at an earlier grade level than the Common Core standards, while the Common Core standards tended to place skills in earlier grades or at the same grade more often. The majority of standards were within one grade of each other (e.g., Nebraska content is in grade 7; Common Core content is in grade 6). Very few topics were found two or more grades apart. All of the topics that were found two more grades apart were in earlier Common Core grades. Those topics include the meaning of operations on decimals and fractions, measuring angles, and symmetry.

Of the 44 indicators in the Nebraska Mathematics Standards for 7th grade, 43 are addressed and 1 is not addressed by the Common Core State Standards. Of those addressed, 31 are strong alignments, 10 are partial alignments, and 2 are weak alignments.

Mathematics Alignment Study

Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
Grade 7				
MA 7.1 Students will communicate number sense concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.				
MA 7.1.1 Number System: Students will represent and show relationships among rational numbers.				
7.1.1.a	Show equivalence among fractions, decimals, and percents	Strong		<p>7.NS.2 Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.</p> <p>d. Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.</p> <p>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</p>

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
				<p>salary of \$27.50. If you want to place a towel bar $9\frac{3}{4}$ inches long in the center of a door that is 27 $\frac{1}{2}$ 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.</p>	
		CC	NE content is in grade 7; CC content is in grade 6.	<p>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.</p> <p>c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means $30/100$ times the quantity); solve problems involving finding the whole, given a part and the percent.</p>	
7.1.1.b	Compare and order rational numbers (e.g., fractions, decimals, percents)	Partial (knowledge type)	CC	NE content emphasizes the skill while CC content emphasizes the concept. NE content is in grade 7; CC content is in grade 6.	6.NS.7 Understand ordering and absolute value of rational numbers.
7.1.1.c	Represent large numbers using scientific notation	Strong	NE	NE content is in grade 7; CC content is in grade 8.	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. <i>For example, estimate the population of the United States as 3×10^8 and the</i>

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
				<i>population of the world as 7×10^9, and determine that the world population is more than 20 times larger.</i>	
7.1.1.d	Classify numbers as natural, whole, integer, or rational	Not addressed			
7.1.1.e	Find least common multiple and greatest common divisor given two numbers	Strong	CC	NE content is in grade 7; CC content is in grade 6.	6.NS.4 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 $4(9 + 2)$.
MA 7.1.2 Operations: Students will demonstrate the meaning of arithmetic operations with positive fractions, decimals, and integers.					
7.1.2.a	Use drawings, words, and symbols to explain the meaning of multiplication and division of fractions (e.g., $2/3 \times 6$ as two-thirds of six, or $6 \times 2/3$ as 6 groups of two-thirds, or $6 \div 2/3$ as how many two-thirds there are in six.)	Strong	CC	NE content is in grade 7; CC content is in grade 6.	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. <i>For example, create a story context for $(2/3) \div (3/4)$ and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that $(2/3) \div (3/4) = 8/9$ because $3/4$ of $8/9$ is $2/3$. (In general, $(a/b) \div (c/d) = ad/bc$.) How much chocolate will each person get if 3 people share $1/2$</i>

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
				<p><i>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?</i></p>	
		CC	NE content is in grade 7; CC content is in grade 5.	<p>5.NF.4 Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.</p> <p>a. Interpret the product $(a/b) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$. For example, use a visual fraction model to show $(2/3) \times 4 = 8/3$, and create a story context for this equation. Do the same with $(2/3) \times (4/5) = 8/15$. (In general, $(a/b) \times (c/d) = ac/bd$.)</p> <p>b. 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.</p>	
7.1.2.b	Use drawings, words, and symbols to explain the meaning	Strong	CC	NE content is in grade 7; CC content	5.NBT.7 Add, subtract, multiply, and divide decimals to hundredths, using

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of multiplication and division of decimals			is in grade 5.	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.
7.1.2.c	Use drawings, words, and symbols to explain the addition and subtraction of integers	Strong		<p>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.</p> <p>a. 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.</p> <p>b. Understand $p + q$ as the number located a distance q from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.</p> <p>c. Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$.</p>

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				<p>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.</p> <p>d. Apply properties of operations as strategies to add and subtract rational numbers.</p>
MA 7.1.3 Computation: Students will compute fluently and accurately using appropriate strategies and tools.				
7.1.3.a	Compute accurately with integers	Strong		<p>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.</p> <p>7.NS.2 Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.</p>
7.1.3.b	Select, apply, and explain the method of computation when problem solving using integers and positive rational numbers (e.g., models, mental computation, paper-pencil, technology, divisibility rules)	Strong		<p>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.</p> <p>b. Understand $p + q$ as the number located a distance q from p, in the positive or negative direction</p>

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				<p>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.</p> <p>c. Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.</p> <p>d. Apply properties of operations as strategies to add and subtract rational numbers.</p>
				<p>7.NS.2 Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.</p> <p>a. Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational</p>

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				<p>numbers by describing real-world contexts.</p> <p>b. Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$. Interpret products of rational numbers by describing real-world contexts.</p> <p>c. Apply properties of operations as strategies to multiply and divide rational numbers.</p>
7.1.3.c	Solve problems involving percent of numbers (e.g., percent of, % increase, % decrease)	Strong		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.
MA 7.1.4 Estimation: Students will estimate and check reasonableness of answers using appropriate strategies and tools.				
7.1.4.a	Use estimation methods to check the reasonableness of solutions for problems involving integers and positive rational numbers	Strong		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 to calculate with numbers in any form; convert between forms as

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				appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. <i>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.</i>
MA 7.2 Students will communicate geometric concepts and measurement concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.				
MA 7.2.1 Characteristics: Students will describe, compare, and contrast characteristics, properties, and relationships of geometric shapes and objects.				
7.2.1.a	Identify and describe similarity of two-dimensional shapes using side and angle measurements	Partial (scope)	NE includes using side and angle measurements to identify similarity in all two-dimensional shapes.	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. <i>For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.</i>
7.2.1.b	Name line, line segment, ray, and angle (e.g., \overleftrightarrow{AB} , \overline{PR} <	Partial	CC implies naming the lines, line segments, rays, and angles. NE	4.G.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse),

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LMN)	(implied)		content is in grade 7; CC content is in grade 4.	and perpendicular and parallel lines. Identify these in two-dimensional figures.	
MA 7.2.2 Coordinate Geometry: Students will specify locations and describe relationships using coordinate geometry.					
7.2.2.a	Plot the location of an ordered pair in the coordinate plane	Strong	CC	NE content is in grade 7; CC content is in grade 6.	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.
7.2.2.b	Identify the quadrant of a given point in the coordinate plane	Strong	CC	NE content is in grade 7; CC content is in grade 6.	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. b. 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.
7.2.2.c	Find the distance between points along horizontal and vertical lines of a coordinate plane (e.g., what is the distance	Strong	CC	NE content is in grade 7; CC content is in grade 6.	6.NS.8 Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
	between (0, 3) and (0, 9))			and absolute value to find distances between points with the same first coordinate or the same second coordinate.	
MA 7.2.3 Transformations: Students will use transformations and symmetry to analyze geometric shapes.					
7.2.3.a	Identify lines of symmetry for a reflection	Strong	CC	NE content is in grade 7; CC content is in grade 4.	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.
7.2.3.b	Perform and describe positions and orientation of shapes under a single transformation (e.g., translation, rotation, reflection) on a coordinate plane	Strong	NE	NE content is in grade 7; CC content is in grade 8.	8.G.3 Describe the effect of dilations, translations, rotations and reflections on two-dimensional figures using coordinates.
MA 7.2.4 Spatial Modeling: Students will use visualization to create geometric models in solving problems.					
7.2.4.a	Identify the shapes that make up the three-dimensional object	Weak		Content is similar, with significant differences in emphasis and phrasing.	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.
7.2.4.b	Create two-dimensional representations of three-dimensional objects to visualize and solve problems (e.g., perspective drawing of surface area)	Partial (emphasis and phrasing)		NE emphasizes the creation of representations, while CC emphasizes the use of nets to find surface area. NE content is in grade 7; CC content is in grade 6.	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

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				mathematical problems.
7.2.4.c	Draw angles to given degree	Strong		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.
MA 7.2.5 Measurement: Students will select and apply appropriate procedures, tools, and formulas to determine measurements.				
7.2.5.a	Measure angles to the nearest degree	Strong	CC NE content is in grade 7; CC content is in grade 4.	4.MD.6 Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.
7.2.5.b	Determine the area of trapezoids and circles, and the circumference of circles	Strong		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. 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.
7.2.5.c	Recognize the inverse relationship between the size of a unit and the number of units used when measuring	Weak	CC NE includes the recognition of an inverse relationship. NE content is in grade 7; CC content is in grade 2.	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

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				size of the unit chosen.	
MA 7.3 Students will communicate algebraic concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.					
MA 7.3.1 Relationships: Students will represent and analyze relationships using algebraic symbols.					
7.3.1.a	Describe and create algebraic expressions from words, tables, and graphs	Strong	NE	NE content is in grade 7; CC content is in grade 8.	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. <i>For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.</i>
			NE	NE content is in grade 7; CC content is in grade 8.	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 .
			NE	NE content is in grade 7; CC content is in grade 8.	8.F.2 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). <i>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</i>

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				<i>the greater rate of change.</i>
				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.
				a. Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p , q , and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. <i>For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?</i>
				b. 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. <i>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.</i>
7.3.1.b	Use a variable to describe a situation with an inequality (e.g.,	Strong		7.EE.4 Use variables to represent quantities in a real-world or

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one-step, one variable)				<p>mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.</p> <p>b. 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. <i>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.</i></p>
7.3.1.c	Recognize and generate equivalent forms of simple algebraic expressions	Strong		7.EE.1 Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
			CC NE content is in grade 7; CC content is in grade 6.	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 $3y$.

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		CC	NE content is in grade 7; CC content is in grade 6.	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). <i>For example, the expressions $y + y + y$ and $3y$ are equivalent because they name the same number regardless of which number y stands for.</i>
MA 7.3.2 Modeling in Context: Students will create, use, and interpret models of quantitative relationships.				
7.3.2.a	Model contextualized problems using various representations (e.g., one-step/variable expressions, one-step/variable equations)	Strong		7.NS.3 Solve real-world and mathematical problems involving the four operations with rational numbers. 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 to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. <i>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</i>

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				<i>to place a towel bar $9 \frac{3}{4}$ inches long in the center of a door that is $27 \frac{1}{2}$ 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.</i>
7.3.2.b	Represent a variety of quantitative relationships using algebraic expressions and one-step equations	Strong		<p>7.NS.3 Solve real-world and mathematical problems involving the four operations with rational numbers.</p> <p>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 to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. <i>For example: If a woman making \$25 an hour gets a 10% raise, she will make an additional $\frac{1}{10}$ of her salary an hour, or \$2.50, for a new salary of \$27.50. If you want to place a towel bar $9 \frac{3}{4}$ inches long in the center of a door that is $27 \frac{1}{2}$ 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</i></p>

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<i>computation.</i>				
MA 7.3.3 Procedures: Students will apply properties to solve equations and inequalities.				
7.3.3.a	Explain additive inverse of addition (e.g., $7 + -7 = 0$)	Strong		<p>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.</p> <p>a. 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.</p> <p>b. Understand $p + q$ as the number located a distance q from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.</p> <p>c. Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this</p>

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				principle in real-world contexts.	
7.3.3.b	Use symbolic representation of the distributive property (e.g., $2(x + 3) = 2x + 6$)	Partial (emphasis and phrasing)	CC	NE emphasizes the symbolic representation, while CC emphasizes applying the distributive property as one of the properties of operations to generate equivalent expressions. NE content is in grade 7; CC content is in grade 6.	6.EE.3 Apply the properties of operations to generate equivalent expressions. <i>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 $3y$.</i>
7.3.3.c	Given the value of the variable(s), evaluate algebraic expressions with respect to order of operations	Strong	CC	NE content is in grade 7; CC content is in grade 6.	6.EE.2 Write, read, and evaluate expressions in which letters stand for numbers. c. Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used 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). <i>For example, use the formulas $V = s^3$ and $A = 6s^2$ to find the volume and surface area of a cube with sides of length $s = 1/2$.</i>
7.3.3.d	Solve two-step equations involving integers and positive	Strong	NE	NE content is in grade 7; CC content is in grade 8.	8.EE.7 Solve linear equations in one variable.

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rational numbers				<p>a. 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).</p> <p>b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.</p> <p>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 to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. <i>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</i></p>

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				<i>to place a towel bar $9 \frac{3}{4}$ inches long in the center of a door that is $27 \frac{1}{2}$ 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.</i>
7.3.3.e	Solve one-step inequalities involving positive rational numbers	Strong		<p>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.</p> <p>b. 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. <i>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.</i></p>
7.3.3.f	Identify and explain the properties used in solving two-step equations (e.g., addition, subtraction, multiplication and division)	Partial (knowledge type)	The NE content emphasizes the concept, while the CC content emphasizes the skill.	<p>7.EE.1 Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.</p> <p>7.EE.3 Solve multi-step real-life and mathematical problems posed with positive and negative rational</p>

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				<p>numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. <i>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.</i></p>
<p>MA 7.4 Students will communicate data analysis/probability concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.</p>				
<p>MA 7.4.1 Display and Analysis: Students will formulate questions that can be addressed with data and then organize, display, and analyze the relevant data to answer their questions.</p>				
7.4.1.a	Analyze data sets and interpret their graphical representations	Strong		<p>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. <i>For example, estimate the mean word length in a book by randomly sampling words</i></p>

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				<p><i>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.</i></p> <p>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. <i>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.</i></p>
7.4.1.b	Find and interpret mean, median, mode, and range for sets of data	Partial (specificity)	NE specifies mean, median, mode, and range.	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. <i>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.</i>
		CC	NE content is in grade 7; CC content is in grade 6.	6.SP.5 Summarize numerical data sets in relation to their context, such as by: a. Reporting the number of observations.

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				<p>b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.</p> <p>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 were gathered.</p> <p>d. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.</p>
7.4.1.c	Explain the difference between a population and a sample	Strong		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.
7.4.1.d	List biases that may be created by various data collection	Partial (emphasis and	NE emphasizes bias introduced by data collection, while CC emphasizes validity of generalizations based on a	7.SP.1 Understand that statistics can be used to gain information about a population by examining a sample

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
processes	phrasing)		representative sample.	of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.	
7.4.1.e	Formulate a question about a characteristic within one population that can be answered by simulation or a survey	Partial (knowledge type)	CC	The NE content emphasizes the skill, while the CC content emphasizes the concept. NE content is in grade 7; CC content is in grade 6.	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. <i>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.</i>
MA 7.4.2 Predictions and Inferences: Students will evaluate predictions and make inferences based on data.					
7.4.2.a	Determine if data collected from a sample can be used to make predictions about a population	Partial (knowledge type)		The NE content emphasizes the skill, while the CC content emphasizes the concept.	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.
MA 7.4.3 Probability: Students will apply and interpret basic concepts of probability.					
7.4.3.a	Find the probability of independent compound events	Strong			7.SP.8 Find probabilities of compound events using organized lists, tables,

* Rigor: CC: Common Core standards are more rigorous; NE: Nebraska standards are more rigorous

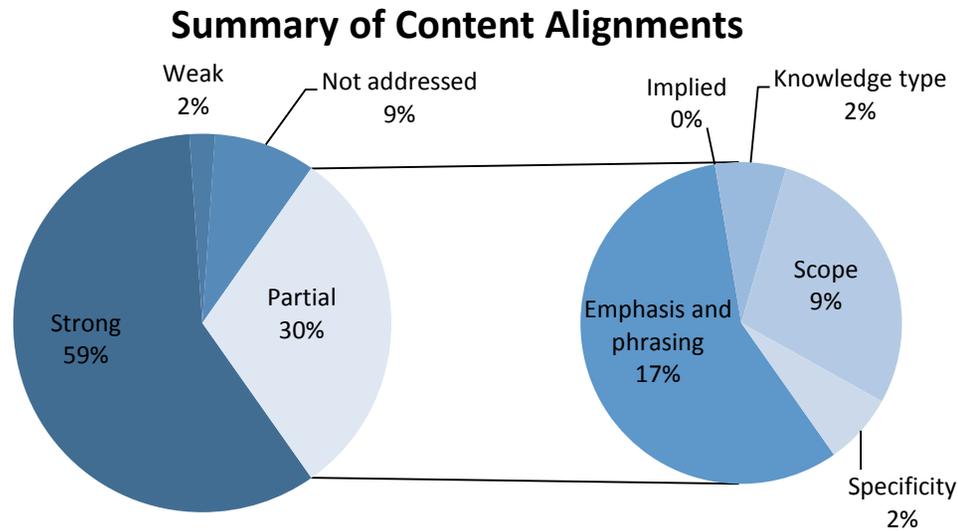
Mathematics Alignment Study

Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
(e.g., tree diagram, organized list)				tree diagrams, and simulation.	
7.4.3.b	Compare and contrast theoretical and experimental probabilities	Strong	NE	NE content is in grade 7; CC content is in high school.	7.SP.7 Investigate chance processes and develop, use, and evaluate probability models. 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.

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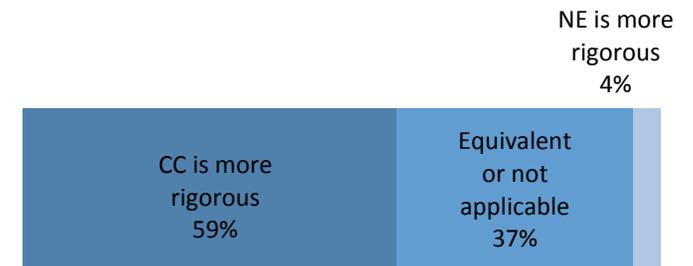
Grade 8: How Nebraska Content is addressed in the Common Core standards

How well Nebraska mathematics content is addressed in the Common Core standards at this grade is summarized in two categories, content alignment and rigor. The findings are depicted in the graphs below. **Content alignment** characterizes the nature of the content match between the Common Core and Nebraska standards. A *Strong* match indicates Common Core fully addresses the content of the Nebraska indicator. A *Partial* match is assigned when the Nebraska indicator either does not offer the same level of *Specificity* as the Common Core content, does not cover the complete *Scope* of the Common Core, differs importantly in its *Emphasis and Phrasing*, provides only an *Implied* coverage of the content, or focuses on a different *Knowledge type*, specifically, that Nebraska addresses a skill where Common Core addresses the related concept. If more than one of the issues just described characterizes the coverage of Common Core content by Nebraska, the alignment is identified as *Weak*. Finally, if the content in Nebraska is not found in the Common Core, it is marked as *Not Addressed*. The standards were also compared to identify relative **Rigor**. A indicator was counted more rigorous over the other when higher demands are made of students, either because mastery of content is expected at an earlier grade, or the expectations regarding the content are significantly more challenging, or both.



A summary of how well Common Core addressed content found in the Nebraska standards. See above for a discussion about the alignment categories.

Rigor



Content in the documents was compared for the relative demands placed on students. The graph displays the percentage of indicators that were more rigorous, by document. A significant percentage of the content was either equivalent in rigor between the two standards, or could not be rated for rigor, including when content was not addressed by either documents or when differences between the content made rigor comparisons invalid. See discussion above for more information.

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Grade 8 Overview

Very few topics in the Nebraska Mathematics Standards are not also addressed or weakly addressed by the Common Core Standards for Mathematics. The topics found to be missing in the Common Core are related to the zero property of multiplication, similarity of three-dimensional objects, identifying misrepresentation of data, and evaluating predictions from questions and new studies. Many alignments of Nebraska standards to the Common Core are strong because the specific Nebraska content is fully addressed within a more expansive Common Core standard. For example, one Nebraska standard asks students to use estimation methods to check the reasonableness of answers. While Common Core also requires this, it is a small part of a larger standard about solving problems. For a variety of reasons, many alignments were rated as partial. In a majority of cases, alignments were rated as partial because the standards in each document differed in their knowledge type. For example, Nebraska emphasizes the skill of comparing and ordering rational numbers, while the Common Core emphasizes understanding how they are ordered. In these cases, the content cannot be said to be more or less difficult, but just a matter of CC emphasizing the concept while NE emphasizes the skill. In a few other cases, the Nebraska indicator was more specific, and so it was unclear whether students must address the same details within the Common Core. For example, the Nebraska standards include specific expectations related to the multiplicative inverse that are not detailed in the Common Core. In regards to rigor, the Nebraska standards were found to require very few expectations at an earlier grade level than the Common Core standards, while the Common Core standards tended to place skills in earlier grades most of the time. The majority of standards were within one grade of each other (e.g., Nebraska content is in grade 8; Common Core content is in grade 7). Very few topics were found two or more grades apart. Topics that were found two or more grades earlier in the Common Core standards as compared to the Nebraska standards include unit conversions, box plots, numerical expressions containing exponents, and multiplicative inverses. Further, a few of the Nebraska standards require the same essential skills as the Common Core, but with different levels of cognitive difficulty. For example, both Nebraska and the Common Core standards include content related to congruence and similarity, but while Common Core requires understanding each concept separately, Nebraska requires comparing and contrasting those relationships, which is a more difficult task.

Of the 46 indicators in the Nebraska Mathematics Standards for 8th grade, 42 are addressed and only 4 are not addressed by the Common Core State Standards. Of those addressed, 27 are strong alignments, 14 are partial alignments, and 1 is a weak alignment.

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards		
Grade 8						
MA 8.1 Students will communicate number sense concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.						
MA 8.1.1 Number System: Students will represent and show relationships among real numbers.						
8.1.1.a	Compare and order real numbers	Partial (emphasis and phrasing)		Content is similar, with some difference in emphasis.	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). <i>For example, by truncating the decimal expansion of $\sqrt{2}$, show that $\sqrt{2}$ is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.</i>
8.1.1.b	Demonstrate relative position of real numbers on the number line (e.g., square root of 2 is left of 1.5)	Partial (emphasis and phrasing)		Content is similar, with some difference in emphasis.	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). <i>For example, by truncating the decimal expansion of $\sqrt{2}$, show that $\sqrt{2}$ is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.</i>
8.1.1.c	Represent small numbers using scientific notation	Partial (emphasis and phrasing)	CC	NE emphasizes the representation of numbers, while CC emphasizes the use of scientific notation for estimation and being able to express	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,

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
			how many times larger one quantity is than another. CC is more difficult.	and to express how many times as much one is than the other. <i>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.</i>	
8.1.1.d	Classify numbers as natural, whole, integer, rational, irrational, or real	Partial (emphasis and phrasing)	NE emphasizes the classification of numbers, while CC emphasizes an informal understanding of rational and irrational numbers and decimal expansions.	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.	
MA 8.1.2 Operations: Students will demonstrate the meaning of arithmetic operations with integers.					
8.1.2.a	Use drawings, words, and symbols to explain the meaning of addition, subtraction, multiplication, and division of integers.	Strong	CC	NE content is in grade 8; CC content is in grade 7.	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. a. 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. b. Understand $p + q$ as the number

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				<p>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.</p> <p>c. Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.</p>
		CC	NE content is in grade 8; CC content is in grade 7.	<p>7.NS.2 Apply and extend previous understandings of multiplication and division of fractions to multiply and divide rational numbers.</p> <p>a. Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational</p>

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				<p>numbers by describing real-world contexts.</p> <p>b. Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$. Interpret products of rational numbers by describing real-world contexts.</p> <p>c. Apply properties of operations as strategies to multiply and divide rational numbers.</p> <p>d. Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.</p>
8.1.2.b	Use words and symbols to explain the zero property of multiplication (e.g., if $ab = 0$ then a or b or both must be zero)	Not addressed		
8.1.2.c	Use words and symbols to explain why division by zero is undefined	Weak	The NE content emphasizes the explanation of why division by zero is undefined, while the CC content emphasizes the understanding integers can be divided, as long as the divisor is not zero.	<p>7.NS.2 Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.</p> <p>b. Understand that integers can be</p>

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
				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 products of rational numbers by describing real-world contexts.	
MA 8.1.3 Computation: Students will compute fluently and accurately using appropriate strategies and tools.					
8.1.3.a	Compute accurately with rational numbers	Strong	CC	NE content is in grade 8; CC content is in grade 7.	7.NS.3 Solve real-world and mathematical problems involving the four operations with rational numbers.
8.1.3.b	Evaluate expressions involving absolute value of integers	Partial (knowledge type)	CC	The NE content emphasizes the skill, while the CC content emphasizes the concept. NE content is in grade 8; CC content is in grade 6.	6.NS.7 Understand ordering and absolute value of rational numbers. c. 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. <i>For example, for an account balance of -30 dollars, write $-30 = 30$ to describe the size of the debt in dollars.</i>
8.1.3.c	Calculate squares of integers, the square roots of perfect squares, and the square roots of whole numbers using technology	Partial (scope)		NE includes calculating the square roots of whole numbers using technology.	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.

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				Know that $\sqrt{2}$ is irrational.
8.1.3.d	Select, apply, and explain the method of computation when problem solving using rational numbers (e.g., models, mental computation, paper-pencil, technology, divisibility rules)	Strong		MP.5 Use appropriate tools strategically. [A more detailed description of this mathematical practice standard is given in the CCSS Introduction]
8.1.3.e	Solve problems involving ratios and proportions (e.g., $\frac{x}{5} = \frac{10}{17}$)	Strong	CC	NE content is in grade 8; CC content is in grade 7.
				7.RP.2 Recognize and represent proportional relationships between quantities.
				a. 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.
				b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
				c. Represent proportional relationships by equations. For example, if total cost t is proportional to the number n of items purchased at a constant price p , the relationship between total cost and the number of items can be expressed as $t = pn$.

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
				d. Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points $(0, 0)$ and $(1, r)$ where r is the unit rate.	
		CC	NE content is in grade 8; CC content is in grade 7.	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.	
MA 8.1.4 Estimation: Students will estimate and check reasonableness of answers using appropriate strategies and tools.					
8.1.4.a	Use estimation methods to check the reasonableness of solutions for problems involving rational numbers	Strong	CC	NE content is in grade 8; CC content is in grade 7.	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 to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. <i>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</i>

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				<i>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.</i>
MA 8.2 Students will communicate geometric concepts and measurement concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.				
MA 8.2.1 Characteristics: Students will describe, compare, and contrast characteristics, properties, and relationships of geometric shapes and objects.				
8.2.1.a	Identify and describe similarity of three-dimensional objects	Not addressed		
8.2.1.b	Compare and contrast relationships between similar and congruent objects	Strong	NE	NE is more difficult. Comparing and contrasting relationships is more difficult than understanding the relationships as separate concepts.
				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.
				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.
8.2.1.c	Identify geometric properties of parallel lines cut by a transversal and related angles (e.g.,	Strong	CC	CC is more difficult. Using arguments is more difficult than identifying properties and examining
				8.G.5 Use informal arguments to establish facts about the angle sum and exterior angle of triangles,

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
perpendicular and parallel lines with transversals) and angles (e.g., corresponding, alternate interior, alternate exterior)			relationships.	about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. <i>For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.</i>	
8.2.1.d	Identify pairs of angles (e.g., adjacent, complementary, supplementary, vertical)	Strong	CC	CC is more difficult. CC includes using arguments, while NE only includes identifying pairs of angles.	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. <i>For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.</i>
8.2.1.e	Examine the relationships of the interior angles of a triangle (e.g., the sum of the angles is 180 degrees)	Strong	CC	CC is more difficult. Using arguments is more difficult than examining relationships.	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. <i>For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why</i>

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
<i>this is so.</i>					
MA 8.2.2 Coordinate Geometry: Students will specify locations and describe relationships using coordinate geometry.					
8.2.2.a	Use coordinate geometry to represent and examine the properties of rectangles and squares using horizontal and vertical segments	Partial (emphasis and phrasing)	CC	NE emphasizes examination of the properties of rectangles and squares, while CC emphasizes finding the length of sides in real-world and mathematical problem situations. NE content is in grade 8; CC content is in grade 6.	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.
MA 8.2.3 Transformations: Students will perform transformations and use them to analyze the orientation and size of geometric shapes.					
8.2.3.a	Identify the similarity of dilated shapes	Strong			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.
8.2.3.b	Perform and describe positions and sizes of shapes under dilations (e.g., scale factor, ratios)	Strong			8.G.3 Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
			CC	NE content is in grade 8; CC content is in grade 7.	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

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
				different scale.	
MA 8.2.4 Spatial Modeling: Students will use visualization, spatial reasoning, and geometric modeling to solve problems.					
8.2.4.a	Draw geometric objects with specified properties (e.g., parallel sides, number of sides, angle measures, number of faces)	Strong	CC	NE content is in grade 8; CC content is in grade 7.	7.G.2 Draw (freehand, with ruler and protractor, and with technology) geometric shapes from given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.
MA 8.2.5 Measurement: Students will select and apply appropriate procedures, tools, and formulas to determine measurements.					
8.2.5.a	Use strategies to find the perimeter and area of complex shapes	Partial (scope)	CC	NE includes using strategies to find the perimeter of complex shapes. NE content is in grade 8; CC content is in grade 7.	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.
			CC	NE content is in grade 8; CC content is in grade 6.	6.G.1 Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.
8.2.5.b	Determine surface area and volume of three-dimensional objects (e.g., rectangular prisms,	Strong			8.G.9 Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
cylinders)				world and mathematical problems.
		CC	NE content is in grade 8; CC content is in grade 7.	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.
8.2.5.c	Apply the Pythagorean theorem to find missing lengths in right triangles and to solve problems	Strong		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.
8.2.5.d	Use scale factors to find missing lengths in similar shapes	Strong	CC NE content is in grade 8; CC content is in grade 7.	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.
8.2.5.e	Convert between metric and standard units of measurement, given conversion factors (e.g., meters to yards)	Strong	CC NE content is in grade 8; CC content is in grade 6.	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. d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				multiplying or dividing quantities.
MA 8.3 Students will communicate algebraic concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.				
MA 8.3.1 Relationships: Students will represent and analyze relationships using algebraic symbols.				
8.3.1.a	Represent and analyze a variety of patterns with tables, graphs, words, and algebraic equations	Partial (emphasis and phrasing)	NE emphasizes representing and analyzing a variety of patterns, while CC emphasizes analyzing patterns in functions and data.	<p>8.F.2 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). <i>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.</i></p> <p>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.</p> <p>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</p>

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
				the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. <i>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?</i>	
8.3.1.b	Describe relationships using algebraic expressions, equations, and inequalities (e.g., two-step, one variable)	Strong	CC	NE content is in grade 8; CC content is in grade 7.	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. a. Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p , q , and r are specific rational numbers. Solve equations of these forms fluently. Compare the algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. <i>For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?</i> b. 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

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				the solution set of the inequality and interpret it in the context of the problem. <i>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.</i>
8.3.1.c	Identify constant slope from tables and graphs	Strong		<p>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. <i>For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.</i></p> <p>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.</p> <p>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. <i>For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an</i></p>

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				<i>additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.</i>
MA 8.3.2 Modeling in Context: Students will create, use, and interpret models of quantitative relationships.				
8.3.2.a	Model contextualized problems using various representations (e.g., two-step/one variable equations)	Strong		8.EE.8 Analyze and solve pairs of simultaneous linear equations. c. Solve real-world and mathematical problems leading to two linear equations in two variables. <i>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.</i>
		CC	NE content is in grade 8; CC content is in grade 7.	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. a. Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p , q , and r are specific rational numbers. Solve equations of these forms fluently. Compare the algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. <i>For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?</i>

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Nebraska Standards		Content Alignment	More Rigor*	Comments	Common Core Standards	
8.3.2.b	Represent a variety of quantitative relationships using algebraic expressions and two-step/one variable equations	Strong			8.EE.8	Analyze and solve pairs of simultaneous linear equations. c. Solve real-world and mathematical problems leading to two linear equations in two variables. <i>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.</i>
			CC	NE content is in grade 8; CC content is in grade 7.	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. a. Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p , q , and r are specific rational numbers. Solve equations of these forms fluently. Compare the algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. <i>For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?</i>
MA 8.3.3 Procedures: Students will apply properties to solve equations and inequalities.						
8.3.3.a	Explain the multiplicative inverse (e.g., $4 * \frac{1}{4} = 1$)	Partial (specificity)	CC	NE specifies the multiplicative inverse. NE content is in grade 8; CC content is in grade 4.	4.NF.4	Apply and extend previous understandings of multiplication to multiply a fraction by a whole

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
				number. a. 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 $5 \times (1/4)$, recording the conclusion by the equation $5/4 = 5 \times (1/4)$. b. 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 $3 \times (2/5)$ as $6 \times (1/5)$, recognizing this product as $6/5$. (In general, $n \times (a/b) = (n \times a)/b$.)	
8.3.3.b	Evaluate numerical expressions containing whole number exponents (e.g., if $x = 4$, then $(x + 3)^2 + 5x = ?$)	Strong	CC	NE content is in grade 8; CC content is in grade 6.	6.EE.1 Write and evaluate numerical expressions involving whole-number exponents.
8.3.3.c	Solve multi-step equations involving rational numbers	Strong			8.EE.7 Solve linear equations in one variable. b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms
8.3.3.d	Solve two-step inequalities involving rational numbers	Strong	CC	NE content is in grade 8; CC content is in grade 7.	7.EE.4 Use variables to represent quantities in a real-world or mathematical problem, and

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				<p>construct simple equations and inequalities to solve problems by reasoning about the quantities.</p> <p>b. 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. <i>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.</i></p>
8.3.3.e	Identify and explain the properties used in solving two-step inequalities and multi-step equations	Partial (emphasis and phrasing)	NE emphasizes explaining properties, while CC emphasizes the construction of an argument and applying the properties. CC content is in high school but is more difficult.	HS.A-REI.1 <p>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.</p>
		CC	NE content is in grade 8; CC content is in grade 7.	7.EE.1 <p>Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.</p>
		CC	NE content is in grade 8; CC content is in grade 7.	7.EE.3 <p>Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals),</p>

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
				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 $\frac{1}{10}$ of her salary an hour, or \$2.50, for a new salary of \$27.50. If you want to place a towel bar $9\frac{3}{4}$ inches long in the center of a door that is $27\frac{1}{2}$ 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.	
MA 8.4 Students will communicate data analysis/probability concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.					
MA 8.4.1 Display and Analysis: Students will formulate questions that can be addressed with data, and then organize, display, and analyze the relevant data to answer their questions.					
8.4.1.a	Represent data using circle graphs and box plots with and without the use of technology	Partial (scope)	CC	NE includes circle graphs. NE content is in grade 8; CC content is in grade 6.	6.SP.4 Display numerical data in plots on a number line, including dot plots, histograms, and box plots.
8.4.1.b	Compare characteristics between sets of data or within a given set of data	Strong	CC	NE content is in grade 8; CC content is in grade 7.	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

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				expressing it as a multiple of a measure of variability. <i>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.</i>
		CC	NE content is in grade 8; CC content is in grade 7.	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. <i>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.</i>
8.4.1.c	Find, interpret, and compare measures of central tendency (mean, median, mode) and the quartiles for sets of data	Partial (scope)	NE includes mode.	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. <i>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.</i>
8.4.1.d	Select the most appropriate unit of central tendency for sets of data	Partial (emphasis and phrasing)	NE emphasizes selecting the appropriate unit of central tendency, while CC emphasizes relating the	6.SP.5 Summarize numerical data sets in relation to their context, such as by:

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
			choice of measure to the shape of the data distribution. CC content is in grade 6 but is less difficult.	<p>a. Reporting the number of observations.</p> <p>b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.</p> <p>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 were gathered.</p> <p>d. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.</p>
8.4.1.e	Identify misrepresentation and misinterpretation of data represented in circle graphs and box plots	Not addressed		
MA 8.4.2 Predictions and Inferences: Students will evaluate predictions and make inferences based on data.				
8.4.2.a	Evaluate predictions to formulate new questions and plan new studies	Not addressed		
8.4.2.b	Compare and contrast two sets	Strong	CC	NE content is in grade 8; CC content
				7.SP.2 Use data from a random sample to draw inferences about a population

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Nebraska Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
of data to make inferences			is in grade 7.	with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. <i>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.</i>	
		CC	NE content is in grade 8; CC content is in grade 7.	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. <i>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.</i>	
MA 8.4.3 Probability: Students will apply and interpret basic concepts of probability.					
8.4.3.a	Identify complementary events and calculate their probabilities	Strong	NE	NE content is in grade 8; CC content is in high school.	HS.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”).

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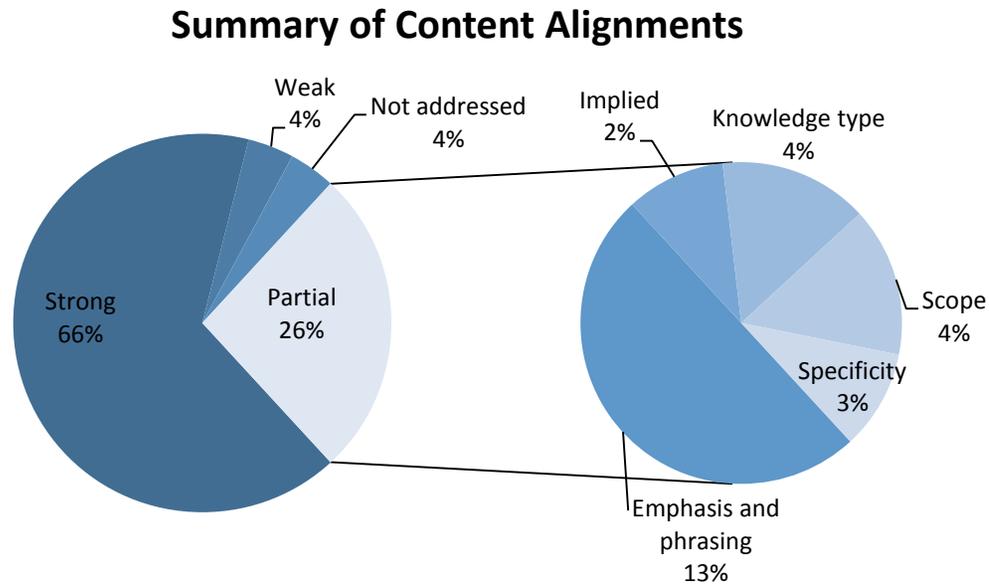
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Nebraska Standards		Content Alignment	More Rigor*	Comments	Common Core Standards
8.4.3.b	Compute probabilities for independent compound events	Strong	CC	NE content is in grade 8; CC content is in grade 7.	<p>7.SP.8 Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.</p> <p>a. Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.</p> <p>b. Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., “rolling double sixes”), identify the outcomes in the sample space which compose the event.</p> <p>c. Design and use a simulation to generate frequencies for compound events. <i>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?</i></p>

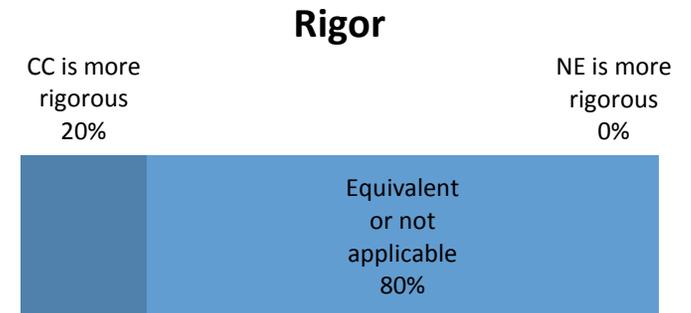
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High School: How Nebraska Content is addressed in the Common Core standards

How well Nebraska mathematics content is addressed in the Common Core standards at this grade is summarized in two categories, content alignment and rigor. The findings are depicted in the graphs below. **Content alignment** characterizes the nature of the content match between the Common Core and Nebraska standards. A *Strong* match indicates Common Core fully addresses the content of the Nebraska indicator. A *Partial* match is assigned when the Nebraska indicator either does not offer the same level of *Specificity* as the Common Core content, does not cover the complete *Scope* of the Common Core, differs importantly in its *Emphasis and Phrasing*, provides only an *Implied* coverage of the content, or focuses on a different *Knowledge type*, specifically, that Nebraska addresses a skill where Common Core addresses the related concept. If more than one of the issues just described characterizes the coverage of Common Core content by Nebraska, the alignment is identified as *Weak*. Finally, if the content in Nebraska is not found in the Common Core, it is marked as *Not Addressed*. The standards were also compared to identify relative **Rigor**. A indicator was counted more rigorous over the other when higher demands are made of students, either because mastery of content is expected at an earlier grade, or the expectations regarding the content are significantly more challenging, or both.



A summary of how well Common Core addressed content found in the Nebraska standards. See above for a discussion about the alignment categories.



Content in the documents was compared for the relative demands placed on students. The graph displays the percentage of indicators that were more rigorous, by document. A significant percentage of the content was either equivalent in rigor between the two standards, or could not be rated for rigor, including when content was not addressed by either documents or when differences between the content made rigor comparisons invalid. See discussion above for more information.

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High School Overview

Very few topics in the Nebraska Mathematics Standards are not also addressed or weakly addressed by the Common Core Standards for Mathematics. The topics found to be missing in the Common Core are related to explaining the effects of operations and taking roots on the magnitude of quantities, recognizing that there are other geometry systems, converting between units of area and volume, and the properties of equality. Many alignments of Nebraska standards to the Common Core are strong because the specific Nebraska content is fully addressed within a more expansive Common Core standard. For example, one Nebraska standard asks students to use coordinate geometry to analyze geometric situations. The Common Core standards also include the use of coordinate geometry to analyze situations, but specify those situations (e.g., derive the equation of a circle). A few strong alignments were found between Nebraska standards and the Common Core's Mathematical Practice standards. For a variety of reasons, many alignments were rated as partial. In a majority of cases, alignments were rated as partial because the standards in each document differed in their emphasis and phrasing. For example, while both Nebraska standards and Common Core standards include content related to sketching geometric objects, Nebraska emphasizes the tools to be used, while Common Core emphasizes making formal geometric constructions. Other partial alignments were made due to differences in specificity, knowledge type, or scope. In regards to rigor, the majority of standards were placed at the high school level in both documents. In the very few cases in which the grade levels differed, very few topics were found two or more grades apart. Topics that were found two or more grades earlier in the Common Core standards as compared to the Nebraska standards include the concept of absolute value, properties and relationships among classes of geometric objects, surface area and volume, rates, and sample space. Further, a few of the Nebraska standards require the same essential skills as the Common Core, but with different levels of cognitive difficulty. For example, both Nebraska and the Common Core standards include content related to arc length and area of sectors of a circle, but while Nebraska requires finding arc lengths and areas, Common Core requires deriving facts and formulas related to arc length and area of a sector, which is more difficult.

Of the 78 indicators in the Nebraska Mathematics Standards for high school, 74 are addressed and only 4 are not addressed by the Common Core State Standards. Of those addressed, 50 are strong alignments, 20 are partial alignments, and 4 are weak alignments.

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
Grade 12					
Standard MA 12.1 Students will communicate number sense concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.					
MA 12.1.1 Number System: Students will represent and show relationships among complex numbers.					
12.1.1.a	Demonstrate multiple equivalent forms of irrational numbers (e.g., $\sqrt{8}=8^{1/2}=2\sqrt{2}$)	Partial (knowledge type)	The NE content emphasizes the skill, while the CC content emphasizes the concept.	HS.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. <i>For example, we define $5^{1/3}$ to be the cube root of 5 because we want $(5^{1/3})^3 = 5^{(1/3)^3}$ to hold, so $(5^{1/3})^3$ must equal 5.</i>
12.1.1.b	Compare, contrast and apply the properties of numbers and the real number system, including rational, irrational, imaginary, and complex numbers	Partial (emphasis and phrasing)	Content is similar, with some difference in emphasis and phrasing.	HS.N-CN.1	Perform arithmetic operations with complex numbers. 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.
				HS.N-RN.2	Extend the properties of exponents to rational exponents. Rewrite expressions involving radicals and rational exponents using the properties of exponents.
				HS.N-RN.3	Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational, and that the product of a

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				nonzero rational number and an irrational number is irrational.
		CC	NE content is in high school; CC content is in grade 8.	8.EE.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions. <i>For example, $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$.</i>
MA 12.1.2 Operations: Students will demonstrate the meaning and effects of arithmetic operations with real numbers.				
12.1.2.a	Use drawings, words, and symbols to explain the effects of such operations as multiplication and division, and computing positive powers and roots on the magnitude of quantities (e.g., if you take the square root of a number, will the result always be smaller than the original number? (e.g., $\sqrt{1/4}=1/2$))	Not addressed		
12.1.2.b	Use drawings, words, and symbols to explain that the distance between two numbers on the number line is the absolute value of their difference	Partial (emphasis and phrasing)	CC Content is similar, with some differences in emphasis and phrasing. NE content is in high school; CC content is in grade 6.	6.NS.7 Understand ordering and absolute value of rational numbers. a. 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. b. Write, interpret, and explain statements of order for rational

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				<p>numbers in real-world contexts. For example, write $-3^{\circ}\text{C} > -7^{\circ}\text{C}$ to express the fact that -3°C is warmer than -7°C.</p> <p>c. 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.</p>
MA 12.1.3 Computation: Students will compute fluently and accurately using appropriate strategies and tools.				
12.1.3.a	Compute accurately with real numbers	Weak	Content is similar, with significant differences in emphasis and phrasing.	N-RN.3 Explain why the sum or product of two 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.
12.1.3.b	Simplify exponential expressions (e.g., powers of -1, 0, $\frac{1}{2}$, $3^2 * 3^2 = 3^4$)	Strong	CC NE content is in high school; CC content is in grade 8. CC is more difficult.	8.EE.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions. <i>For example, $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$.</i>
12.1.3.c	Multiply and divide numbers using scientific notation	Strong	CC NE content is in high school; CC content is in grade 8.	8.EE.4 Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
					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.
12.1.3.d	Select, apply, and explain the method of computation when problem solving using real numbers (e.g., models, mental computation, paper-pencil, or technology)	Strong		MP.5	Use appropriate tools strategically. [A more detailed description of this mathematical practice standard is given in the CCSS Introduction]
MA 12.1.4 Estimation: Students will estimate and check reasonableness of answers using appropriate strategies and tools.					
12.1.4.a	Use estimation methods to check the reasonableness of real number computations and decide if the problem calls for an approximation or an exact number (e.g., 10π (pi) is approximately 32.4, square and cube roots)	Partial (emphasis and phrasing)	Content is similar, with some difference in emphasis.	N-Q.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
		CC	NE content is in high school; CC content is in grade 8.	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). <i>For example, by truncating the decimal expansion of $\sqrt{2}$, show that $\sqrt{2}$ is between 1 and 2, then between 2.4 and 1.5, and explain how to continue on to get better approximations.</i>

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Nebraska Mathematics Standards		Content Alignment	More Rigor*	Comments	Common Core Standards
12.1.4.b	Distinguish relevant from irrelevant information, identify missing information and either find what is needed or make appropriate estimates	Strong			MP.1 Make sense of problems and persevere in solving them. [As defined by CC, making sense of problems includes analyzing the givens, constraints, relationships, and goals in a problem]
MA 12.2 Students will communicate geometric concepts and measurement concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.					
MA 12.2.1 Characteristics: Students will analyze characteristics, properties, and relationships among geometric shapes and objects.					
12.2.1.a	Identify and explain the necessity of and give examples of definitions and theorems	Partial (scope)		NE includes explaining the necessity of definitions and theorems.	MP.3 Construct viable arguments and critique the reasoning of others. [As defined by CC, constructing viable arguments includes understanding and using stated assumptions, definitions, and previously established results.] MP.6 Attend to precision [As defined by CC, attending to precision includes using clear definitions in discussions with others and their own reasoning. By high school, students have learned to make explicit use of definitions.]
12.2.1.b	Analyze properties and relationships among classes of two and three dimensional geometric objects using inductive reasoning and counterexamples	Partial (emphasis and phrasing)		Content is similar, with some difference in emphasis and phrasing.	HS.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.

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
		CC	NE content is in high school; CC content is in grade 5.	5.G.3 Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. <i>For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.</i>
		CC	NE content is in high school; CC content is in grade 5.	5.G.4 Classify two-dimensional figures in a hierarchy based on properties.
12.2.1.c	State and prove geometric theorems using deductive reasoning (e.g., parallel lines with transversals, congruent triangles, similar triangles)	Strong		HS.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. HS.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. HS.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.

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				<p>HS.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.</p> <p>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.</p> <p>G.SRT.5 Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.</p>
12.2.1.d	Apply geometric properties to solve problems (e.g., parallel lines, line transversals, similar triangles, congruent triangles, proportions)	Strong		HS.G-SRT.5 Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.
12.2.1.e	Identify and apply right triangle relationships (e.g., sine, cosine, tangent, special right triangles, converse of Pythagorean	Strong		HS.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

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
	Theorem)			angles. HS.G-SRT.8 Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.
		CC	NE content is in high school; CC content is in grade 8.	8.G.6 Explain a proof of the Pythagorean Theorem and its converse.
12.2.1.f	Recognize that there are geometries, other than Euclidean geometry, in which the parallel postulate is not true	Not addressed		
12.2.1.g	Know the definitions and basic properties of a circle and use them to prove basic theorems and solve problems	Strong		HS.G-C.1 Prove that all circles are similar. HS.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. HS.G-C.3 Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.
MA 12.2.2 Coordinate Geometry: Student will use coordinate geometry to analyze and describe relationships in the coordinate plane.				
12.2.2.a	Use coordinate geometry to analyze geometric situations (e.g., parallel lines,	Strong		HS.G-GPE.1 Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete

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Nebraska Mathematics Standards		Content Alignment	More Rigor*	Comments	Common Core Standards
	perpendicular lines, circle equations)				<p>the square to find the center and radius of a circle given by an equation.</p> <p>HS.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 $(1, \sqrt{3})$ lies on the circle centered at the origin and containing the point $(0, 2)$.</p> <p>HS.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).</p>
12.2.2.b	Apply the midpoint formula	Partial (emphasis and phrasing)		Content is similar, with some difference in emphasis and phrasing.	HS.G-GPE.6 Find the point on a directed line segment between two given points that partitions the segment in a given ratio.
12.2.2.c	Apply the distance formula	Strong			HS.G-GPE.7 Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.
12.2.2.d	Prove special types of triangles and quadrilaterals (e.g., right triangles, isosceles trapezoid,	Strong			HS.G-CO.11 Prove theorems about parallelograms. Theorems include: opposite sides are congruent, opposite angles are congruent, the

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
parallelogram, rectangle, square)				<p>diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.</p> <p>HS.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 $(1, \sqrt{3})$ lies on the circle centered at the origin and containing the point $(0, 2)$.</p> <p>HS.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.</p>

MA 12.2.3 Transformations: Students will apply and analyze transformations.

12.2.3.a	Explain and justify the effects of simple transformations on the ordered pairs of two-dimensional shapes	Strong		<p>HS.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).</p>
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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
		CC	NE content is in high school; CC content is in grade 8.	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.
12.2.3.b	Perform and describe multiple transformations	Strong		<p>HS.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).</p> <p>HS.G-CO.3 Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.</p> <p>HS.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.</p>

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
		CC	NE content is in high school; CC content is in grade 8.	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.
MA 12.2.4 Spatial Modeling: Students will use visualization, spatial reasoning, and geometric modeling to solve problems.					
12.2.2.4.a	Sketch and draw appropriate representations of geometric objects using ruler, protractor, or technology	Partial (emphasis and phrasing)	Content is similar, with some difference in emphasis and phrasing.	HS.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.
12.2.4.b	Use geometric models to visualize, describe, and solve problems (e.g., find the height of a tree; find the amount of paint needed for a room; scale model)	Strong		HS.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).
				HS.G-	Apply geometric methods to solve design problems (e.g., designing

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				MG.3 an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).
MA 12.2.5 Measurement: Students will apply the units, systems, and formulas to solve problems.				
12.2.5.a	Use strategies to find surface area and volume of complex objects	Strong		HS.G-GMD.3 Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.
			CC NE content is in high school; CC content is in grade 7.	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.
12.2.5.b	Apply appropriate units and scales to solve problems involving measurement	Strong		HS.N-Q.1 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. HS.N-Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
12.2.5.c	Convert between various units of area and volume, such as square feet to square yards	Not addressed		

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Nebraska Mathematics Standards		Content Alignment	More Rigor*	Comments	Common Core Standards	
12.2.5.d	Convert equivalent rates (e.g., feet/second to miles/hour)	Partial (emphasis and phrasing)	CC	NE content is in high school; CC content is in grade 6. NE emphasizes equivalent rates, while CC emphasizes ratio reasoning in problem solving situations.	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. a. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.
12.2.5.e	Find arc length and area of sectors of a circle	Partial (emphasis and phrasing)	CC	CC is more difficult. NE emphasizes the skill of finding arc lengths and areas, while CC emphasizes derivations and definitions.	HS.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.
12.2.5.f	Determine surface area and volume of three-dimensional objects (e.g., spheres, cones, pyramids)	Strong			HS.G-GMD.3	Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.
			CC	NE content is in high school; CC content is in grade 7.	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.

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Nebraska Mathematics Standards		Content Alignment	More Rigor*	Comments	Common Core Standards	
12.2.5.g	Know that the effect of a scale factor k on length, area and volume is to multiply each by k , k^2 and k^3 , respectively	Weak		CC content is in 7th grade, but NE content is more difficult. NE includes the effect of scale factors on volume.	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.
MA 12.3 Students will communicate algebraic concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.						
MA 12.3.1 Relationships: Students will generalize, represent, and analyze relationships using algebraic symbols						
NON LINEAR FUNCTIONS INCLUDE: QUADRATIC, ABSOLUTE VALUE, SQUARE ROOT, EXPONENTIAL						
12.3.1.a	Represent, interpret, and analyze functions with graphs, tables, and algebraic notation and convert among these representations (e.g., linear, non-linear)	Strong			HS.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.
					HS.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.
					HS.F-IF.6	Calculate and interpret the average rate of change of a function

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				(presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.
				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.
				F-IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). <i>For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.</i>
12.3.1.b	Identify domain and range of functions represented in either symbolic or graphical form (e.g., linear, non-linear)	Strong		HS.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 $y = f(x)$.
				HS.F-IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it

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				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.
12.3.1.c	Identify the slope and intercepts of a linear relationship from an equation or graph	Strong		HS.S-ID.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.
12.3.1.d	Identify characteristics of linear and non-linear functions	Strong		HS.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. a. Graph linear and quadratic functions and show intercepts, maxima, and minima.
12.3.1.e	Graph linear and non-linear functions	Strong		HS.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. a. Graph linear and quadratic functions and show intercepts, maxima, and minima.
12.3.1.f	Compare and analyze the rate of change by using ordered pairs, tables, graphs, and	Strong		HS.F-IF.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
equations				table) over a specified interval. Estimate the rate of change from a graph.
12.3.1.g	Graph and interpret linear inequalities	Strong		HS.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.
12.3.1.h	Represent, interpret, and analyze functions and their inverses	Strong		HS.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. HS.F-BF.4 Find inverse functions. a. 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, $f(x) = 2x^3$ or $f(x) = (x+1)/(x-1)$ for $x \neq 1$. b. Verify by composition that one function is the inverse of another. c. Read values of an inverse function from a graph or a table, given that the function has an inverse.

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Nebraska Mathematics Standards		Content Alignment	More Rigor*	Comments	Common Core Standards
12.3.1.i	Determine if a relation is a function	Partial (knowledge type)		CC content emphasizes the concept, while the NE content emphasizes the skill.	HS.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 $y = f(x)$.
MA 12.3.2 Modeling in Context: Students will model and analyze quantitative relationships.					
CONTEXTUALIZED PROBLEM – A MATHEMATICAL SITUATION PLACED IN A PARTICULAR CONTEXT (E.G., USING WORDS, DIAGRAMS, TABLES, DRAWINGS, ETC.)					
12.3.2.a	Model contextualized problems using various representations (e.g., graphs, tables, one variable equalities, one variable inequalities, linear equations in slope intercept form, inequalities in slope intercept form, system of linear equations with two variables)	Strong			MP.4 Model with mathematics. [As defined by CC, modeling with mathematics includes applying math to solve real-world (i.e., contextualized) problems.]
					HS.A-CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
12.3.2.b	Represent a variety of quantitative relationships using linear equations and one variable inequalities	Strong			HS.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

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				exponential functions.
12.3.2.c	Analyze situations to determine the type of algebraic relationship (e.g., linear, nonlinear)	Partial (scope)	NE includes all types of algebraic relationships.	HS.F-LE.1 Distinguish between situations that can be modeled with linear functions and with exponential functions. a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.
12.3.2.d	Model contextualized problems using various representations for non-linear functions (e.g., quadratic, exponential, square root, and absolute value)	Strong		MP.4 Model with mathematics. [As defined by CC, modeling with mathematics includes applying math to solve real-world (i.e., contextualized) problems.] HS.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.

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
MA 12.3.3 Procedures: Students will represent and solve equations and inequalities.				
12.3.3.a	Explain/apply the reflexive, symmetric, and transitive properties of equality	Not addressed	CC refers to the properties of equality both in the introduction to the 8 th grade and the introduction to HS Algebra, and has a table of them in the glossary, but never implicitly or explicitly in the standards themselves.	
12.3.3.b	Simplify algebraic expressions involving exponents (e.g., $(3x^4)^2$)	Strong		HS.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 $(x^2 - y^2)(x^2 + y^2)$.
12.3.3.c	Add and subtract polynomials	Strong		HS.A-APR.1 Perform arithmetic operations on polynomials. 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.
12.3.3.d	Multiply and divide polynomials (e.g., divide $x^3 - 8$ by $x - 2$, divide $x^4 - 5x^3 - 2x$ by x^2)	Strong		HS.A-APR.1 Perform arithmetic operations on polynomials. 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. HS.A- Rewrite simple rational expressions

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				APR.6 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.
12.3.3.e	Factor polynomials	Strong		HS.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 $(x^2 - y^2)(x^2 + y^2)$. HS.A-SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.
12.3.3.f	Identify and generate equivalent forms of linear equations	Strong		HS.A-REI.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
			CC NE content is in high school; NE content is in grade 8.	8.EE.7 Solve linear equations in one variable. a. Give examples of linear equations in one variable with one solution, infinitely many solutions,

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				<p>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).</p> <p>b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.</p>
12.3.3.g	Solve linear equations and inequalities including absolute value	Partial (implied)	CC implies solving equations and inequalities that include absolute value.	<p>HS.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.</p> <p>HS.A-REI.3 Solve equations and inequalities in one variable. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.</p> <p>HS.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</p>

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				successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.
12.3.3.h	Identify and explain the properties used in solving equations and inequalities	Strong		HS.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.
12.3.3.i	Solve quadratic equations (e.g., factoring, graphing, quadratic formula)	Strong		HS.A-REI.4 Solve quadratic equations in one variable. a. 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. b. 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 $a \pm bi$ for real

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				numbers a and b .
12.3.3.j	Add, subtract, and simplify rational expressions	Strong		<p>HS.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 $(x^2 - y^2)(x^2 + y^2)$.</p> <p>HS.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.</p>
12.3.3.k	Multiply, divide, and simplify rational expressions	Strong		<p>HS.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 $(x^2 - y^2)(x^2 + y^2)$.</p> <p>HS.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.</p>
12.3.3.l	Evaluate polynomial and rational expressions and	Strong		HS.A- Solve simple rational and radical equations in one variable, and give

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
expressions containing radicals and absolute values at specified values of their variables				<p>REI.2 examples showing how extraneous solutions may arise.</p> <p>HS.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.</p> <p>b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.</p>
12.3.3.m	Derive and use the formulas for the general term and summation of finite arithmetic and geometric series	Strong		<p>HS.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.</p>
12.3.3.n	Combine functions by composition, as well as by addition, subtraction, multiplication, and division	Strong		<p>HS.F-BF.1 Write a function that describes a relationship between two quantities.</p> <p>b. 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.</p> <p>c. Compose functions. For</p>

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				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.
12.3.3.o	Solve an equation involving several variables for one variable in terms of the others	Strong		HS.A-CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. <i>For example, rearrange Ohm's law $V = IR$ to highlight resistance R.</i>
12.3.3.p	Analyze and solve systems of two linear equations in two variables algebraically and graphically	Strong		HS.A-REI.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.
MA 12.4 Students will communicate data analysis/probability concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.				
MA 12.4.1 Display and Analysis: Students will formulate a question and design a survey or an experiment in which data is collected and displayed in a variety of formats, then select and use appropriate statistical methods to analyze the data.				
12.4.1.a	Interpret data represented by the normal distribution and formulate conclusions	Partial (implied)	CC implies formulating conclusions from the normal distribution.	HS.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.

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12.4.1.b	Compute, identify, and interpret measures of central tendency (mean, median, mode) when provided a graph or data set	Partial (scope)		NE includes mode.	HS.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.
12.4.1.c	Explain how sample size and transformations of data affect measures of central tendency	Partial (specificity)		NE is more specific.	HS.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).
12.4.1.d	Describe the shape and determine spread (variance, standard deviation) and outliers of a data set	Strong			HS.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).
12.4.1.e	Explain how statistics are used or misused in the world	Partial (emphasis and phrasing)		NE emphasizes real-world statistics use and misuse, while CC emphasizes the purposes and appropriate applications of statistics.	HS.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. HS.S-ID.9 Distinguish between correlation and causation. HS.S-IC.1 Understand statistics as a process for making inferences about population parameters based on a random sample from that

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards	
				population.	
12.4.1.f	Create scatter plots, analyze patterns, and describe relationships in paired data	Strong		HS.S-ID.6	Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.
12.4.1.g	Explain the impact of sampling methods, bias, and the phrasing of questions asked during data collection and the conclusions that can rightfully be made	Weak	NE emphasizes the impact of sampling methods and bias, while CC emphasizes the differences among sample surveys, experiments, and observational studies, and how randomization relates to each.	HS.S-IC.3	Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.
12.4.1.h	Explain the differences between randomized experiment and observational studies	Strong		HS.S-IC.3	Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.
MA 12.4.2 Predictions and Inferences: Students will develop and evaluate inferences to make predictions.					
12.4.2.a	Compare data sets and evaluate conclusions using graphs and summary statistics	Weak	NE emphasizes the comparison of data sets, while CC emphasizes the evaluation of reports. CC implies the use of graphs and summary statistics, which are often found in reports.	HS.S-IC.6	Evaluate reports based on data.
12.4.2.b	Support inferences with valid arguments	Partial (knowledge type)	NE content emphasizes the skill, while the CC content emphasizes the concept.	HS.S-IC.1	Understand statistics as a process for making inferences about population parameters based on a random sample from that population.
12.4.2.c	Develop linear equations for linear models to predict	Strong		HS.S-ID.6	Represent data on two quantitative variables on a scatter plot, and

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	unobserved outcomes using regression line and correlation coefficient			describe how the variables are related. c. Fit a linear function for a scatter plot that suggests a linear association.
				HS.S-ID.8 Compute (using technology) and interpret the correlation coefficient of a linear fit.
12.4.2.d	Recognize when arguments based on data confuse correlation with causation	Strong		HS.S-ID.9 Distinguish between correlation and causation.
MA 12.4.3 Probability: Students will apply and analyze concepts of probability.				
12.4.3.a	Construct a sample space and a probability distribution	Strong		HS.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”).
				HS.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.
				HS.S-MD.3 (+) Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can

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				<p>be calculated; find the expected value. <i>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.</i></p>
				<p>HS.S-MD.4</p> <p>(+) Develop a probability distribution for a random variable defined for a sample space in which probabilities are assigned empirically; find the expected value. <i>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?</i></p>
		CC	NE content is in high school; CC content is in grade 7.	<p>7.SP.8</p> <p>8. Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.</p> <p>a. Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.</p> <p>b. Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event</p>

* Rigor: CC: Common Core standards are more rigorous; NE: Nebraska standards are more rigorous

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				described in everyday language (e.g., “rolling double sixes”), identify the outcomes in the sample space which compose the event
12.4.3.b	Identify dependent and independent events and calculate their probabilities	Strong		<p>HS.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.</p> <p>HS.S-CP.3 Understand the conditional probability of A given B as $P(A \text{ and } B)/P(B)$, 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.</p> <p>HS.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.</p> <p>HS.S-CP.7 Apply the Addition Rule, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$, and interpret the answer in terms of the model.</p>

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Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
				HS.S-CP.8 Apply the general Multiplication Rule in a uniform probability model, $P(A \text{ and } B) = P(A)P(B A) = P(B)P(A B)$, and interpret the answer in terms of the model.
12.4.3.c	Use the appropriate counting techniques to determine the probability of an event (e.g., combinations, permutations)	Strong		HS.S-CP.9 Use permutations and combinations to compute probabilities of compound events and solve problems.
12.4.3.d	Analyze events to determine if they are mutually exclusive	Partial (specificity)	NE specifies analyzing for mutual exclusivity.	HS.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.
12.4.3.e	Determine the relative frequency of a specified outcome of an event to estimate the probability of the outcome	Partial (emphasis and phrasing)	Content is similar, with some differences in emphasis and phrasing.	HS.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. <i>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</i>

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Mathematics Alignment Study

Nebraska Mathematics Standards	Content Alignment	More Rigor*	Comments	Common Core Standards
<i>compare the results.</i>				

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