

For the Nebraska Department of Education

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

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MREL

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Document Overview

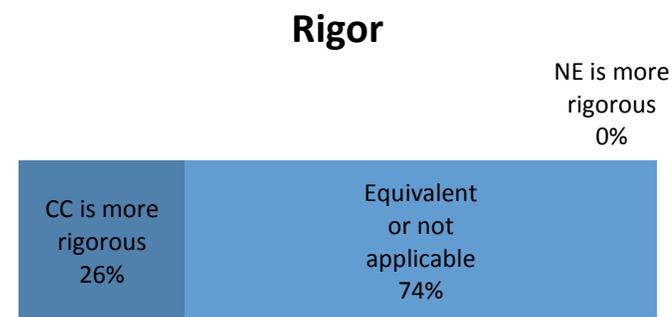
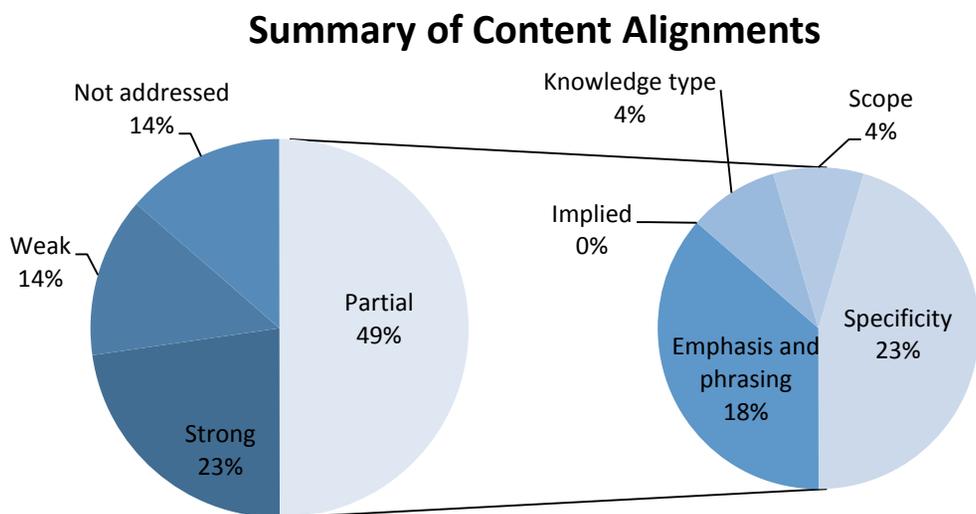
This document is a tool for understanding the relationship between the *Common Core State Standards for Mathematics* and the *Nebraska Mathematics Standards*. It is organized by the Common Core standards and presents an analysis, done from the perspective of the Common Core, of how content in the Common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

The analysis used two categories of criteria to compare the Common Core and Nebraska 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 Common Core content is addressed in the Nebraska standards

How well the Common Core mathematics content is addressed in the Nebraska 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 Nebraska fully addresses the content of the Common Core. 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 a standard in the Common Core could not be aligned to Nebraska standards or indicators, 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 Nebraska addressed content found in the Common Core 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 standards or 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 Common Core Mathematics Standards are not also addressed by the Nebraska Standards for Mathematics. The topics not found in the Nebraska standards are related to specific aspects of counting forward from a given number, making ten from any number, describing objects in the environment with shape names, and forming larger shapes from smaller ones. The majority of the topics are fully addressed; only two standards received a weak alignment rating. These two standards are related to specific aspects of measurement and three-dimensional shapes. Most of the content related to simple counting, comparing numbers, addition and/or subtraction are fully covered in the Nebraska standards. The majority of partial alignments are due to emphasis and phrasing or specificity; meaning that the Nebraska standards are not as specific as Common Core or there are notable differences in emphasis and phrasing. In general, the Common Core standards often highlight different aspects of content found in the Nebraska standards, either through phrasing or by adding specific knowledge and skills to the standard. Examples of differences include that the Common Core identifies the kinds of arrangements of objects (a line, a rectangular array, etc.) students should use when counting, or that students should “decompose numbers into pairs,” (Common Core phrasing), while the Nebraska standards simply state that students should identify equivalent representations of objects. In regards to rigor, the Common Core standards were found to require some expectations at an earlier grade level than the Nebraska standards, for example, expectations related to writing equations for addition and subtraction problems, and naming the parts of shapes.

Of the 22 rated standards in the Common Core for kindergarten, 19 are addressed and only 3 are not addressed by the Nebraska Standards. Of those addressed, 5 are strong alignments, 11 are partial alignments, and 3 are weak alignments.

Mathematics Alignment Study

Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
Kindergarten				
Counting and Cardinality				
Know number names and the count sequence.				
K.CC.1	Count to 100 by ones and by tens.	Strong	CC	Common core content is in Kindergarten; NE content is in grade 1.
				1.1.1.a Count, read, and write numbers 0 – 100
				1.1.1.d Count by multiples of 10 up to 100
				0.1.1.a Count, read and write numbers 0 – 20
K.CC.2	Count forward beginning from a given number within the known sequence (instead of having to begin at 1).	Not addressed		
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).	Strong		0.1.1.a Count, read and write numbers 0 - 20
				0.1.1. d Match numerals to the quantities they represent 0 - 20, using a variety of models and representations

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

Mathematics Alignment Study

Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards		
Count to tell the number of objects.						
K.CC.4	Understand the relationship between numbers and quantities; connect counting to cardinality.	Partial (knowledge type)	CC content emphasizes the concept while NE content emphasizes the skill.			
					0.1.1.b	Count objects using one-to-one correspondence 0 - 20
					1.1.1.g	Connect number words to the quantities they represent 0 – 20
				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)	
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.	Partial (specificity)	CC is more specific.	0.1.1.a	Count, read and write numbers 0 – 20.	
				0.1.1.b	Count objects using one-to-one correspondence 0 – 20.	
				0.1.1.d	Match numerals to the quantities they represent 0 – 20, using a variety of models and	

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Mathematics Alignment Study

Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
representations.					
Compare numbers.					
K.CC.6	Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies.	Partial (emphasis and phrasing)	Content is similar, with some difference in phrasing. CC specifies the use of strategies.	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)
				0.4.1.c	Compare the attributes of the data (e.g., most, least, same).
K.CC.7	Compare two numbers between 1 and 10 presented as written numerals.	Strong		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)
Operations and Algebraic Thinking					
Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.					
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.	Partial (specificity)	CC specifies the use of fingers, mental images, drawings, and sounds	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?).
				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?).
				0.3.2.a	Model situations that involve the

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
				addition and subtraction of whole numbers 0 - 10 using objects
		CC	CC content is in Kindergarten; NE content is in grade 1.	1.1.2.a Use objects, drawings, words, and symbols to explain addition as a joining action
		CC	CC content is in kindergarten; NE content is in grade 1.	1.1.2.c Use objects, drawings, words, and symbols to explain subtraction as a separation action
K.OA.2	Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.	Strong		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?).
				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?)
				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?)

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
				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?)
K.OA.3	Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., $5 = 2 + 3$ and $5 = 4 + 1$).	Partial (emphasis and phrasing)	Content is similar, with some differences in emphasis and phrasing.	0.1.1.e	Demonstrate and identify multiple equivalent representations for numbers 1 - 10 (e.g., 10 is 1 and 9; 10 is 6 and 4)
K.OA.4	For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation.	Not addressed			
K.OA.5	Fluently add and subtract within 5.	Strong	NE content is in grade 1, but is more difficult.	1.1.3.a 1.1.3.b	Fluently add whole number sums up to 10. Fluently subtract whole number differences from 10
Number and Operations in Base Ten					
Work with numbers 11–19 to gain foundations for place value.					
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	Partial (specificity)	CC is more specific. NE content is in grade 1, but is more difficult.	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;

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
	decomposition by a drawing or equation (such as $18 = 10 + 8$); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.			23 is 23 ones)	
Measurement and Data					
Describe and compare measurable attributes.					
K.MD.1	Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.	Weak	CC	CC content includes several measurable attributes of a single object. CC content is in kindergarten; NE content is in grade 1.	1.2.5.f Compare and order objects according to length
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>	Weak	CC	CC includes describing the difference between measurable attributes in addition to length.	1.2.5.f Compare objects according to length
Classify objects and count the number of objects in each category.					
K.MD.3	Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.	Partial (emphasis and phrasing)		Content is similar, with some differences in emphasis and phrasing.	0.4.1.a Sort and classify objects according to an attribute (e.g., size, color, shape)
					0.1.1.b Count objects using one-to-one

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
correspondence 0 - 20					
Geometry					
Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres).					
K.G.1	Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as above, below, beside, in front of, behind, and next to.	Partial (scope)	CC includes describing objects in the environment and using shape names.	0.2.4.a	Demonstrate positional words (e.g., above/below, near/far, over/under, in/out, down/up, around/through)
				0.2.1.a	Sort and name two-dimensional shapes (e.g., square, circle, rectangle, triangle)
K.G.2	Correctly name shapes regardless of their orientations or overall size.	Partial (specificity)	CC specifies being able to name shapes regardless of orientation or size.	0.2.1.a	Sort and name two-dimensional shapes (e.g., square, circle, rectangle, triangle)
				2.2.1.d	Identify solid shapes (e.g., triangular prism, rectangular prisms, cones, cylinders, pyramids, spheres)
K.G.3	Identify shapes as two-dimensional (lying in a plane, “flat”) or three-dimensional (“solid”).	Weak	Content is similar, with significant differences in emphasis.	0.2.1.a	Sort and name two-dimensional shapes (e.g., square, circle, rectangle, triangle)
			NE content is in grade 2, but is more difficult.	2.2.1.d	Identify solid shapes (e.g., triangular prism, rectangular prisms, cones, cylinders, pyramids, spheres)
Analyze, compare, create, and compose shapes.					

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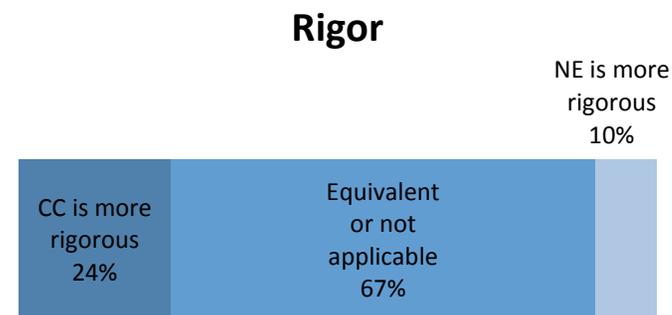
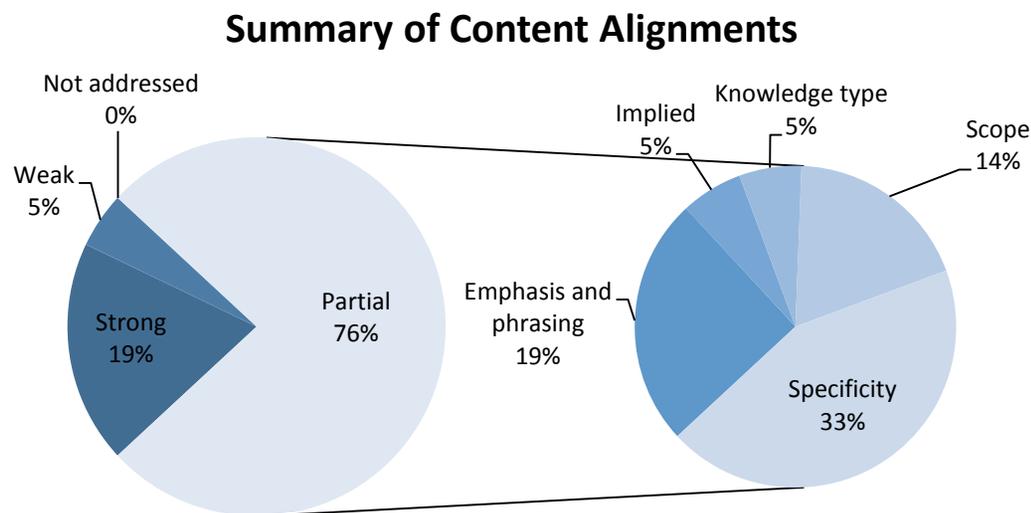
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Common Core Standards		Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
K.G.4	Analyze and compare a variety of two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, parts (e.g., number of sides and vertices/“corners”) and other attributes (e.g., having sides of equal length).	Partial (specificity)	CC	CC is more specific. CC content is in kindergarten; NE content is in grade 1.	1.2.1.b	Describe attributes of two-dimensional shapes (e.g., square, circle, rectangle, triangle)
K.G.5	Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.	Partial (emphasis and phrasing)	CC	Content is similar, with some difference in emphasis and phrasing. CC content is in kindergarten; NE content is in grade 1.	1.2.4.b	Sketch two-dimensional shapes (e.g., square, circle, rectangle, triangle)
			CC	CC content is in kindergarten; NE content is in grade 3.	3.2.4.b	Build three-dimensional objects (e.g., using clay for rectangular prisms, cone, cylinder)
K.G.6	Compose simple shapes to form larger shapes. For example, “Can you join these two triangles with full sides touching to make a rectangle?”	Not addressed				

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

How well the Common Core mathematics content is addressed in the Nebraska 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 Nebraska fully addresses the content of the Common Core. 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 a standard in the Common Core could not be aligned to Nebraska standards or indicators, 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 Nebraska addressed content found in the Common Core 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 standards or 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

Nearly all of the topics found in the Common Core Mathematics Standards are addressed by the Nebraska Standards for Mathematics. The topics not found in the Nebraska standards are all specific aspects of standards that are at least partially addressed. These standards were rated as Partial (scope), or Weak. These topics include determining if equations are true or false, relating problem-solving strategies to a written method and explaining reasoning, and composing shapes to make more complex shapes. Most of the content related to solving word problems with addition and/or subtraction, determining unknown numbers, and counting to 120 are fully covered in the Nebraska standards and received strong ratings. The majority of partial alignments are due to emphasis and phrasing or specificity; meaning that the Nebraska standards are not as specific as Common Core or there are notable differences in emphasis and phrasing. In general, the Common Core State Standards often highlight different aspects of content that is found in the Nebraska standards, either through phrasing or by adding specific knowledge and skills to the standard. For example, the Common Core emphasizes using the properties as strategies to add and subtract, while Nebraska emphasizes using representations of the properties. An example of a specificity difference includes Common Core specifying two-digit numbers based on meanings of the tens and ones digits. In regards to rigor, the Common Core standards were found to require a few expectations at an earlier grade level than the Nebraska standards, for example, expectations related to applying properties of operations as strategies to add and subtract. Even though these expectations are for 1st grade in Common Core, they are not found until 5th grade for Nebraska's standards or indicators.

Of the 21 rated standards in the Common Core for 1st grade, all are addressed by the Nebraska Standards. Of the 21 alignments, 4 are strong, 16 are partial alignments, and 1 is weak.

Mathematics Alignment Study

Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
Grade 1				
Operations and Algebraic Thinking				
Represent and solve problems involving addition and subtraction.				
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.	Strong		1.3.2.a Model situations that involve the addition and subtraction of whole numbers 0 - 20, using objects and pictures 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?)
1.OA.2	Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.	Partial (specificity)	CC specifies three whole numbers whose sum is less than or equal to 20.	1.1.2.a Use objects, drawings, words, and symbols to explain addition as a joining action 1.3.2.a Model situations that involve the addition and subtraction of whole numbers 0 - 20, using objects and pictures
Understand and apply properties of operations and the relationship between addition and subtraction.				
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	Partial (emphasis and phrasing)	CC emphasizes using the properties as strategies to add and subtract, while NE emphasizes using representations of the properties. CC CC content is in grade 1; NE content	1.3.3.b Use concrete, pictorial, and verbal representations of the commutative property of addition 5.3.3.b Use symbolic representations of the associative property (e.g., $(2 +$

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
	added to make a ten, so $2 + 6 + 4 = 2 + 10 = 12$. (Associative property of addition.)		is in grade 5.	$3) + 4 = 2 + (3 + n)$, $(2 \times 3) \times 4 = 2 \times (3 \times n)$
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.	Strong		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 $5 - 3 = 2$) 1.3.3.a Write number sentences to represent fact families
Add and subtract within 20.				
1.OA.5	Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).	Partial (emphasis and phrasing)	CC emphasizes relating counting to addition and subtraction, while ND emphasizes addition as a joining action, and subtraction as a separation action	1.1.2.a Use objects, drawings, words, and symbols to explain addition as a joining action 1.1.2.c Use objects, drawings, words, and symbols to explain subtraction as a separation action
1.OA.6	Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten (e.g., $8 + 6 = 8 + 2 + 4 = 10 + 4 = 14$); decomposing a number leading to a ten (e.g., $13 - 4 = 13 - 3 - 1 = 10 - 1 = 9$); using the relationship	Partial (emphasis and phrasing)	CC emphasizes relationships between addition and subtraction, while NE emphasizes modeling situations that involve addition and subtraction	1.3.2.a Model situations that involve the addition and subtraction of whole numbers 0 - 20, using objects and pictures 1.1.3.d Use a variety of methods and tools to compute sums and differences (e.g., models, mental computation, paper-pencil)

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
	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.a	Fluently add whole number sums up to 10
				1.1.3.b	Fluently subtract whole number differences from 10
Work with addition and subtraction equations.					
1.OA.7	Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. For example, which of the following equations are true and which are false? $6 = 6$, $7 = 8 - 1$, $5 + 2 = 2 + 5$, $4 + 1 = 5 + 2$.	Partial (scope)	CC includes determining if equations involving addition and subtraction are true or false.	1.3.1.d	Use $<$, $=$, $>$ to compare quantities
1.OA.8	Determine the unknown whole number in an addition or subtraction equation relating to three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations $8 + ? = 11$, $5 = ? - 3$, $6 + 6 = ?$.	Strong	CC content is in grade 1; NE content is in grade 3.	3.3.3.b	Solve simple one-step whole number equations involving addition and subtraction (e.g., $\Delta + 2 = 3$)

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
Number and Operations in Base Ten				
Extend the counting sequence.				
1.NBT.1	Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.	Strong	CC	CC content is in grade 1; NE content is in grade 2.
				1.1.1.a Count, read, and write numbers 0 - 100
				2.1.1.a Read and write numbers 0 - 1,000 (e.g., count numbers from 400 - 500; write numbers from 400 - 500)
Understand place value.				
1.NBT.2	Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases: a. 10 can be thought of as a bundle of ten ones — called a “ten.” b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones. c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).	Partial (knowledge type)	The CC content emphasizes the concept, while the NE content emphasizes the skill.	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)
1.NBT.3	Compare two two-digit numbers based on meanings of the tens and ones digits, recording the	Partial (specificity)	CC specifies two-digit numbers based on meanings of the tens and ones	1.1.1.i Compare and order whole numbers 0 - 100

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
	results of comparisons with the symbols $>$, $=$, and $<$.		digits.	1.3.1.d Use $<$, $=$, $>$ to compare quantities
Use place value understanding and properties of operations to add and subtract.				
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.	Partial (scope)	CC	CC includes relating the strategy to a written method and explaining the reasoning used. CC content is in grade 1; NE content is in grade 2.
				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 $5 - 3 = 2$)
				2.1.3.c Add and subtract three-digit whole numbers with regrouping
				1.1.3.d Use a variety of methods and tools to compute sums and differences (e.g., models, mental computation, paper-pencil)
1.NBT.5	Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.	Partial (specificity)	CC is more specific.	1.1.3.d Use a variety of methods and tools to compute sums and differences (e.g., models, mental computation, paper-pencil)

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

Mathematics Alignment Study

Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
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.	Partial (scope)	CC includes relating the strategy to a written method and explaining the reasoning used.	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 $5 - 3 = 2$)
				1.1.3.c	Add and subtract two-digit numbers without regrouping
				1.1.3.d	Use a variety of methods and tools to compute sums and differences (e.g., models, mental computation, paper-pencil)
				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)
Measurement and Data					
Measure lengths indirectly and by iterating length units.					
1.MD.1	Order three objects by length; compare the lengths of two objects indirectly by using a third object.	Partial (specificity)	CC is more specific.	1.2.5.f	Compare and order objects according to length
		NE	CC content is in grade 1; NE content is in kindergarten.	0.2.5.c	Measure using nonstandard units

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

Mathematics Alignment Study

Common Core Standards		Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
1.MD.2	Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. <i>Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.</i>	Partial (implied)	NE	NE implies that students will use same-size length units that span an object with no gaps or overlaps. CC content is in grade 1; NE content is in kindergarten.	0.2.5.c	Measure using nonstandard units
					2.2.5.d	Measure length using feet and yards
Tell and write time.						
1.MD.3	Tell and write time in hours and half-hours using analog and digital clocks.	Partial (specificity)		CC specifies writing time and analog and digital clocks.	0.2.5.b	Identify time to the hour
					1.2.5.b	Identify time to the half hour
Represent and interpret data.						
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.	Partial (specificity)		CC specifies up to three categories of data and interpreting as well as organizing and representing the data.	1.4.1.c	Represent data by using tally marks
					1.4.1.d	Compare and interpret information from displayed data (e.g., more, less, fewer)
Geometry						
Reason with shapes and their attributes.						
1.G.1	Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-	Partial (emphasis and phrasing)		CC emphasizes distinguishing between defining and non-defining attributes, while NE emphasizes	1.2.1.b	Describe attributes of two-dimensional shapes (e.g., square,

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

Mathematics Alignment Study

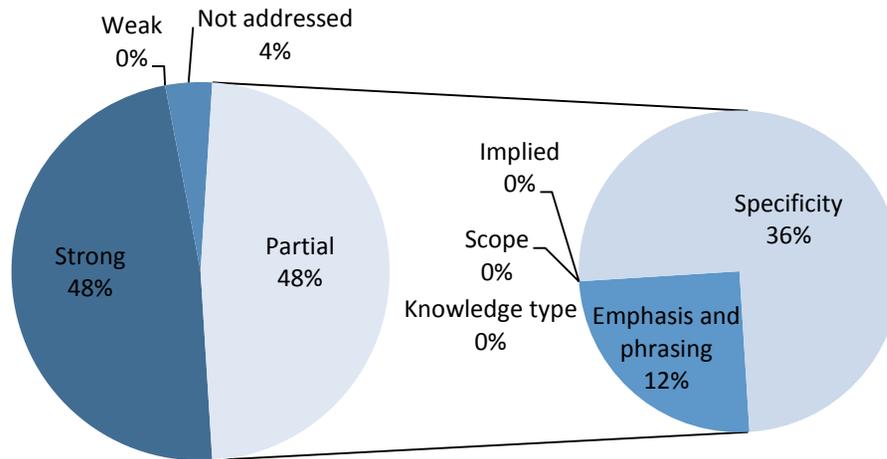
Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
	defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.		describing the attributes.		circle, rectangle, triangle)
				1.2.1.a	Compare two-dimensional shapes (e.g., square, circle, rectangle, triangle)
				1.2.4.b	Sketch two-dimensional shapes (e.g., square, circle, rectangle, triangle)
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.	Weak	CC includes composing shapes to make more complex shapes.	2.2.1.d	Identify solid shapes (e.g., triangular prism, rectangular prisms, cones, cylinders, pyramids, spheres)
				1.2.4.b	Sketch two-dimensional shapes (e.g., square, circle, rectangle, triangle)
1.G.3	Partition circles and rectangles into two and four equal shares, describe the shares using the words halves, fourths, and quarters, and use the phrases half of, fourth of and quarter of. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares.	Partial (specificity)	CC CC is more specific. CC content is in grade 1; NE content is in grade 3. CC content is in grade 1; NE content is in grade 2.	3.1.1.h	Find parts of whole and parts of a set for $\frac{1}{2}$, $\frac{1}{3}$, or $\frac{1}{4}$
				2.1.1.h	Use visual models to represent fractions of one-half as a part of a whole

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

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

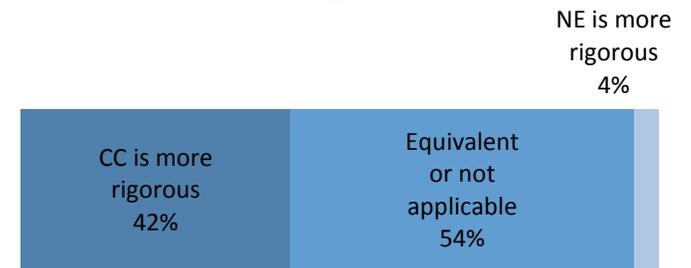
How well the Common Core mathematics content is addressed in the Nebraska standards at this grade is summarized in two categories, content alignment and rigor. The findings are depicted in the graphs below. **Content alignment** characterizes the nature of the content match between the Common Core and Nebraska standards. A *Strong* match indicates Nebraska fully addresses the content of the Common Core. 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 a standard in the Common Core could not be aligned to Nebraska standards or indicators, 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 Nebraska addressed content found in the Common Core 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 standards or 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 2 Overview

All except one of the Common Core Mathematics Standards are addressed by the Nebraska Standards for Mathematics. The topic of the standard not addressed is specific content related to comparing units of length. Most of the content related to solving word problems with addition and/or subtraction; counting, reading, writing, and comparing three-digit numbers; and measurement of objects are fully covered in the Nebraska standards and received strong ratings. The majority of partial alignments are due to specificity; meaning that the Nebraska standards are not as specific as Common Core. For example, while both documents include modeling situations involving addition and subtraction, the Common Core standards included the detail that students should use modeling situations involving lengths. It is unclear from the Nebraska standard whether students must address the same details as specified in the Common Core. In regards to rigor, the majority of the standards were found to be at the same level of rigor as the Common Core standards. For the standards that did show a grade discrepancy, the majority of standards were within one grade (e.g., Nebraska content is in grade 3; Common Core content is in grade 2). Topics that were two or more grades apart include estimation of length, the concept of odd and even, and line plots.

Of the 25 rated standards in the Common Core for 2nd grade, all except 1 are addressed by the Nebraska Standards. Of those addressed, 12 are strong, 12 are partial, and none are weak alignments.

Mathematics Alignment Study

Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
Grade 2					
Operations and Algebraic Thinking					
Represent and solve problems involving addition and subtraction.					
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.	Strong	CC	CC content is in grade 2; NE content is in grade 3.	3.3.3.b Solve simple one-step whole number equations involving addition and subtraction (e.g., $\Delta + 2 = 3$)
					2.3.2.a Model situations that involve the addition and subtraction of whole numbers 0 - 100, using objects and number lines
			NE	CC content is in grade 2; NE content is in grade 1.	1.1.2.c Use objects, drawings, words, and symbols to explain subtraction as a separation action
Add and subtract within 20.					
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.	Strong			2.1.3.a Fluently add whole number facts with sums to 20
					2.1.3.b Fluently subtract whole number facts with differences from 20
			NE	CC content is in grade 2; NE content is in grade 1.	1.1.3.d Use a variety of methods and tools to compute sums and differences (e.g., models, mental computation, paper-pencil)

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

Mathematics Alignment Study

Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards		
Work with equal groups of objects to gain foundations for multiplication						
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.	Partial (specificity)	CC	CC specifies expressing an even number as a sum of two equal addends. CC content is in grade 2; NE content is in grade 4.	4.1.1.d	Classify a number as even or odd
					2.1.1.b	Count by multiples of 2 up to 100
2.OA.4	Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.	Partial (emphasis and phrasing)	CC	CC emphasizes the use of addition, while NE emphasizes explaining the meaning of multiplication. CC content is in grade 2; NE content is in grade 3.	3.1.2.a	Represent multiplication as repeated addition using objects, drawings, words, and symbols (e.g., $3 \times 4 = 4 + 4 + 4$)
					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 $3 \times 4 = 12$)
Number and Operations in Base Ten						
Understand place value.						
2.NBT.1	Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand	Partial (specificity)		CC is more specific.	2.1.1.e	Demonstrate multiple 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)

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

Mathematics Alignment Study

Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
<p>the following as special cases: a. 100 can be thought of as a bundle of ten tens — called a “hundred.” b. The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).</p>					
2.NBT.2	Count within 1000; skip-count by 5s, 10s, and 100s.	Strong	CC	CC content is in grade 2; NE content is in grade 3.	3.1.1.d Count by multiples of 100 to 1,000 3.1.1.b Count by multiples of 5 to 200 3.1.1.c Count by multiples of 10 to 400
2.NBT.3	Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.	Strong			2.1.1.a Read and write numbers 0 - 1,000 (e.g., count numbers from 400 - 500; write numbers from 400 - 500) 2.1.1.e Demonstrate multiple 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)
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.	Strong			2.1.1.e Demonstrate multiple 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)

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

Mathematics Alignment Study

Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
				2.1.1.f Compare and order whole numbers 0 - 1,000
				1.3.1.d Use $<$, $=$, $>$ to compare quantities
Use place value understanding and properties of operations to add and subtract.				
2.NBT.5	Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.	Strong		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 $5 - 3 = 2$)
				2.1.3.d Use a variety of methods and tools to compute sums and differences (e.g., models, mental computation, paper–pencil)
				1.3.3.b Use concrete, pictorial, and verbal representations of the commutative property of addition
2.NBT.6	Add up to four two-digit numbers using strategies based on place value and properties of operations.	Partial (specificity)	CC is more specific.	2.1.3.d Use a variety of methods and tools to compute sums and differences (e.g., models, mental computation, paper–pencil)
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	Strong		2.1.3.c Add and subtract three-digit whole numbers with regrouping
				2.1.1.e Demonstrate multiple 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)

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

Mathematics Alignment Study

Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards		
	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.			2.3.2.a	Model situations that involve the addition and subtraction of whole numbers 0 - 100, using objects and number lines	
				2.1.3.d	Use a variety of methods and tools to compute sums and differences (e.g., models, mental computation, paper-pencil)	
2.NBT.8	Mentally add 10 or 100 to a given number 100-900, and mentally subtract 10 or 100 from a given number 100-900.	Partial (emphasis and phrasing)	CC	Content is similar, with some differences in emphasis and phrasing. CC content is in grade 2; NE content is in grade 3.	3.1.1.c	Count by multiples of 10 to 400
			NE	CC content is in grade 2; NE content is in grade 1.	3.1.1.d	Count by multiples of 100 to 1,000
					1.1.3.d	Use a variety of methods and tools to compute sums and differences (e.g., models, mental computation, paper-pencil)
2.NBT.9	Explain why addition and subtraction strategies work, using place value and the properties of operations.	Strong	CC	CC content is in grade 2; NE content is in grade 3.	3.3.3.c	Explain the procedure(s) used in solving simple one-step whole number equations involving addition and subtraction
					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 $5 - 3 = 2$)

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

Mathematics Alignment Study

Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
Measurement and Data				
Measure and estimate lengths in standard units.				
2.MD.1	Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.	Strong		2.2.5.c Identify and use appropriate tools for the attribute being measured (e.g., clock, calendar, thermometer, scale, ruler) 2.2.5.d Measure length using feet and yards
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.	Not addressed		
2.MD.3	Estimate lengths using units of inches, feet, centimeters, and meters.	Strong	CC	CC content is in grade 2; NE content is in grade 4. 4.2.5.e Estimate and measure length using customary (nearest 1/2 inch) and metric (nearest centimeter) units
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.	Strong		2.2.5.e Compare and order objects using inches, feet and yards 2.2.5.d Measure length using feet and yards
Relate addition and subtraction to length.				
2.MD.5	Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g.,	Partial (specificity)	CC specifies modeling situations involving lengths that are given in the same units.	2.3.2.a Model situations that involve the addition and subtraction of whole numbers 0 - 100, using objects and

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Mathematics Alignment Study

Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
	by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.			number lines
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.	Strong		2.2.2.a Identify numbers using location on a vertical number line 2.3.2.a Model situations that involve the addition and subtraction of whole numbers 0 - 100, using objects and number lines
Work with time and money.				
2.MD.7	Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.	Partial (specificity)	CC CC specifies analog and digital clocks. CC content is in grade 2; NE content is in grade 3.	3.2.5.c Identify time of day (e.g., am, pm, noon, midnight) 2.2.5.b Identify time to 5 minute intervals
2.MD.8	Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using \$ and ¢ symbols appropriately. <i>Example: If you have 2 dimes and 3 pennies, how many cents do you have?</i>	Partial (specificity)	CC specifies modeling situations involving money.	3.2.5.b Count mixed coins and bills greater than \$1.00 2.3.2.a Model situations that involve the addition and subtraction of whole numbers 0 - 100, using objects and number lines
Represent and interpret data.				

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

Mathematics Alignment Study

Common Core Standards		Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
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.	Partial (emphasis and phrasing)	CC	Content is similar, with some differences in emphasis and phrasing. CC content is in grade 2; NE content is in grade 4.	4.4.1.a	Represent data using dot/line plots
					2.2.5.d	Measure length using feet and yards
					2.2.5.e	Compare and order objects using inches, feet and yards
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.	Partial (specificity)	CC	CC specifies solving simple put-together, take-apart, and compare problems. CC content is in grade 2; NE content is in grade 3.	3.4.1.a	Represent data using horizontal and vertical bar graphs
					2.4.1.b	Interpret data using pictographs (e.g., 7 more; 2 less; 12 all together)
Geometry						
Reason with shapes and their attributes.						
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.	Partial (specificity)		CC specifies the number of angles or a given number of equal faces of shapes.	2.2.4.a	Sketch two-dimensional shapes (e.g., trapezoid, parallelogram)
					2.2.1.a	Describe attributes of two-dimensional shapes (e.g., trapezoid, parallelogram)
					2.2.1.d	Identify solid shapes (e.g., triangular prism, rectangular prisms, cones, cylinders, pyramids, spheres)

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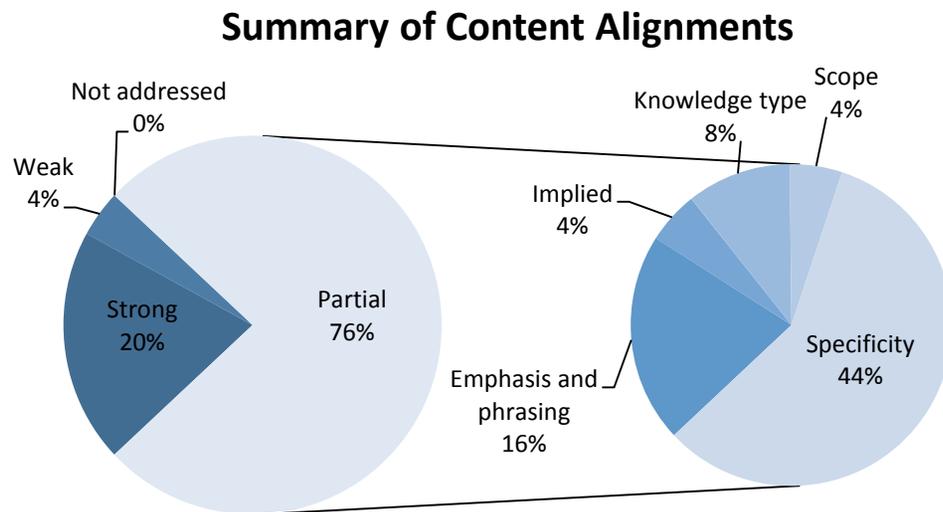
Mathematics Alignment Study

Common Core Standards		Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
2.G.2	Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.	Partial (emphasis and phrasing)		Content is similar, with some differences in emphasis and phrasing.	2.1.1.h	Use visual models to represent fractions of one-half as a part of a whole
			CC	CC content is in grade 2; NE content is in grade 3.	3.1.1.h	Find parts of whole and parts of a set for $\frac{1}{2}$, $\frac{1}{3}$, or $\frac{1}{4}$
2.G.3	Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words <i>halves</i> , <i>thirds</i> , <i>half of</i> , <i>a third of</i> , 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.	Partial (specificity)		CC is more specific.	2.1.1.h	Use visual models to represent fractions of one-half as a part of a whole
			CC	CC content is in grade 2; NE content is in grade 3.	3.1.1.h	Find parts of whole and parts of a set for $\frac{1}{2}$, $\frac{1}{3}$, or $\frac{1}{4}$

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

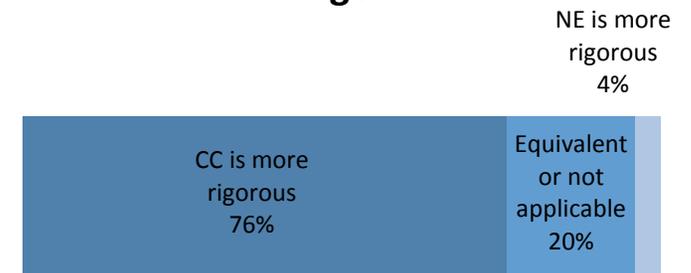
Grade 3: How Common Core content is addressed in the Nebraska standards

How well the Common Core mathematics content is addressed in the Nebraska 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 Nebraska fully addresses the content of the Common Core. 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 a standard in the Common Core could not be aligned to Nebraska standards or indicators, 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 Nebraska addressed content found in the Common Core 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 standards or 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 3 Overview

All of the Common Core *Mathematics* Standards are addressed by the Nebraska Standards for Mathematics. A few of the topics related to interpreting products of whole numbers, determining the unknown whole number in multiplication or division equations, fluently multiplying and dividing within 100, and using appropriate place value to perform multi-digit operations are fully covered in the Nebraska standards. The majority of partial alignments were due to specificity; meaning that the Nebraska standards are not as specific as Common Core. An example of a specificity difference includes Common Core specifying measuring areas by counting unit squares. In regards to rigor, most of the Common Core standards were found to require expectations at an earlier grade level than the Nebraska standards. For example, expectations related to understanding fractions as numbers is expected in 3rd grade for Common core, but is not an expectation until 4th or 5th grade for Nebraska standards or indicators. The majority of the rigor ratings were due to a difference of only one or two grade level expectations. One rigor issue was due to a difference of five grade levels—students are expected to find the perimeter of polygons in 3rd grade for Common Core standards, but they are not expected to master this skill until 8th grade in the Nebraska standards.

Of the 25 rated standards in the Common Core for 3rd grade, all are addressed by the Nebraska Standards. Of the 25 alignments, 5 are strong, 19 are partial, and 1 is weak.

Mathematics Alignment Study

Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
Grade 3					
Operations and Algebraic Thinking					
Represent and solve problems involving multiplication and division.					
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. <i>For example, describe a context in which a total number of objects can be expressed as 5×7.</i>	Strong		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.)	
3.OA.2	Interpret whole-number quotients of whole numbers, e.g., interpret $56 \div 8$ as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. <i>For example, describe a context in which a number of shares or a number of groups can be expressed as $56 \div 8$.</i>	Partial (emphasis and phrasing)	CC	Content is similar, with some differences in emphasis and phrasing. CC content is in grade 3; NE content is in grade 4.	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?)]
3.OA.3	Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and	Partial (specificity)	CC	CC specifies multiplication and division within 100 to solve word problems. CC content is in grade 3;	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

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Mathematics Alignment Study

Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
	measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.		NE content is in grade 4.	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?] 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 $3 \times 4 = 12$)	
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 $8 \times ? = 48$, $5 = ? \div 3$, $6 \times 6 = ?$.	Strong	CC	CC content is in grade 3; NE content is in grade 4.	4.3.3.d Solve simple one-step whole number equations (e.g., $x + 2 = 3$, $3 * y = 6$)
Understand properties of multiplication and the relationship between multiplication and division.					
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 multiplying $3 \times 5 = 15$ then $15 \times 2 = 30$, or by $5 \times 2 =$	Partial (emphasis and phrasing)	CC	CC emphasizes the application of the properties, while NE emphasizes the representation of the properties. CC content is in grade 3; NE content is in grade 4, 5 and 7.	7.3.3.b Use symbolic representation of the distributive property (e.g., $2(x + 3) = 2x + 6$) 5.3.3.b Use symbolic representations of the associative property (e.g., $(2 + 3) + 4 = 2 + (3 + n)$, $(2 \times 3) \times 4 = 2 \times (3$

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Mathematics Alignment Study

Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
	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.)				x n)) 4.3.3.c Use symbolic representations of the commutative property of multiplication (e.g., $2 \times 3 = \Delta \times 2$)
3.OA.6	Understand division as an unknown-factor problem. For example, find $32 \div 8$ by finding the number that makes 32 when multiplied by 8.	Partial (emphasis and phrasing)	Content is similar, with some differences in emphasis and phrasing.	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 $12 \div 3 = 4$.)
Multiply and divide within 100.					
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 end of Grade 3, know from memory all products of two one-digit numbers.	Strong	CC	CC content is in grade 3; NE content is in grade 4.	4.1.3.a Compute whole number division facts 0 - 10 fluently 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 $12 \div 3 = 4$.) 3.1.3.a Compute whole number

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards		
				multiplication facts 0 - 10 fluently		
Solve problems involving the four operations, and identify and explain patterns in arithmetic.						
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.	Partial (specificity)	CC	CC specifies word problems using the four operations. CC content is in grade 3; NE content is in grade 7.	7.3.3.d	Solve two-step equations involving integers and positive rational numbers
					3.1.4.a	Estimate the two-digit product of whole number multiplication and check the reasonableness
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>	Partial (emphasis and phrasing)		Content is similar, with some differences in emphasis and phrasing.	3.1.2.a	Represent multiplication as repeated addition using objects, drawings, words, and symbols (e.g., $3 \times 4 = 4 + 4 + 4$)
					3.3.1.a	Identify, describe, and extend numeric and non-numeric patterns
Numbers and Operations in Base Ten						
Use place value understanding and properties of operations to perform multi-digit arithmetic.						
3.NBT.1	Use place value understanding to round whole numbers to the nearest 10 or 100.	Partial (specificity)		CC specifies the use of place value understanding to round.	3.1.1.i	Round a given number to tens, hundreds, or thousands
3.NBT.2	Fluently add and subtract within	Strong			3.1.3.b	Add and subtract through four-digit

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Mathematics Alignment Study

Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
	1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.			whole numbers with regrouping	
				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)	
				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 $5 - 3 = 2$)	
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.	Strong	CC	CC content is in grade 3; NE content is in grade 4.	4.1.3.e Mentally compute multiplication and division involving powers of 10
				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)	

Number and Operations — Fractions

Develop understanding of fractions as numbers.

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Mathematics Alignment Study

Common Core Standards		Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
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 $1/b$.	Partial (knowledge type)	CC	CC content emphasizes the concept while NE content emphasizes the skill. CC content is in grade 3; NE content is in grade 4.	4.1.1.e	Represent a fraction as parts of a whole and/or parts of a set
					3.1.1.h	Find parts of whole and parts of a set for $1/2$, $1/3$, or $1/4$
3.NF.2	Understand a fraction as a number on the number line; represent fractions on a number line diagram. a. Represent a fraction $1/b$ on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size $1/b$ and that the endpoint of the part based at 0 locates the number $1/b$ on the number line. b. Represent a fraction a/b on a number line diagram by marking off a lengths $1/b$ from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line.	Partial (specificity)	CC	CC is more specific. CC content is in grade 3; NE content is in grade 4.	4.1.1.h	Locate fractions on a number line
					3.2.2.a	Draw a number line and plot points

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Mathematics Alignment Study

Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
3.NF.3	Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.	Partial (specificity)	CC	CC is more specific. CC content is in grade 3; NE content is in grade 5.
	a. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.			5.1.1.b Compare and order whole numbers, fractions, and decimals through the thousandths place 4.1.1.f Use visual models to find equivalent fractions (e.g., $2/4 = 1/2$, $2/8 = 1/4$, $1 = 2/2 = 5/5$, $3/3$) 4.1.1.h Locate fractions on a number line
	b. Recognize and generate simple equivalent fractions, e.g., $1/2 = 2/4$, $4/6 = 2/3$. Explain why the fractions are equivalent, e.g., by using a visual fraction model.			4.1.1.g Determine the size of a fraction relative to one half using equivalent forms (e.g., Is $3/8$ more or less than one half?)
	c. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. Examples: Express 3 in the form $3 = 3/1$; recognize that $6/1 = 6$; locate $4/4$ and 1 at the same point of a number line diagram.			1.3.1.d Use $<$, $=$, $>$ to compare quantities
	d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual			

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
fraction model.					
Measurement and Data					
Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.					
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.	Partial (implied)	CC	NE implies measuring time intervals. CC content is in grade 3; NE content is in grade 4.	4.2.5.b Identify time to the minute on an analog clock 4.2.5.c Solve problems involving elapsed time 3.2.2.b Determine the distance between two whole number points on a number line
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.	Partial (specificity)	CC	CC is more specific. CC content is in grade 3; NE content is in grades 4, 5 and 6.	6.2.5.b Measure volume/capacity using the metric system 5.2.5.e Measure weight (mass) and temperature using metric units 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) 4.3.3.d Solve simple one-step whole number equations (e.g., $x + 2 = 3$, $3 * y = 6$)
Represent and interpret data.					

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Common Core Standards		Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
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. <i>For example, draw a bar graph in which each square in the bar graph might represent 5 pets.</i>	Partial (specificity)	CC	CC specifies two-step “how many more” and “how many less” problems. CC content is in grade 3; NE content is in grades 4.	4.3.3.d	Solve simple one-step whole number equations (e.g., $x + 2 = 3$, $3 * y = 6$)
					3.4.1.b	Use comparative language to describe the data (e.g., increasing, decreasing)
					3.4.1.c	Interpret data using horizontal and vertical bar graphs
					3.4.1.a	Represent data using horizontal and vertical bar graphs
					2.4.1.a	Represent data using pictographs
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.	Partial (specificity)	CC	CC specifies representing measurement data using line plots. CC content is in grade 3; NE content is in grades 5.	5.2.5.c	Estimate and measure length with customary units to the nearest $\frac{1}{4}$ inch
			CC	CC content is in grade 3; NE content is in grade 4.	4.4.1.a	Represent data using dot/line plots
					3.2.5.f	Measure length to the nearest $\frac{1}{2}$ inch and centimeter (e.g., requires rounding)
Geometric measurement: understand concepts of area and relate area to multiplication and to addition.						
3.MD.5	Recognize area as an attribute of plane figures and understand concepts of area measurement.	Partial (knowledge type)	CC	CC content emphasizes the concept while NE content emphasizes the skill. CC content is in grade 3; NE	5.2.5.f	Determine the area of rectangles and squares

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards		
	<p>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.</p> <p>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.</p>		content is in grade 5.			
3.MD.6	Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).	Partial (specificity)	CC	CC specifies measuring areas by counting unit squares. CC content is in grade 3; NE content is in grade 5.	5.2.5.f	Determine the area of rectangles and squares
3.MD.7	<p>Relate area to the operations of multiplication and addition.</p> <p>a. 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.</p> <p>b. Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real-world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.</p> <p>c. Use tiling to show in a concrete case that the area of a rectangle</p>	Weak	CC	CC emphasizes relating area to multiplication and addition. CC content is in grade 3; NE content is in grade 5.	5.2.5.f	Determine the area of rectangles and squares

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
with whole-number side lengths a and $b + c$ is the sum of $a \times b$ and $a \times c$. Use area models to represent the distributive property in mathematical reasoning.				
d. Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real-world problems.				

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

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 perimeters.	Partial (scope)	CC	CC includes finding unknown sides and demonstrating the relationship of perimeter to area. CC content is in grade 3; NE content is in grade 5 and 8.	8.2.5.a 5.2.5.a	Use strategies to find the perimeter and area of complex shapes Select and use appropriate tools to measure perimeter and angles
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Geometry

Reason with shapes and their attributes.

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.,	Partial (specificity)	NE	CC is more specific. CC content is in grade 3; NE content is in grade 2.	2.2.1.a 2.2.1.c	Describe attributes of two-dimensional shapes (e.g., trapezoid, parallelogram) Compare two-dimensional shapes (e.g., trapezoid, parallelogram)
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Mathematics Alignment Study

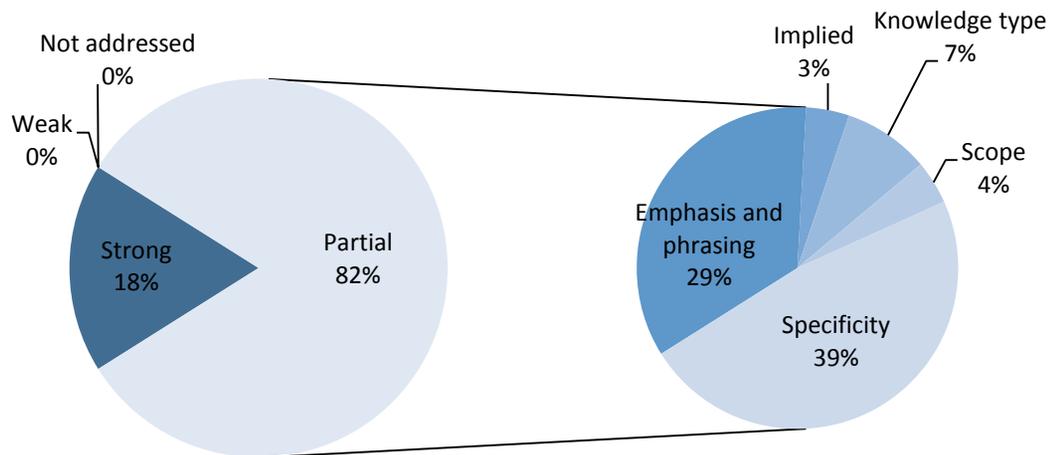
Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
	quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.			2.2.4.a Sketch two-dimensional shapes (e.g., trapezoid, parallelogram)
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.	Partial (specificity)	CC	Content is similar, with some differences in emphasis. CC specifies partitioning shapes into parts with equal areas. CC content is in grade 3; NE content is in grade 5.
				5.2.5.f Determine the area of rectangles and squares
				3.1.1.h Find parts of whole and parts of a set for $\frac{1}{2}$, $\frac{1}{3}$, or $\frac{1}{4}$

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

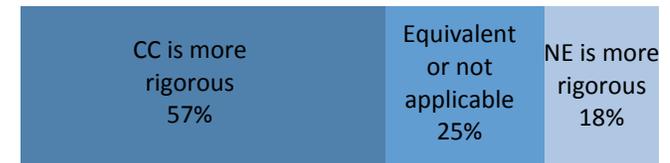
How well the Common Core mathematics content is addressed in the Nebraska standards at this grade is summarized in two categories, content alignment and rigor. The findings are depicted in the graphs below. **Content alignment** characterizes the nature of the content match between the Common Core and Nebraska standards. A *Strong* match indicates Nebraska fully addresses the content of the Common Core. 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 a standard in the Common Core could not be aligned to Nebraska standards or indicators, 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 Nebraska addressed content found in the Common Core 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 standards or 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 4 Overview

All of the Common Core *Mathematics* Standards are addressed by the Nebraska Standards for Mathematics. A few of the topics related to comparing fractions and decimals; measuring angles in degrees; and drawing points, lines, line segments, rays, and angles are fully covered in the Nebraska standards. The majority of partial alignments were due to emphasis and phrasing, and specificity. The Common Core standards place a different emphasis than Nebraska on some content, for example, the Common Core emphasizes relative sizes of measurement units, while NE emphasizes converting between units. In addition, some of the Nebraska standards are not as specific as Common Core. For example, Common Core specifies real world and mathematical problems, while Nebraska standards do not. With regards to rigor, a majority of the Common Core standards were found to require expectations at an earlier grade level than the Nebraska standards. For example, understanding fractions as multiples of another fraction is expected in 4th grade for Common Core, but is not an expectation until 7th grade for Nebraska standards or indicators. The majority of the rigor ratings were due to a difference of only one or two grade level expectations.

Of the 28 rated standards in the Common Core for 4th grade, all are addressed by the Nebraska Standards. Of the 28 alignments, 5 are strong, 23 are partial, and none are weak.

Mathematics Alignment Study

Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
Grade 4				
Operations and Algebraic Thinking				
Use the four operations with whole numbers to solve problems.				
4.OA.1	Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.	Partial (emphasis and phrasing)	NE Content is similar, with some difference in emphasis and phrasing. CC content is in grade 4; NE content is in grade 3.	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.)
4.OA.2	Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.	Partial (emphasis and phrasing)	CC emphasizes multiplicative comparisons, while NE emphasizes modeling change.	4.3.2.b Describe and model quantitative change involving multiplication (e.g., money doubling)
4.OA.3	Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a	Partial (specificity)	CC specifies interpreting the remainder in a context.	5.3.2.a Model situations that involve the addition, subtraction, and multiplication of positive rational numbers using words, graphs, and tables 4.1.3.d Divide a three-digit number with one digit divisor with and without a

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Mathematics Alignment Study

Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
	letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.				remainder
				4.1.4.a	Estimate the three-digit product and the two-digit quotient of whole number multiplication and division and check the reasonableness
				4.3.3.a	Represent the idea of a variable as an unknown quantity using a letter or a symbol (e.g., $n + 3$, $b - 2$)
				4.4.1.i	Round a whole number to millions
Gain familiarity with factors and multiples.					
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.	Partial (specificity)	CC	CC is more specific. CC content is in grade 4; NE content is in grade 5.	5.1.1.f Identify factors and multiples of any whole number 5.1.1.e Classify a number as prime or composite
Generate and analyze patterns.					
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	Partial (specificity)	CC	CC specifies describing and making generalizations about apparent features of the pattern not explicit in the rule itself. CC content is in grade 4; NE content is in grade 5.	5.3.1.a Describe, extend, apply rules, and make generalizations about numeric, and geometric patterns

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
	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.a	Describe, extend, and apply rules about numeric patterns
Number and Operations in Base Ten					
Generalize place value understanding for multi-digit whole numbers.					
4.NBT.1	Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. For example, recognize that $700 \div 70 = 10$ by applying concepts of place value and division.	Partial (knowledge type)	The CC content emphasizes the concept, while the NE content emphasizes the skill.	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 thousand; 2,350 is 235 tens; 2,350 is $2,000 + 300 + 50$; 2,350 is 23 hundreds and 5 tens)
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.	Partial (emphasis and phrasing)	Content is similar, with some difference in emphasis and phrasing.	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)
			NE CC content is in grade 4; NE content is in grade 3.	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)
			NE CC content is in grade 4; NE content is in grade 3.	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

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards		
					thousand; 2,350 is 235 tens; 2,350 is 2,000 + 300 + 50; 2,350 is 23 hundreds and 5 tens)	
		NE	CC content is in grade 4; NE content is in grade 1.	1.3.1.d	Use <, =, > to compare quantities	
4.NBT.3	Use place value understanding to round multi-digit whole numbers to any place.	Partial (specificity)	CC	CC specifies place value understanding. CC content is in grade 4; NE content is in grade 5.	5.1.1.g	Round whole numbers and decimals to any given place
Use place value understanding and properties of operations to perform multi-digit arithmetic.						
4.NBT.4	Fluently add and subtract multi-digit whole numbers using the standard algorithm.	Partial (specificity)	NE	CC specifies using the standard algorithm to add and subtract. CC content is in grade 4; NE content is in grade 3.	3.1.3.b	Add and subtract through four-digit whole numbers with regrouping
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.	Partial (scope)	CC	CC includes area models. CC content is in grade 4; NE content is in grade 5.	5.1.2.c	Use words and symbols to explain the distributive property of multiplication over addition (e.g., $5(y + 2) = 5y + 5(2)$)
					5.1.2.b	Use words and symbols to explain the meaning of the commutative and associative properties of addition and multiplication
					4.1.3.c	Multiply two-digit whole numbers
					3.1.2.d	Use drawings, words, and symbols to explain the meaning of multiplication using an array (e.g.,

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Mathematics Alignment Study

Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
				an array with 3 rows and 4 columns represents the multiplication sentence $3 \times 4 = 12$)
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.	Partial (emphasis and phrasing)	Content is similar, with some difference in emphasis and phrasing. CC includes area models.	4.1.3.d Divide a three-digit number with one digit divisor with and without a remainder 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 $12 \div 3 = 4$.) 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 $3 \times 4 = 12$)

Number and Operations — Fractions

Extend understanding of fraction equivalence and ordering.

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 even though the two fractions themselves are the same size. Use this principle to	Partial (specificity)	CC is more specific.	4.1.1.f Use visual models to find equivalent fractions (e.g., $2/4 = 1/2$, $2/8 = 1/4$, $1 = 2/2 = 5/5$, $3/3$)
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Mathematics Alignment Study

Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
				recognize and generate equivalent fractions.	
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 indicator fraction such as $1/2$. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual fraction model.	Strong	CC	CC content is in grade 4; NE content is in grade 5.	5.1.1.b Compare and order whole numbers, fractions, and decimals through the thousandths place
			CC	CC content is in grade 4; NE content is in grade 5.	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)
					4.1.1.f Use visual models to find equivalent fractions (e.g., $2/4 = 1/2$, $2/8 = 1/4$, $1 = 2/2 = 5/5$, $3/3$)
Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.					
4.NF.3	Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$.	Partial (specificity)		CC is more specific.	
	a. Understand addition and subtraction of fractions as joining and separating parts referring to		CC	CC content is in grade 4; NE content is in grade 6.	6.1.2.a Use drawings, words, and symbols to explain the meaning of addition

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Mathematics Alignment Study

Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
	the same whole.			and subtraction of fractions
	b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. Examples: $\frac{3}{8} = \frac{1}{8} + \frac{1}{8} + \frac{1}{8}$; $\frac{3}{8} = \frac{1}{8} + \frac{2}{8}$; $2\frac{1}{8} = 1 + 1 + \frac{1}{8} = \frac{8}{8} + \frac{8}{8} + \frac{1}{8}$.			
	c. 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.	CC	CC content is in grade 4; NE content is in grade 5.	5.1.3.a Add and subtract positive rational numbers (e.g., proper and improper fractions, mixed numbers, fractions with common and uncommon denominators, decimals through the thousandths place)
	d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.	CC	CC content is in grade 4; NE content is in grade 5.	5.3.2.a Model situations that involve the addition, subtraction, and multiplication of positive rational numbers using words, graphs, and tables
4.NF.4	Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.	Partial (specificity)	CC is more specific.	

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Mathematics Alignment Study

Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
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 $5/4 = 5 \times (1/4)$.		CC	CC content is in grade 4; NE content is in grades 7.	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.)	
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, $n \times (a/b) = (n \times a)/b$.)				4.1.1.f Use visual models to find equivalent fractions (e.g., $2/4 = 1/2$, $2/8 = 1/4$, $1 = 2/2 = 5/5$, $3/3$)	
c. Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. <i>For example: If each person at a party will eat $3/8$ of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?</i>		CC	CC content is in grade 4; NE content is in grades 5.	5.3.2.a Model situations that involve the addition, subtraction, and multiplication of positive rational numbers using words, graphs, and tables	
Understand decimal notation for fractions, and compare decimal fractions.					
4.NF.5	Express a fraction with denominator 10 as an equivalent	Partial (emphasis	CC	Content is similar, with some difference in emphasis and phrasing.	5.1.3.a Add and subtract positive rational numbers (e.g., proper and

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Mathematics Alignment Study

Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100. <i>For example, express $3/10$ as $30/100$ and add $3/10 + 4/100 = 34/100$.</i>	and phrasing)		CC content is in grade 4; NE content is in grade 5.	improper fractions, mixed numbers, fractions with common and uncommon denominators, decimals through the thousandths place)	
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.	Partial (specificity)	CC	CC specifies fractions with denominators 10 or 100. CC content is in grade 4; NE content is in grades 5 and 6.	6.1.1.a Show equivalence among common fractions, decimals and percents 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)
4.NF.7	Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual model.	Strong		4.1.1.c Compare and order whole numbers and decimals through the hundredths place (e.g., money) 4.1.1.f Use visual models to find equivalent fractions (e.g., $2/4 = 1/2$, $2/8 = 1/4$, $1 = 2/2 = 5/5$, $3/3$) 1.3.1.d Use $<$, $=$, $>$ to compare quantities	

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Mathematics Alignment Study

Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards		
Measurement and Data						
Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.						
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 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),	Partial (emphasis and phrasing)	CC	CC emphasizes relative sizes of measurement units, while NE emphasizes converting between units. CC content is in grade 4; NE content is in grades 5 and 6.	6.2.5.c 5.3.2.b	Convert length, weight (mass), and liquid capacity from one unit to another within the same system Represent a variety of quantitative relationships using tables and graphs
4.MD.2	Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.	Partial (emphasis and phrasing)	CC	Content is similar, with some difference in emphasis and phrasing. CC content is in grade 4; NE content is in grades 5 and 6.	6.3.2.a 6.2.5.f 5.2.5.b 5.2.5.e	Model contextualized problems using various representations (e.g., graphs, tables) Determine the volume of rectangular prisms Identify correct unit (customary or metric) to the measurement situation (e.g., distance from home to school; measure length of a room) Measure weight (mass) and

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
				temperature using metric units	
				4.1.3.b Add and subtract decimals to the hundredths place (e.g., money)	
				4.2.5.c Solve problems involving elapsed time	
				3.2.2.b Determine the distance between two whole number points on a number line	
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.	Partial (specificity)	CC	CC specifies real world and mathematical problems. CC content is in grade 4; NE content is in grades 5 and 6.	6.2.5.d Determine the perimeter of polygons 5.2.5.f Determine the area of rectangles and squares
Represent and interpret data.					
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. <i>For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.</i>	Partial (emphasis and phrasing)	CC	Content is similar, with some difference in emphasis and phrasing. CC content is in grade 4; NE content is in grade 5.	5.3.2.a Model situations that involve the addition, subtraction, and multiplication of positive rational numbers using words, graphs, and tables

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
				5.1.3.a Add and subtract positive rational numbers (e.g., proper and improper fractions, mixed numbers, fractions with common and uncommon denominators, decimals through the thousandths place)	
				4.4.1.a Represent data using dot/line plots	
Geometric measurement: understand concepts of angle and measure angles.					
4.MD.5	Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:	Partial (knowledge type)	CC	The CC content emphasizes the concept, while the CC content emphasizes the skill. CC content is in grade 4; NE content is in grade 7.	7.2.1.b Name line, line segment, ray, and angle (e.g., \overleftrightarrow{AB} , $\overrightarrow{PR} < LMN$)
	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.		CC	CC content is in grade 4; NE content is in grade 5.	5.2.1.d Identify degrees on a circle (e.g., 45, 90, 180, 270, 360)
	b. An angle that turns through n one-degree angles is said to have an angle measure of n degrees.		CC	CC content is in grade 4; NE content is in grade 7.	7.2.5.a Measure angles to the nearest degree
4.MD.6	<u>Measure angles in whole-number degrees using a protractor. Sketch</u>	Strong	CC	CC content is in grade 4; NE content	12.2.4.a Sketch and draw appropriate representations of geometric

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
	angles of specified measure.		is in grades 7 and 9-12.		objects using ruler, protractor, or technology 7.2.4.c Draw angles to given degree 7.2.5.a Measure angles to the nearest degree
4.MD.7	Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.	Partial (implied)	CC	NE implies solving addition and subtraction problems to find unknown angles. CC content is in grade 4; NE content is in grade 8.	8.2.1.d Identify pairs of angles (e.g., adjacent, complementary, supplementary, vertical) 8.2.1.e Examine the relationships of the interior angles of a triangle (e.g., the sum of the angles is 180 degrees)
Geometry					
Draw and identify lines and angles, and classify shapes by properties of their lines and angles.					
4.G.1	Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.	Strong			4.2.1.c Identify parallel, perpendicular, and intersecting lines 4.2.1.b Classify an angle as acute, obtuse, and right 3.2.1.c Identify lines, line segments, rays, and angles
			NE	CC content is in grade 4; NE content is in grade 3.	

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Mathematics Alignment Study

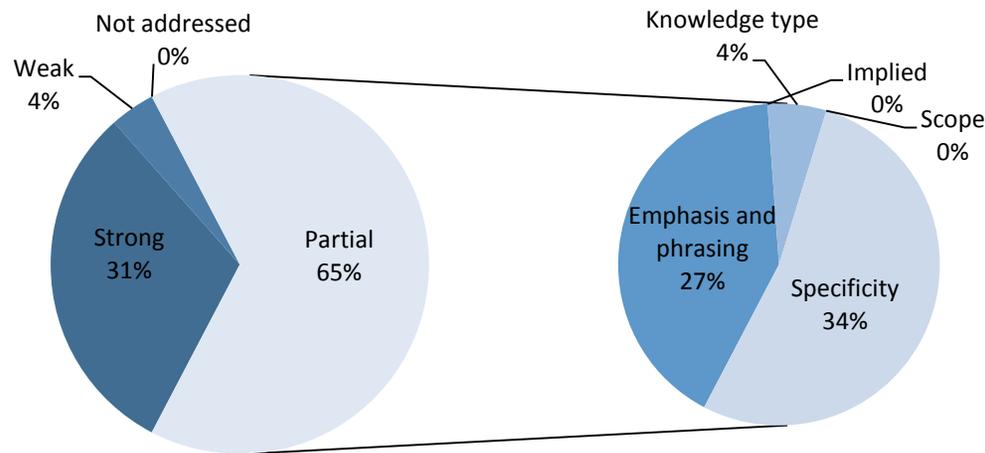
Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards		
		NE	CC content is in grade 4; NE content is in grade 3.	3.2.4.a	Sketch and label lines, rays, line segments, and angles	
4.G.2	Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of specified size. Recognize right triangles as a category, and identify right triangles.	Partial (specificity)	CC specifies the presence or absence of parallel or perpendicular lines. NE content is in grade 5, but is more difficult. Justifying a classification is more rigorous than performing a classification.	5.2.1.c	Justify the classification of two-dimensional shapes (e.g., triangles by angles and sides)	
				4.2.1.b	Classify an angle as acute, obtuse, and right	
				2.2.1.a	Describe attributes of two-dimensional shapes (e.g., trapezoid, parallelogram)	
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.	Strong	NE	CC content is in grade 4; NE content is in grades 1, 2, and 3.	3.2.3.a	Draw all possible lines of symmetry in two-dimensional shapes
				2.2.3.a	Identify lines of symmetry in two-dimensional shapes	
				1.2.3.a	Identify one line of symmetry in two-dimensional shapes (e.g., circle, square, rectangle, triangle)	

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

How well the Common Core mathematics content is addressed in the Nebraska 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 Nebraska fully addresses the content of the Common Core. 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 a standard in the Common Core could not be aligned to Nebraska standards or indicators, 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 Nebraska addressed content found in the Common Core 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 standards or 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 5 Overview

All of the Common Core *Mathematics* Standards are addressed by the Nebraska Standards for Mathematics. Only one standard received a weak alignment rating for content related to the expectation that students be able interpret multiplication as scaling (sizing). Some of the Common Core standards are fully addressed within the Nebraska standards, reflecting a strong alignment. The majority of partial alignments are due to emphasis and phrasing or specificity; meaning that the Nebraska standards are not as specific as Common Core or there are notable differences in emphasis and phrasing and specificity. For example, Common Core standards emphasize classifying figures in a hierarchy based on properties, while Nebraska indicators emphasize classifying two-dimensional shapes and three-dimensional objects. An example of specificity includes Common Core stating that students should understand the relationship between addition and subtraction. In regards to rigor, the Common Core standards were found to require many expectations at an earlier grade level than the Nebraska standards; a few Nebraska indicators required expectations at an earlier grade level than the Common Core standards. Most of the rigor ratings were due to a grade level discrepancy of only one or two grades. However, one of the Common Core standards relating to converting among different-sized standard measurement units within a given measurement system was aligned to a Nebraska high school indicator.

Of the 26 rated standards in the Common Core for Grade 5, all are addressed by the Nebraska Standards. Of the 25 aligned standards, 8 are strong, 17 are partial, and 1 is a weak alignment.

Mathematics Alignment Study

Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
Grade 5					
Operations and Algebraic Thinking					
Write and interpret numerical expressions.					
5.OA.1	Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.	Strong		5.3.3.c	Evaluate numerical expressions by using parentheses with respect to order of operations (e.g., $6 + (3 * 5)$)
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.	Partial (emphasis and phrasing)	Content is similar, with some difference in emphasis and phrasing.	5.3.1.c	Communicate relationships using expressions and equations
Analyze patterns and relationships.					
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. <i>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</i>	Partial (specificity)	CC	12.3.1.f	Compare and analyze the rate of change by using ordered pairs, tables, graphs, and equations
			CC specifies apparent relationships between corresponding terms. CC content is in grade 5; NE content is in high school.	5.3.1.b	Create and analyze numeric patterns using words, tables, and graphs

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards		
<i>sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.</i>						
Number and Operations in Base Ten						
Understand the place value system.						
5.NBT.1	Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.	Partial (emphasis and phrasing)	NE	Content is similar, with some difference in emphasis and phrasing. CC content is in grade 5; NE content is in grade 4.	4.1.1.f	Demonstrate multiple equivalent representations for decimal numbers through the hundredths place (e.g., 2 and 5 hundredths is 2.05; 6.23 is $6 + .2 + .03$)
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.	Partial (emphasis and phrasing)	CC	Content is similar, with some difference in emphasis and phrasing. CC content is in grade 5; NE content is in grade 6.	6.1.1.d	Represent large numbers using exponential notation (e.g., $1,000 = 10^3$)
					5.3.1.b	Create and analyze numeric patterns using words, tables, and graphs
					4.1.3.e	Mentally compute multiplication and division involving powers of 10
5.NBT.3	Read, write, and compare decimals to thousandths.	Partial (specificity)		CC specifies reading and writing	5.1.1.b	Compare and order whole numbers, fractions, and decimals

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards		
a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (1/10) + 9 \times (1/100) + 2 \times (1/1000)$.			decimals.		through the thousandths place	
b. Compare two decimals to thousandths based on meanings of the digits, using $>$, $=$, and $<$ symbols to record the results of comparisons.				5.1.1.a	Demonstrate multiple equivalent representations for whole numbers and decimals through the thousandths place (e.g., 3.125 is $3 + .1 + .02 + .005$)	
				1.3.1.d	Use $<$, $=$, $>$ to compare quantities	
5.NBT.4	Use place value understanding to round decimals to any place.	Strong		5.1.1.g	Round whole numbers and decimals to any given place	
Perform operations with multi-digit whole numbers and with decimals to hundredths.						
5.NBT.5	Fluently multiply multi-digit whole numbers using the standard algorithm.	Partial (specificity)	NE	CC specifies using the standard algorithm. CC content is in grade 5; NE content is in grade 4.	4.1.3.c	Multiply two-digit whole numbers
5.NBT.6	Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	Partial (specificity)	NE	CC specifies finding whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors. CC content is in grade 5; NE content is in grade 4.	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?)]
			NE	CC content is in grade 5; NE	3.1.2.d	Use drawings, words, and symbols to explain the meaning of

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
			content is in grade 3.	multiplication using an array (e.g., an array with 3 rows and 4 columns represents the multiplication sentence $3 \times 4 = 12$)
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.	Partial (specificity)	CC CC specifies the relationship between addition and subtraction. CC content is in grade 5; NE content is in grades 6 and 7.	7.1.2.b Use drawings, words, and symbols to explain the meaning of multiplication and division of decimals 6.1.2.b Use drawings, words, and symbols to explain the meaning of addition and subtraction of decimals 5.3.3.f Identify and explain the properties of equality used in solving one-step equations involving common positive rational numbers

Numbers and Operations — Fractions

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

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. <i>For example, $2/3 + 5/4 = 8/12 + 15/12 = 23/12$. (In general, $a/b + c/d = (ad + bc)/bd$.)</i>	Strong		5.1.3.a Add and subtract positive rational numbers (e.g., proper and improper fractions, mixed numbers, fractions with common and uncommon denominators, decimals through the thousandths place)
5.NF.2	Solve word problems involving addition and subtraction of	Strong		5.3.2.a Model situations that involve the addition, subtraction, and

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
	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 indicator 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 $3/7 < 1/2$.				<p>multiplication of positive rational numbers using words, graphs, and tables</p> <p>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)</p> <p>5.1.3.a Add and subtract positive rational numbers (e.g., proper and improper fractions, mixed numbers, fractions with common and uncommon denominators, decimals through the thousandths place)</p>
Apply and extend previous understandings of multiplication and division to multiply and divide fractions.					
5.NF.3	Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. <i>For example, interpret $3/4$ as the result of dividing 3 by 4, noting that $3/4$ multiplied by 4 equals 3 and that when 3 wholes are shared equally among 4 people each person has a share of size $3/4$. If 9 people want to share a 50-pound sack of rice equally by weight,</i>	Partial (emphasis and phrasing)	CC	Content is similar, with some difference in emphasis and phrasing. CC content is in grade 5; NE content is in grade 7.	<p>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.)</p> <p>2.1.1.h Use visual models to represent fractions of one-half as a part of a whole</p>

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

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
	<p>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.</p> <p>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.</p>				<p>(e.g., money doubling)</p> <p>4.3.3.b Use symbolic representation of the identity property of multiplication (e.g., $5 * 1 = 5$)</p>
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.	Partial (emphasis and phrasing)	CC	Content is similar, with some difference in emphasis and phrasing. CC content is in grade 5; NE content is in grade 7.	<p>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.)</p> <p>5.3.2.a Model situations that involve the addition, subtraction, and multiplication of positive rational</p>

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

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
				numbers using words, graphs, and tables
5.NF.7	Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.	Partial (specificity)	CC	
	a. Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. For example, create a story context for $(1/3) \div 4$ and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $(1/3) \div 4 = 1/12$ because $(1/12) \times 4 = 1/3$.		CC is more specific. CC content is in grade 5; NE content is in grades 6 and 7.	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.)
	b. Interpret division of a whole number by a unit fraction, and compute such quotients. For example, create a story context for $4 \div (1/5)$ and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $4 \div (1/5) = 20$ because $20 \times (1/5) = 4$.			
	c. Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit			6.3.2.a Model contextualized problems using various representations (e.g., graphs, tables)

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

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
fractions, e.g., by using visual fraction models and equations to represent the problem. <i>For example, How much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?</i>				
Measurement and Data				
Convert like measurement units within a given measurement system.				
5.MD.1	Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.	Strong	CC	<p>CC content is in grade 5; NE content is in grades 6 and 9-12.</p> <p>12.2.5.c</p> <p>6.3.2.a</p> <p>Convert between various units of area and volume, such as square feet to square yards</p> <p>Model contextualized problems using various representations (e.g., graphs, tables)</p>
Represent and interpret data.				
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. <i>For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.</i>	Partial (emphasis and phrasing)	<p>NE</p> <p>NE</p>	<p>4.4.1.c</p> <p>4.4.1.a</p> <p>Content is similar, with some difference in emphasis and phrasing. CC content is in grade 5; NE content is in grade 4.</p> <p>CC content is in grade 5; NE content is in grade 4.</p> <p>Interpret data and draw conclusions using dot/line plots</p> <p>Represent data using dot/line plots</p>

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

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
	<p>whole-number products as volumes, e.g., to represent the associative property of multiplication.</p> <p>b. Apply the formulas $V = l \times w \times h$ and $V = b \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real-world and mathematical problems.</p> <p>c. Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.</p>			

Geometry

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

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	Partial (specificity)	CC	CC is more specific. CC content is in grade 5; NE content is in grade 6.	6.2.2.a	Identify the ordered pair of a plotted point in the coordinate plane
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Rigor: CC: Common Core standards are more rigorous; NE: Nebraska standards are more rigorous.

Mathematics Alignment Study

Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
				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).
5.G.2	Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.	Strong	CC	CC is more specific. CC content is in grade 5; NE content is in grade 6.
				6.3.2.a Model contextualized problems using various representations (e.g., graphs, tables)
				6.2.2.a Identify the ordered pair of a plotted point in the coordinate plane
				5.2.2.a Plot the location of an ordered pair in the first quadrant
Classify two-dimensional figures into categories based on their properties.				
5.G.3	Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.	Strong		5.2.1.c Justify the classification of two-dimensional shapes (e.g., triangles by angles and sides)

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

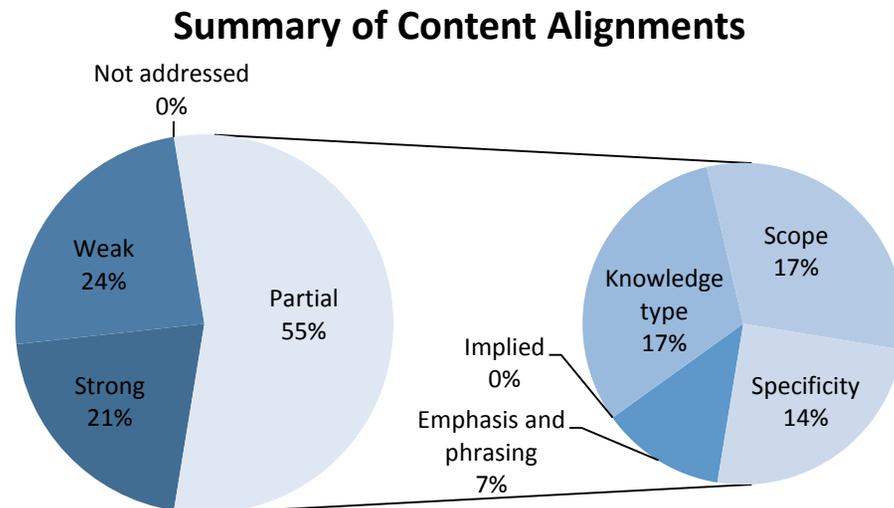
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Common Core Standards		Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
5.G.4	Classify two-dimensional figures in a hierarchy based on properties.	Partial (emphasis and phrasing)	NE	CC emphasizes classifying figures in a hierarchy based on properties, while NE emphasizes justifying the classification of shapes.	5.2.1.c	Justify the classification of two-dimensional shapes (e.g., triangles by angles and sides)

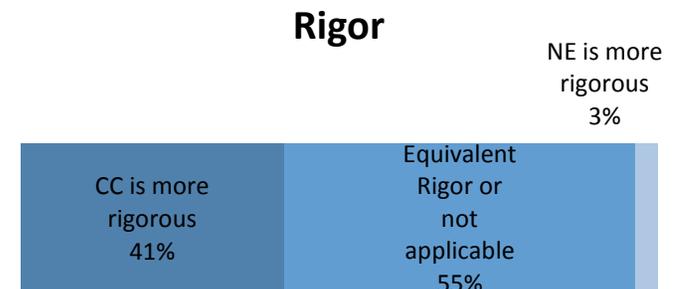
Rigor: CC: Common Core standards are more rigorous; NE: Nebraska standards are more rigorous.

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

How well the Common Core mathematics content is addressed in the Nebraska 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 Nebraska fully addresses the content of the Common Core. 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 a standard in the Common Core could not be aligned to Nebraska standards or indicators, 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 Nebraska standards addressed content found in the Common Core standards. See above for a discussion about the alignment categories.



Content in the Common Core was compared to the Nebraska standards for the relative demands placed on students. The graph displays the percentage of standards or indicators that were more rigorous, by document. A significant percentage of the content was either equivalent in rigor between the two sets of 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 Common Core Mathematics Standards are not also addressed by the Nebraska Standards for Mathematics. The topics not found in the Nebraska standards are all specific details about topics that are otherwise at least partially addressed. These standards were rated as Partial (scope), or Weak. In general, the specific aspect not addressed in the Nebraska standards was related to real-world problem solving. Some topics in the Common Core standards are minimally addressed in the standards, receiving a weak alignment rating. In general, this was due to the large amount of specific detail included in the Common Core standards that is not found in the Nebraska standards. For example, within one standard Common Core includes the concept of independent and dependent variables, analyzing the relationship between variables, and relating the relationship between the independent and dependent variables to the equation. That amount of detail is not present in the Nebraska standards. Instead, the related Nebraska standard includes using a variable to describe a situation with an equation. In terms of expectations for students, the majority of standards were within one grade of each other (e.g., Nebraska content is in grade 6; Common Core content is in grade 5). A few topics were found two or more grades apart. In those cases, differences in rigor were found regarding specific detail within a standard, while other aspects of the standard were found to be at the same level of rigor. For example, both Common Core and Nebraska address many aspects of rational numbers in 6th grade. However, Common Core addresses the absolute value of integers in grade 6, while Nebraska does not address that concept until grade 8. All of the topics that were found two or more grades apart were those found in earlier grades in the Common Core.

Of the 29 rated standards in the Common Core for Grade 6, all 29 are addressed. Of those addressed, 6 are strong alignments, 16 are partial alignments, and 7 are weak alignments.

Mathematics Alignment Study

Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
Grade 6					
Ratios and Proportional Relationships					
Understand ratio concepts and use ratio reasoning to solve problems.					
6.RP.1	Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. For example, “The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak.” “For every vote candidate A received, candidate C received nearly three votes.”	Weak	CC specifies using ratio language to describe a relationship. The CC content emphasizes the concept, while the NE content emphasizes the skill.	8.1.3 Solve problems involving ratios and proportions (e.g., $x/5 = 10/17$)	
6.RP.2	Understand the concept of a unit rate a/b associated with a ratio $a:b$ with $b \neq 0$, and use rate language in the context of a ratio relationship. <i>For example, “This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is $3/4$ cup of flour for each cup of sugar.” “We paid \$75 for 15 hamburgers, which is a rate of \$5 per hamburger.”</i>	Weak	CC specifies unit rates and the use of rate language. The CC content emphasizes the concept, while the NE content emphasizes the skill.	8.1.3 Solve problems involving ratios and proportions (e.g., $x/5 = 10/17$)	
6.RP.3	Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of	Partial (specificity)	CC	CC specifies solving unit rate problems. CC content about ratios is in grade 6; NE content regarding ratios is in	8.1.3.e Solve problems involving ratios and proportions (e.g., $x/5 = 10/17$)

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
	equivalent ratios, tape diagrams, double number line diagrams, or equations.		grade 8.	
	a. Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.			8.3.1.a Represent and analyze a variety of patterns with tables, graphs, words, and algebraic equations
	b. Solve unit rate problems including those involving unit pricing and constant speed. For example, If it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?			8.2.5.e Convert between metric and standard units of measurement, given conversion factors (e.g., meters to yards)
	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.			6.1.1.a Show equivalence among common fractions, decimals and percents.
	d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.			8.2.5.e Convert between metric and standard units of measurement, given conversion factors (e.g., meters to yards)

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
The Number System					
Apply and extend previous understandings of multiplication and division to divide fractions by fractions.					
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 $1/2$ 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>	Strong	CC	CC content is in grade 6; NE content is in grade 7.	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.)
Compute fluently with multi-digit numbers and find common factors and multiples.					
6.NS.2	Fluently divide multi-digit numbers using the standard algorithm.	Partial (emphasis and phrasing)	CC emphasizes the use of the standard algorithm, while NE emphasizes the division of rational numbers. CC and NE differ in their approach to operations. The standard algorithms are not taught	6.1.3.a Multiply and divide positive rational numbers	

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Mathematics Alignment Study

Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
			explicitly when the algorithms are first introduced. When first introduced, CC emphasizes the use of strategies. NE does not specify the standard algorithm or strategies.	
6.NS.3	Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.	Partial (emphasis and phrasing)	CC emphasizes the use of the standard algorithm, while NE emphasizes operations on rational numbers. CC and NE differ in their approach to operations. The standard algorithms are not taught explicitly when the algorithms are first introduced. When first introduced, CC emphasizes the use of strategies. NE does not specify the standard algorithm or strategies.	6.1.3.a Multiply and divide positive rational numbers
		NE	CC content is in grade 6; NE content is in grade 5.	5.1.3.a Add and subtract positive rational numbers (e.g., proper and improper fractions, mixed numbers, fractions with common and uncommon denominators, decimals through the thousandths place)

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
	having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, debits/credits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.			6.1.1.c Identify integers less than 0 on a number line
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.	Partial (knowledge type)	The CC content emphasizes the concept, while the NE content emphasizes the skill.	
	a. Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., $-(-3) = 3$, and that 0 is its own opposite.			6.1.1.c Identify integers less than 0 on a number line

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
<p>contexts. <i>For example, write $-3^{\circ}\text{C} > -7^{\circ}\text{C}$ to express the fact that -3°C is warmer than -7°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>		CC	CC content is in grade 6; NE content is in grade 8.	<p>8.1.3.b Evaluate expressions involving absolute value of integers</p> <p>6.1.1.b Compare and order positive and negative integers</p>
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	Partial (scope)	CC includes real-world problems and the use of absolute value to find distances between points on a coordinate plane.	<p>7.2.2.a Plot the location of an ordered pair in the coordinate plane</p> <p>7.2.2.c Find the distance between points along horizontal and vertical lines of a coordinate plane (e.g., what is the distance between (0, 3) and (0, 9))</p>

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
coordinate.				
Expressions and Equations				
Apply and extend previous understandings of arithmetic to algebraic expressions.				
6.EE.1	Write and evaluate numerical expressions involving whole-number exponents.	Strong		6.1.1.d Represent large numbers using exponential notation (e.g., $1,000 = 10^3$)
		CC	CC content is in grade 6; NE content is in grade 8.	8.3.3.b Evaluate numerical expressions containing whole number exponents (e.g., if $x = 4$, then $(x + 3)^2 + 5x = ?$)
6.EE.2	Write, read, and evaluate expressions in which letters stand for numbers.	Partial (scope)	CC includes real-world problems and the use of absolute value to find distances between points on a coordinate plane.	
	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>			6.3.1.a Describe and create simple algebraic expressions (e.g., one operation, one variable) from words and tables
	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</i>			

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
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>	Strong	CC	CC content is in grade 6; NE content is in grade 7.	7.3.1.c Recognize and generate equivalent forms of simple algebraic expressions
Reason about and solve one-variable equations and inequalities.				
6.EE.5 Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.	Partial (knowledge type)		The CC content emphasizes the concept, while the NE content emphasizes the skill.	7.3.3.e Solve one-step inequalities involving positive rational numbers 6.3.3.d Solve one-step equations involving positive rational numbers
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.	Partial (knowledge type)		The CC content emphasizes the concept, while the NE content emphasizes the skill.	6.3.1.b Use a variable to describe a situation with an equation (e.g., one-step, one variable) 6.3.2.a Model contextualized problems using various representations (e.g., graphs, tables)

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
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.	Partial (specificity)		CC is more specific than NE.	6.3.2.a Model contextualized problems using various representations (e.g., graphs, tables) 6.3.3.d Solve one-step equations involving positive rational numbers
6.EE.8 Write a statement of inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.	Partial (specificity)		CC is more specific than NE.	6.3.2.a Model contextualized problems using various representations (e.g., graphs, tables) 6.3.3.e Solve one-step inequalities involving positive rational numbers
Represent and analyze quantitative relationships between dependent and independent variables.				
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	Weak		CC includes the concept of independent and dependent variables, analyzing the relationship between the variables using graphs and tables, and relating the relationship to the equation.	6.3.1.b Use a variable to describe a situation with an equation (e.g., one-step, one variable) 6.3.2.a Model contextualized problems using various representations (e.g., graphs, tables)

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
<p>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>				
Geometry				
Solve real-world and mathematical problems involving area, surface area, and volume.				
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.	Partial (scope)	CC includes real world problem solving.	8.2.5.a Use strategies to find the perimeter and area of complex shapes
		CC	CC content is in grade 6; NE content is in grade 8.	6.2.5.e Determine the area of parallelograms and triangles

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
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 edge lengths in the context of solving real-world and mathematical problems.	Weak		
			The CC content emphasizes the concept, while the NE content emphasizes the skill. CC specifies how volume should be determined and includes real-world problem solving.	6.2.5.f Determine the volume of rectangular prisms
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.	Partial (scope)		
		CC	CC includes real world problem solving and all polygons. CC content is in grade 6; NE content is in grade 8.	8.2.2.a Use coordinate geometry to represent and examine the properties of rectangles and squares using horizontal and vertical segments
		CC	CC content is in grade 6; NE content is in grade 7.	7.2.2.c Find the distance between points along horizontal and vertical lines of a coordinate plane (e.g., what is the distance between (0, 3) and (0, 9))
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	Partial (scope)		
		CC	CC includes application of these techniques in real world problem solving. CC content is in grade 6; NE content is in grade 7.	7.2.4.a Identify the shapes that make up the three-dimensional object 7.2.4.b Create two-dimensional representations of three-dimensional objects to visualize and solve problems (e.g., perspective drawing)

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
	mathematical problems.			of surface area)
Statistics and Probability				
Develop understanding of statistical variability.				
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>	Weak	CC	7.4.1.e Formulate a question about a characteristic within one population that can be answered by simulation or a survey
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.	Partial (knowledge type)		6.4.1.b Compare and interpret data sets and their graphical representations
6.SP.3	Recognize that a measure of center for a numerical data set summarizes all of its values using a single number, while a measure of variation describes how its values vary with a single number.	Weak	CC	7.4.1.b Find and interpret mean, median, mode, and range for sets of data
Summarize and describe distributions.				

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
6.SP.4	Display numerical data in plots on a number line, including dot plots, histograms, and box plots.	Strong	CC content is in grade 6; NE content is in grade 8.	<p>6.4.1.a Represent data using stem and leaf plots, histograms, and frequency charts</p> <p>8.4.1.a Represent data using circle graphs and box plots with and without the use of technology</p>
6.SP.5	<p>Summarize numerical data sets in relation to their context, such as by:</p> <p>a. Reporting the number of observations.</p> <p>b. Describing the nature of the attribute of 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 was gathered.</p> <p>d. Relating the choice of measures of center and variability to the shape of the</p>	Weak	Content is similar, with significant differences in emphasis and phrasing. CC is more specific.	<p>7.4.1.c Explain the difference between a population and a sample</p> <p>7.4.1.d List biases that may be created by various data collection processes</p> <p>8.4.1.d Find, interpret, and compare measures of central tendency (mean, median, mode) and the quartiles for sets of data</p> <p>8.4.1.c Select the most appropriate unit of central tendency for sets of data</p>

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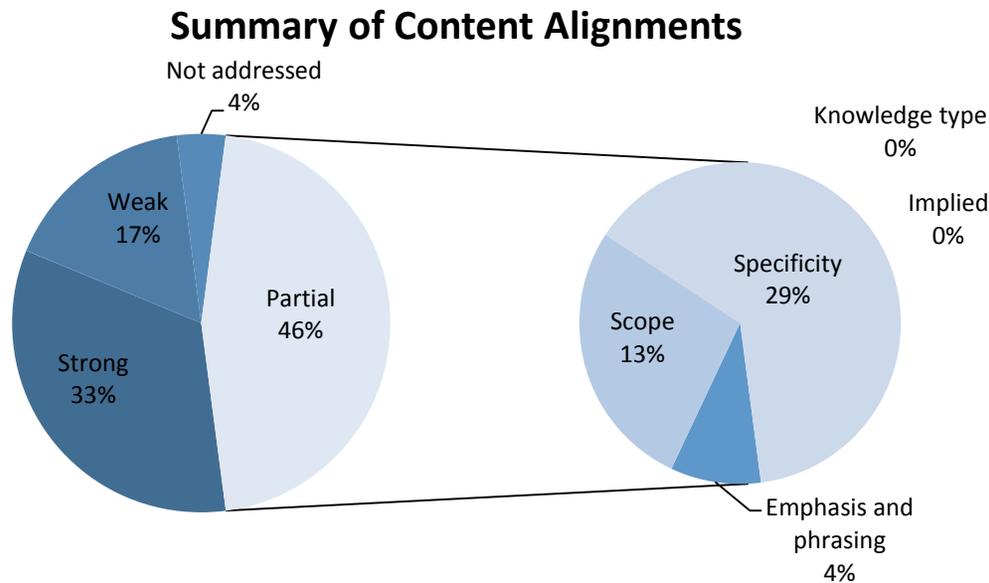
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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
	data distribution and the context in which the data were gathered.			

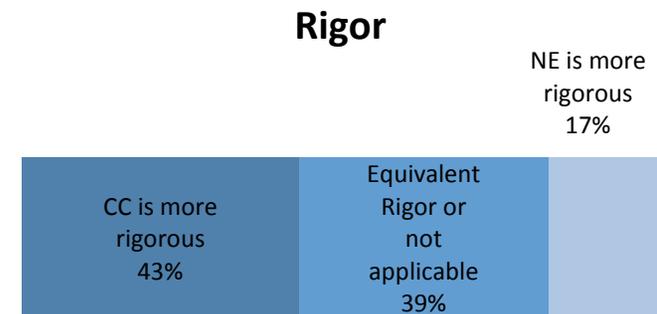
* Rigor: CC: Common Core standards are more rigorous; NE: Nebraska standards are more rigorous.

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

How well the Common Core mathematics content is addressed in the Nebraska 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 Nebraska fully addresses the content of the Common Core. 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 a standard in the Common Core could not be aligned to Nebraska standards or indicators, 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 Nebraska standards addressed content found in the Common Core standards. See above for a discussion about the alignment categories.



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

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Grade 7 Overview

Only one topic in the Common Core Standards, unit rates, is not also addressed by the Nebraska Standards for Mathematics. Topics that were only partially addressed or weakly addressed include giving an informal derivation of the relationship between circumference and area, describing the two-dimensional figures that result from slicing three-dimensional figures, understanding that rewriting an expression can shed light on problems, specific aspects of ratio and proportional problems, and specifics regarding real-world problem solving and situations. In general, content related to problem solving with rational numbers, geometric concepts such as area and volume, and probability were fully addressed. The Common Core standard is more specific than the Nebraska indicator in a few cases, and so it is unclear whether students must address the same details as specified in the Common Core. For example, while both Common Core and Nebraska include scaling shapes, Common Core specifies computing actual lengths and areas and reproducing drawings at different scales. In regards to rigor, the majority of the standards were found to be at the same level of rigor as the Common Core standards. Some of the Common Core standards were found to require expectations at an earlier grade level than the Nebraska standards. The majority of standards were within one grade of each other (e.g., Nebraska content is in grade 6; Common Core content is in grade 7). A few topics were found two or more grades apart. In those cases, differences in rigor were found regarding one detail of a standard, while other aspects of the standard were found to be at the same level of rigor. For example, both Common Core and Nebraska address algebraic expressions in 7th grade. However, Common Core addresses working with rational coefficients in grade 7, while Nebraska does not address that concept until high school. The majority of the topics that were found two grades apart were in earlier Common Core grades. A large number of standards related to probability models were found to be in earlier grades in Nebraska.

Of the 24 rated standards in the Common Core for grade 7, 23 are addressed and only 1 is not addressed by the Nebraska Standards. Of those addressed, 8 are strong alignments, 11 are partial alignments, and 4 are weak alignments.

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
Grade 7					
Ratios and Proportional Relationships					
Analyze proportional relationships and use them to solve real-world and mathematical problems.					
7.RP.1	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. <i>For example, If a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction $\frac{1/2}{1/4}$ miles per hour, equivalently 2 miles per hour.</i>	Not addressed			
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.	Weak	CC	CC includes the constant of proportionality, tables, equations, diagrams, verbal descriptions, and explaining points on a graph. CC content is in grade 7; NE content is in grade 8.	8.3.1.c Identify constant slope from tables and graphs 8.1.3.e Solve problems involving ratios and proportions (e.g., $\frac{x}{5} = \frac{10}{17}$)

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
	<p>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 $t = pn$.</p> <p>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.</p>			
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.	Partial (scope)	CC includes multistep ratio problems.	7.1.3.c Solve problems involving percent of numbers (e.g., percent of, % increase, % decrease)
The Number System				
Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.				
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	Partial (scope)	CC includes describing situations in which opposite quantities combine to make 0 and the use of the properties of operations as strategies.	

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
	<p>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 principle in real-world contexts.</p> <p>d. Apply properties of operations as strategies to add and subtract rational numbers.</p>			<p>7.3.3.a Explain additive inverse of addition (e.g., $7 + -7 = 0$)</p> <p>8.1.2.a Use drawings, words, and symbols to explain the meaning of addition, subtraction, multiplication, and division of integers.</p> <p>7.1.3.a Compute accurately with integers</p>

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
7.NS.2	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.	Weak	The CC content emphasizes the concept, while the NE content emphasizes the skill. CC specifies applying the properties of operations as strategies to multiply and divide and includes the interpretation of products of rational numbers in real-world contexts.	
	a. Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.			7.3.3.b Use symbolic representation of the distributive property (e.g., $2(x + 3) = 2x + 6$)
	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.	CC	CC content is in grade 7; NE content is in grade 8.	8.1.2.c Use words and symbols to explain why division by zero is undefined
	c. Apply properties of operations as strategies to multiply and divide rational numbers.			7.1.3.a Compute accurately with integers

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
	d. Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.			7.1.1.a	Show equivalence among fractions, decimals, and percents
7.NS.3	Solve real-world and mathematical problems involving the four operations with rational numbers.	Strong		7.3.2.a	Model contextualized problems using various representations (e.g., one-step/variable expressions, one-step/variable equations)
			NE	8.1.3.a	Compute accurately with rational numbers
Expressions and Equations					
Use properties of operations to generate equivalent expressions.					
7.EE.1	Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.	Partial (emphasis and phrasing)	CC	12.3.3.j	Add, subtract, and simplify rational expressions
			Content is similar, with some differences in emphasis and phrasing. CC content is in grade 7; NE content is in high school.	7.3.1.c	Recognize and generate equivalent forms of simple algebraic expressions
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 example, $a + 0.05a = 1.05a$ means that “increase by 5%” is the same as “multiply by 1.05.”</i>	Weak		7.3.1.c	Recognize and generate equivalent forms of simple algebraic expressions
Solve real-life and mathematical problems using numerical and algebraic expressions and equations.					

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Common Core Standards		Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
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 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>	Strong	CC	CC content is in grade 7; NE content is in grade 8.	8.3.3.c	Solve multi-step equations involving rational numbers
					7.1.1.a	Show equivalence among fractions, decimals, and percents
					7.1.4.a	Use estimation methods to check the reasonableness of solutions for problems involving integers and positive rational numbers
					7.3.2.a	Model contextualized problems using various representations (e.g., one-step/variable expressions, one-step/variable equations)
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	Partial (specificity)		CC is more specific.		
					7.3.2.a	Model contextualized problems using various representations (e.g., one-step/variable expressions,

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
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>					one-step/variable equations)
				7.3.3.d	Solve two-step equations involving integers and positive rational numbers
				7.3.3.f	Identify and explain the properties used in solving two-step equations (e.g., addition, subtraction, multiplication and division)
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>		CC	CC content is in grade 7; NE content is in grade 8.	8.3.1.b	Describe relationships using algebraic expressions, equations, and inequalities (e.g., two-step, one variable)
		CC	CC content is in grade 7; NE content is in grade 8.	8.3.3.d	Solve two-step inequalities involving rational numbers

Geometry

Draw, construct and describe geometrical figures and describe the relationships between them.

7.G.1	Solve problems involving scale drawings of geometric figures, including computing actual	Partial (specificity)	CC	CC specifies computing actual lengths and areas and reproducing scale drawings at a different scale.	8.2.3.b	Perform and describe positions and sizes of shapes under dilations (e.g., scale factor, ratios)
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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards		
	lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.		CC is in grade 7; NE content is in grade 8.	8.2.5.d	Use scale factors to find missing lengths in similar shapes	
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.	Partial (specificity)	CC	CC specifies a focus on the construction of triangles. CC content is in grade 7; NE content is in grade 8.	8.2.4.a 7.2.4.c	Draw geometric objects with specified properties (e.g., parallel sides, number of sides, angle measures, number of faces) Draw angles to given degree
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.	Weak		Content is similar, with significant differences in emphasis and phrasing.	7.2.4.a	Identify the shapes that make up the three-dimensional object
Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.						
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.	Partial (scope)		CC includes giving an informal derivation of the relationship between the circumference and area of a circle.	7.2.7.b 7.3.2.a	Determine the area of trapezoids and circles, and the circumference of circles Model contextualized problems using various representations (e.g., one-step/variable expressions, one-step/variable equations)
7.G.5	Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple	Strong	CC	CC content is in grade 7; NE content is in high school.	12.2.1.d	Apply geometric properties to solve problems (e.g., parallel lines, line transversals, similar triangles,

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
equations for an unknown angle in a figure.				congruent triangles, proportions)
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.	Strong	CC	CC content is in grade 7; NE content is in high school.	12.2.5.a Use strategies to find surface area and volume of complex objects
		CC	CC content is in grade 7; NE content is in grade 8.	8.2.5.a Use strategies to find the perimeter and area of complex shapes
		CC	CC content is in grade 7; NE content is in grade 8.	8.2.5.b Determine surface area and volume of three-dimensional objects (e.g., rectangular prisms, cylinders)
				7.2.7.b Determine the area of trapezoids and circles, and the circumference of circles
				7.3.2.a Model contextualized problems using various representations (e.g., one-step/variable expressions, one-step/variable equations)
Statistics and Probability				
Use random sampling to draw inferences about a population.				
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	Strong			7.4.1.c Explain the difference between a population and a sample
				7.4.1.d List biases that may be created by various data collection processes

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards		
	inferences.					
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>	Partial (specificity)	CC	CC content is in grade 7; NE content is in grade 8. CC specifies generating multiple samples to gauge variation.	8.4.2.b 7.4.2.a	Compare and contrast two sets of data to make inferences Determine if data collected from a sample can be used to make predictions about a population
Draw informal comparative inferences about two populations.						
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>	Partial (specificity)	CC	CC is more specific. CC content is in grade 7; NE content is in grade 8.	8.4.1.b 8.4.1.c 8.4.2.b	Compare characteristics between sets of data or within a given set of data Find, interpret, and compare measures of central tendency (mean, median, mode) and the quartiles for sets of data Compare and contrast two sets of data to make inferences

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Common Core Standards		Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
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>	Strong	CC	CC is more specific. CC content is in grade 7; NE content is in grade 8.	8.4.1.b 8.4.1.c 7.4.2.a	Compare characteristics between sets of data or within a given set of data Find, interpret, and compare measures of central tendency (mean, median, mode) and the quartiles for sets of data Determine if data collected from a sample can be used to make predictions about a population
Investigate chance processes and develop, use, and evaluate probability models.						
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 $\frac{1}{2}$ indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.	Strong	NE	CC content is in grade 7; NE content is in grade 5.	5.4.3.c	Explain that the likelihood of an event that can be represented by a number from 0 (impossible) to 1 (certain)
7.SP.6	Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency	Strong	NE	CC emphasizes using data collection to approximate the probability of a chance event. CC content is in grade 7; NE content is in grade 6.	6.4.3.c	Find experimental probability for independent events

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards		
<p>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></p>						
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.	Partial (specificity)	NE	CC is more specific. CC content is in grade 7; NE content is in grade 6.	6.4.3.b 6.4.3.c	Compute theoretical probabilities for independent events Find experimental probability for independent events
<p>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></p>						
<p>b. Develop a possibly 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</p>						

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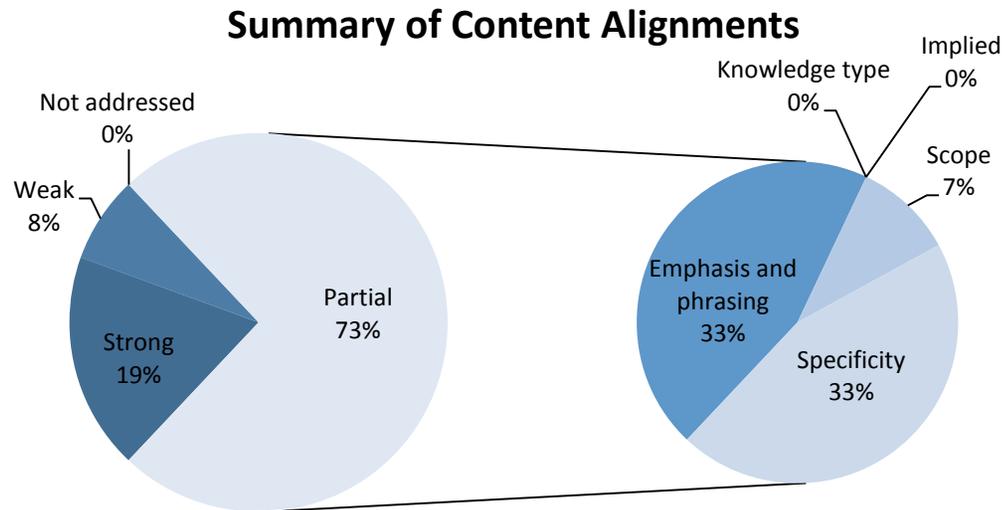
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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
	appear to be equally likely based on the observed frequencies?			
7.SP.8	<p>Find probabilities of compound events using organized lists, tables, tree diagrams, 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 with compose the event.</p> <p>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?</p>	Partial (specificity)	CC is more specific.	7.4.3.a Find the probability of independent compound events (e.g., tree diagram, organized list)

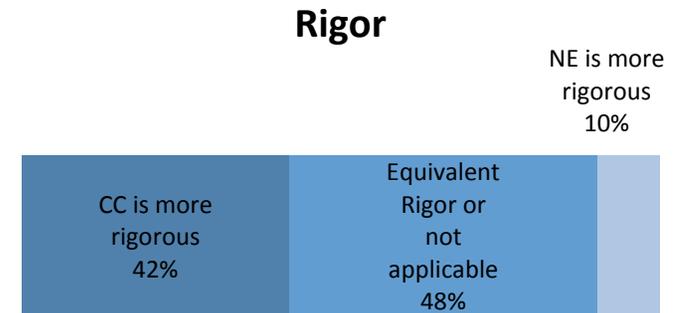
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Grade 8: How Common Core content is addressed in the Nebraska standards

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Grade 8 Overview

Very few topics in the Common Core Standards are not also addressed by the Nebraska Standards for Mathematics. The topics not found in the Nebraska standards are all specific aspects of standards that are at least partially addressed. These standards were rated as Partial (scope), or Weak. The topics not found in the Nebraska standards are related to cube roots, adding and subtracting using scientific notation, deriving the equation $y=mx + b$, and explaining a proof of the Pythagorean Theorem. The majority of partial alignments are due to emphasis and phrasing or specificity; meaning that the Nebraska standards have notable differences in emphasis and phrasing or are not as specific as Common Core. An example of a difference in emphasis and phrasing is that the Common Core emphasizes an informal understanding of rational and irrational numbers, while Nebraska emphasizes classifying numbers as rational or irrational. When the Nebraska indicator is more specific, it is unclear whether students must address the same details within the Common Core. For example, Common Core includes specific aspects of analyzing a functional relationship, including how they should conduct that analysis, while the Nebraska standards do not include that level of detail. In regards to rigor, many of the standards were found to be at the same level of rigor as the Common Core standards. For the standards that did have a grade discrepancy, the majority of standards were within one grade of each other (e.g., Nebraska content is in high school; Common Core content is in grade 8). Further, two of the Common Core standards require the same essential skills as Nebraska, but with higher levels of cognitive difficulty. For example, both Common Core and Nebraska standards address the topic of representing numbers in scientific notation. However, the Common Core emphasizes the use of scientific notation in estimation and to express how many times larger or smaller a number is from another number, while Nebraska emphasizes the representation of the numbers.

Of the 27 rated standards in the Common Core for Grade 8, all 27 are addressed. Of those addressed, 5 are strong alignments, 20 are partial alignments, and 2 are weak alignments.

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
Grade 8					
The Number System					
Know that there are numbers that are not rational, and approximate them by rational numbers.					
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.	Partial (emphasis and phrasing)	CC emphasizes an informal understanding of rational and irrational numbers and decimal expansions, while NE emphasizes the classification of numbers.	8.1.1.d 7.1.1.a	Classify numbers as natural, whole, integer, rational, irrational, or real Show equivalence among fractions, decimals, and percents
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>	Partial (emphasis and phrasing)	Content is similar, with some difference in emphasis.	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)

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

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
Expressions and Equations					
Work with radicals and integer exponents.					
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>	Strong	CC	CC content is in grade 8; NE content is in high school. CC is more difficult.	12.1.3.b Simplify exponential expressions (e.g., powers of -1, 0, $\frac{1}{2}$, $3^2 * 3^2 = 3^4$)
8.EE.2	Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational.	Partial (scope)		NE does not include cube roots.	8.1.3.c Calculate squares of integers, the square roots of perfect squares, and the square roots of whole numbers using technology
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 population of the world as 7×10^9, and determine that the world population is more than 20 times larger.</i>	Partial (emphasis and phrasing)	CC	CC emphasizes the use of scientific notation for use in estimation and being able to express how many times larger one quantity is from another, while NE emphasizes the representation of numbers. CC is more difficult. NE content is in grade 7, but is less difficult	8.1.1.c Represent small numbers using scientific notation 7.1.1.c Represent large numbers using scientific notation
8.EE.4	Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are	Partial (scope)	CC	CC content is in grade 8; NE content is in high school. CC includes all operations, while NE includes only multiplication and	12.1.3.c Multiply and divide numbers using scientific notation

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

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics 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.		division.		
				8.1.1.c	Represent small numbers using scientific notation
		NE	CC content is in grade 8; NE content is in grade 7.	7.1.1.c	Represent large numbers using scientific notation
Understand the connections between proportional relationships, lines, and linear equations.					
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>	Partial (emphasis and phrasing)	CC	CC emphasizes proportional relationships, while NE emphasizes rate of change. CC content is in grade 8; NE content is in high school.	12.3.1.f Compare and analyze the rate of change by using ordered pairs, tables, graphs, and equations
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 .	Weak	CC	CC includes deriving the equation $y = mx + b$. CC specifies the use of similar triangles to explain constant slope. CC content is in grade 8; NE content is in high school.	12.2.1.d Apply geometric properties to solve problems (e.g., parallel lines, line transversals, similar triangles, congruent triangles, proportions)
				8.3.1.c	Identify constant slope from tables and graphs
Analyze and solve linear equations and pairs of simultaneous linear equations.					
8.EE.7	Solve linear equations in one	Partial			CC specifies that students should

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
variable.	(specificity)		give examples of equations with one, infinitely many, or no solutions.	
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).				8.3.3.c Solve multi-step equations involving rational numbers
b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.			NE content is in grade 7, but is less difficult	7.3.3.b Use symbolic representation of the distributive property (e.g., $2(x + 3) = 2x + 6$)
8.EE.8 Analyze and solve pairs of simultaneous linear equations.	Strong	CC	CC content is in grade 8; NE content is in high school.	
a. Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.				12.3.3.p Analyze and solve systems of two linear equations in two variables algebraically and graphically

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
b. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. <i>For example, $3x + 2y = 5$ and $3x + 2y = 6$ have no solution because $3x + 2y$ cannot simultaneously be 5 and 6.</i>				
c. Solve real-world and mathematical problems leading to two linear equations in two variables. For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.				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)

Functions					
Define, evaluate, and compare functions.					
8.F.1	Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.	Partial (implied)	CC	NE implies content related to understanding functions as a rule and what a graph of a function is. CC content is in grade 8; NE content is in high school.	12.3.1.d Identify characteristics of linear and non-linear functions
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</i>	Partial (emphasis and phrasing)		CC emphasizes comparing the properties of functions, while NE emphasizes representing and analyzing patterns in different forms.	8.3.1.a Represent and analyze a variety of patterns with tables, graphs, words, and algebraic equations

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards		
<i>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>						
8.F.3	Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. <i>For example, the function $A = s^2$ giving the area of a square as a function of its side length is not linear because its graph contains the points $(1,1)$, $(2,4)$ and $(3,9)$, which are not on a straight line.</i>	Partial (specificity)	CC	CC is more specific. CC content is in grade 8; NE content is in high school.	12.3.1.d	Identify characteristics of linear and non-linear functions
Use functions to model relationships between quantities.						
8.F.4	Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.	Partial (emphasis and phrasing)	CC emphasizes functions and rate of change, while NE emphasizes equations.		8.3.1.a	Represent and analyze a variety of patterns with tables, graphs, words, and algebraic equations
					8.3.1.b	Describe relationships using algebraic expressions, equations, and inequalities (e.g., two-step, one variable)
8.F.5	Describe qualitatively the functional relationship between two quantities by analyzing a	Partial (specificity)	CC specifies that students analyze a functional relationship between two quantities and how they should		8.3.1.a	Represent and analyze a variety of patterns with tables, graphs, words,

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
	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.		conduct that analysis.	and algebraic equations
Geometry				
Understand congruence and similarity using physical models, transparencies, or geometry software.				
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.	Partial (emphasis and phrasing)	NE CC emphasizes verifying properties experimentally, while NE emphasizes performing and describing transformations. CC content is in grade 8; NE content is in grade 7.	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
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.	Partial (specificity)	CC specifies understanding congruence in respect to transformations.	8.2.1.b Compare and contrast relationships between similar and congruent objects

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Common Core Standards		Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
8.G.3	Describe the effect of dilations, translations, rotations and reflections on two-dimensional figures using coordinates.	Strong	NE	CC content is in grade 8; NE content is in grade 7.	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
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.	Partial (specificity)		CC specifies understanding similarity in respect to transformations.	8.2.1.b 8.2.3.a	Compare and contrast relationships between similar and congruent objects Identify the similarity of dilated 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>	Partial (specificity)	CC	CC is more specific. CC is more difficult. CC includes using arguments, while NE only includes identifying properties and examining relationships.	8.2.1.c 8.2.1.e	Identify geometric properties of parallel lines cut by a transversal and related angles (e.g., perpendicular and parallel lines with transversals) and angles (e.g., corresponding, alternate interior, alternate exterior) Examine the relationships of the interior angles of a triangle (e.g., the sum of the angles is 180 degrees)
Understand and apply the Pythagorean Theorem.						
8.G.6	Explain a proof of the Pythagorean Theorem and its converse.	Weak	CC	Content is similar, with significant differences in emphasis and phrasing. CC includes a proof. CC content is in	8.2.5.c	Apply the Pythagorean theorem to find missing lengths in right triangles and to solve problems

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards		
grade 8; NE content is in high school.						
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.	Partial (specificity)		CC specifies real-world and mathematical problems in two and three dimensions.	8.2.5.c	Apply the Pythagorean theorem to find missing lengths in right triangles and to solve problems
8.G.8	Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.	Partial (emphasis and phrasing)	CC	CC content is in grade 8; NE content is in high school. Content is similar, with some difference in phrasing.	12.2.2.c	Apply the distance formula
Solve real-world and mathematical problems involving volume of cylinders, cones and spheres.						
8.G.9	Know the formulas for the volume of cones, cylinders and spheres and use them to solve real-world and mathematical problems.	Partial (specificity)		CC specifies cones, cylinders, and spheres as well as solving real-world problems.	8.2.5.b	Determine surface area and volume of three-dimensional objects (e.g., rectangular prisms, cylinders)
Statistics and Probability						
Investigate patterns of association in bivariate data.						
8.SP.1	Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.	Strong	CC	CC content is in grade 8; NE content is in high school.	12.4.1.f	Create scatter plots, analyze patterns, and describe relationships in paired data
8.SP.2	Know that straight lines are widely used to model relationships	Strong	CC	CC content is in grade 8; NE content	12.4.1.f	Create scatter plots, analyze patterns, and describe relationships

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

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
	between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.		is in high school.		in paired data
				12.4.2.c	Develop linear equations for linear models to predict unobserved outcomes using regression line and correlation coefficient
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 additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.</i>	Partial (emphasis and phrasing)	CC emphasizes solving problems in the context of bivariate measurement data, while NE emphasizes identifying slope and comparing characteristics of data.	8.3.1.c 8.4.1.b	Identify constant slope from tables and graphs Compare characteristics between sets of data or within a given set of data
8.SP.4	Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe	Partial (specificity)	CC specifies bivariate categorical data and ways to analyze patterns.	8.4.1.b	Compare characteristics between sets of data or within a given set of data

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Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
	<p>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></p>			<p>8.3.1.a Represent and analyze a variety of patterns with tables, graphs, words, and algebraic equations</p>

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

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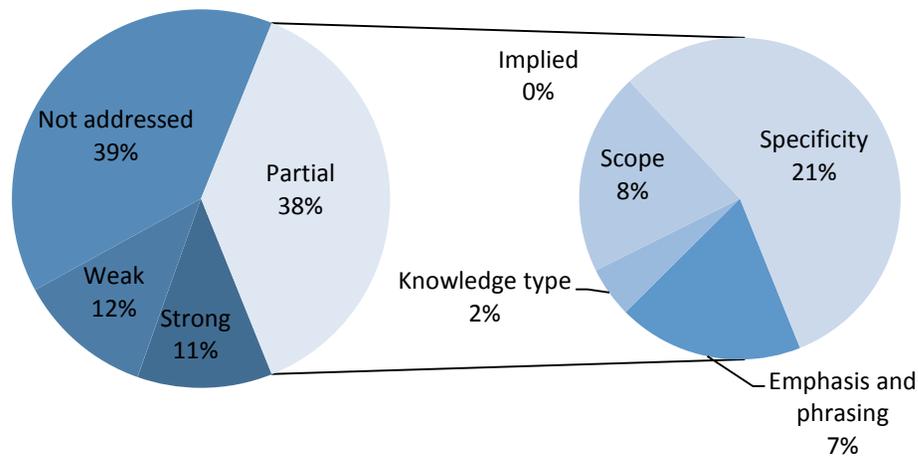
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High School: How Common Core content is addressed in the Nebraska standards

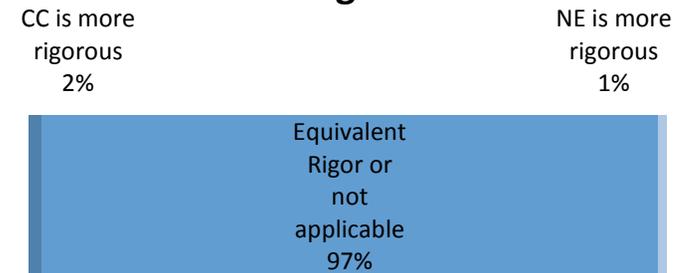
How well the Common Core mathematics content is addressed in the Nebraska standards at this grade is summarized in two categories, content alignment and rigor. The findings for High School as a whole are depicted in the graphs below (specific courses are described in following pages). **Content alignment** characterizes the nature of the content match between the Common Core and Nebraska standards. A *Strong* match indicates Nebraska fully addresses the content of the Common Core indicator. A *Partial* match is assigned when the Nebraska document either does not offer the same level of *Specificity* as the Common Core document, does not cover the complete *Scope* of the Common Core indicator, 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 a standard in the Common Core could not be aligned to Nebraska standards or indicators, 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 Nebraska standards addressed content found in the Common Core standards. See above for a discussion about the alignment categories.

Rigor



Content in the Common Core was compared to the Nebraska standards for the relative demands placed on students. The graph displays the percentage of standards or indicators that were more rigorous, by document. A significant percentage of the content was either equivalent in rigor between the two sets of 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.

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

** Modeling Standards

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High School Overview

Many topics in the Common Core *Mathematics* Standards are not also addressed by the Nebraska Standards for mathematics. However, most topics not found in the Nebraska standards are those present in Common Core standards marked with a “+”, indicating that they are considered standards that students should master who are focused on advanced mathematics courses. Within the appendix to the Common Core, the majority of these standards are found in an optional fourth year course, though a few are found in the courses intended for all students. For McREL’s analysis in the pie charts below, the standards indicated with a “+” are grouped separately from the courses, even when the Appendix included them in the course, in order to more easily identify them. Some of the topics found in these “+” standards include vectors, matrices, complex numbers, and polar coordinates. The majority of partial alignments are due to specificity; meaning that the Nebraska standards are not as specific as Common Core. It is sometimes unclear whether students must address skills to the same level of detail as found within the Common Core. For example, the Common Core specifies that students should solve quadratic equations that have complex solutions. The Nebraska standards require that students solve quadratic equations, but do not specify that these equations should have complex solutions. A few standards are marked as partial alignments due to scope; meaning that the Nebraska standards include some, but not all of the content found in the Common Core standards. Examples of scope differences include instances in which the Common core standards address specific concepts, such as understanding that polynomials form a system analogous to integers, and then specify skills that students will use related to that understanding, such as performing operations on polynomials. Often, the Nebraska standards will address the skills, but will not include the associated conceptual understanding. In regards to rigor, the majority of the standards were found to be at the same level of rigor as the Common Core standards. For the standards that did have a grade discrepancy, the majority of standards were within one grade of each other (e.g., Nebraska content is in grade 8; Common Core content is in high school).

Of the 156 standards or indicators in the Common Core Mathematics Standards for high school, 95 are addressed and 61 are not addressed by the Nebraska State Standards. Of those addressed, 18 are strong alignments, 59 are partial alignments, and 18 are weak alignments.

Note: High School Common Core standards are shown in the analysis as they are in the main standards document – as Conceptual Categories. The “Conceptual Categories” structure in the Common Core documents is designed to encompass four years of high school mathematics. Recognizing the desire for schools to have standards grouped by course, the writers of the Common Core standards included an Appendix A, which shows model courses. In order to provide more precise information about the content alignment between Nebraska state mathematics standards and the Common Core standards, McREL has created graphs that show the matches between Nebraska state standards and the standards found in each of the courses. In cases where the Common Core appendix indicates that a given standard is to be addressed in both Algebra 1 and Algebra 2, data on those standards was reflected in both graphs. For example, Appendix A places HS.A-SSE.1 in both the Algebra 1 and Algebra 2 courses; this content was rated as Weak in alignment to Nebraska standards. The rating was reflected in both the Algebra 1 and Algebra 2 charts and counts.

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

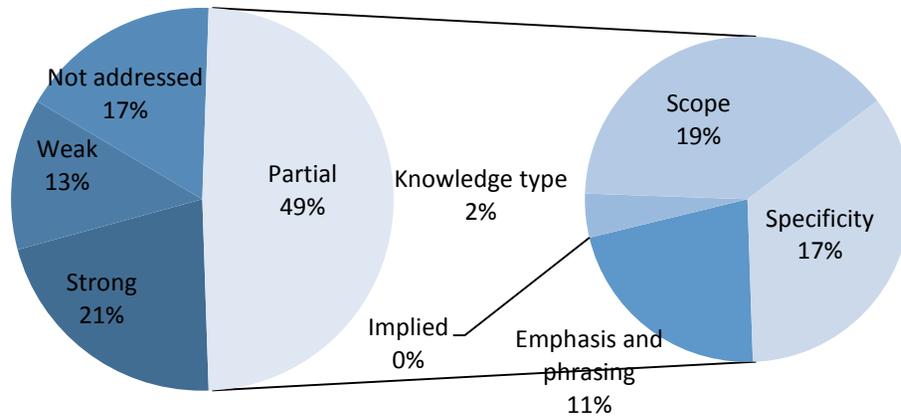
** Modeling Standards

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Algebra I Overview

A few topics in the Common Core Mathematics Standards are not also addressed or are weakly addressed by the Nebraska State Standards for mathematics. The topics found to be missing in the Nebraska standards include specific content related to systems of equations and graphs, defining quantities for modeling, understanding sequences as functions, and inverse functions. Alignments are rated as partial in a few cases when the standards in each document differ in their emphasis and phrasing. Common Core emphasizes determining a recursive process from a context, for example, while Nebraska emphasizes deriving and using formulas for the general term and summation of finite series. In a few cases, the Common Core standards identify specifics about a topic that the Nebraska standards do not. For example, the Common Core standards include expectations related to developing proofs about linear and exponential growth functions that are not specified in Nebraska.

Summary of Content Alignments



Of the 47 standards or indicators identified by Common Core Appendix A as being in the Mathematics Standards for Algebra 1, 39 are addressed and 8 are not addressed by the Nebraska. Of those addressed, 10 are strong alignments, 23 are partial alignments, and 6 are weak alignments. (Please see the high school graph and overview for information on rigor.)

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

** Modeling Standards

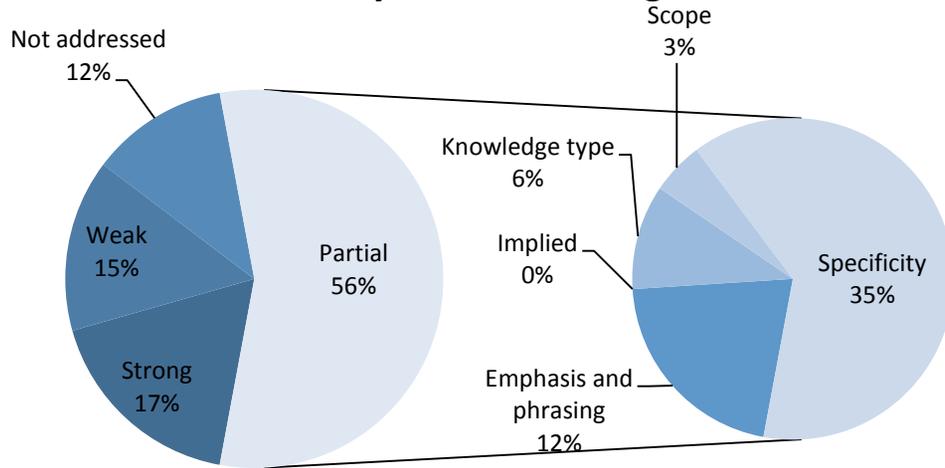
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Geometry Overview

A few topics in the Common Core Mathematics Standards are not also addressed or are weakly addressed by the Nebraska Standards for mathematics. The topics found to be missing in the Nebraska standards relate to specific proofs and derivations, and trigonometric concepts. In many cases, the Common Core standards are more specific than the Nebraska indicators, and so it is unclear whether students must address the same details as specified in the Common Core. For example, the Common Core asks that students know the precise definitions of angle, perpendicular line, parallel line, and line segment. Nebraska does not specify these definitions, but does ask that students identify and give examples of definitions.

Of the 34 standards or indicators identified by Common Core Appendix A as being in the Mathematics Standards for Geometry, 30 are addressed and 4 are not addressed by the Nebraska State Standards. Of those addressed, 6 are strong alignments, 19 are partial alignments, and 5 are weak alignments. (Please see the high school graph and overview for information on rigor.)

Summary of Content Alignments



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

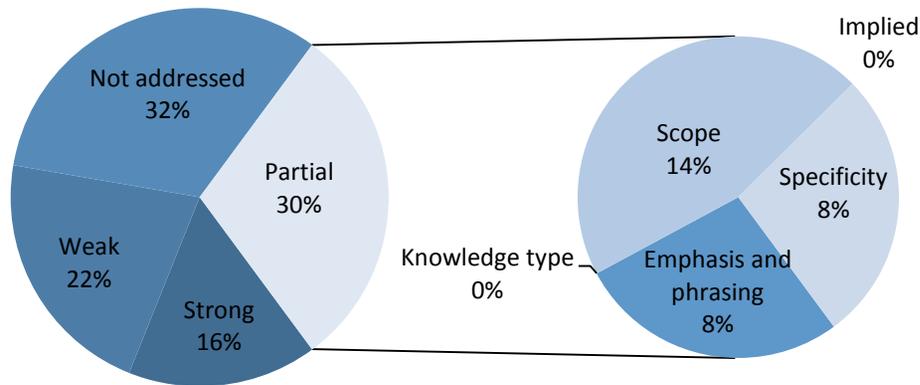
** Modeling Standards

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Algebra 2 Overview

A few topics in the Common Core Mathematics Standards are not also addressed or are weakly addressed by the Nebraska Standards for mathematics. The topics found to be missing in the Nebraska standards relate to the Remainder theorem, identifying and using the zeros of polynomials, polynomial identities, trigonometric functions and identities, and making specific inferences from experimental data. A few partial alignments are due to scope; meaning, the Nebraska standards include some, but not all of the content found in the Common Core. Examples of scope differences include instances in which the Common Core addresses particular aspects of functions (e.g., sketching key features, relating the domain to the quantitative relationship it describes) that are not found in the Nebraska standards.

Summary of Content Alignments



Of the 37 standards or standards identified by Common Core Appendix A as being in the Mathematics Standards for Algebra 2, 25 are addressed and 12 are not addressed by the Nebraska State Standards. Of those addressed, 6 are strong alignments, 11 are partial alignments, and 8 are weak alignments. (Please see the high school graph and overview for information on rigor.)

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

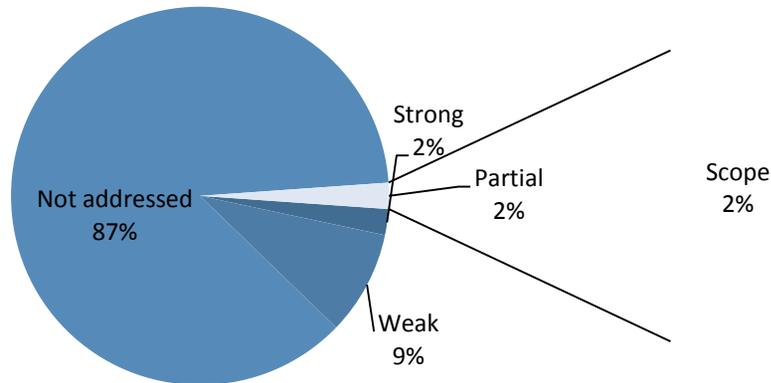
** Modeling Standards

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Additional Mathematics Standards for Advanced Courses (+)

Nearly all of advanced topics in the Common Core Mathematics Standards are not also addressed or are weakly addressed by the Nebraska Standards for Mathematics. The topics found to be missing in the Nebraska standards relate to complex numbers, complex conjugates, vectors, matrices, polynomial identities, trigonometric functions and identities, the derivation of specific equations and formulas, and some advanced probability concepts. All partial and weak alignments include problems due to scope; meaning, the Nebraska standards include some, but not all of the content found in the Common Core. For example, the Common Core standard regarding inverse functions includes verifying by composition that one function is the inverse of another, while the Nebraska standards do not ask students to do that.

Summary of Content Alignments



Of the 45 standards or indicators identified by Common Core Appendix A as being in the Mathematics Standards for an advanced course, 6 are addressed and 39 are not addressed by the Nebraska State Standards. Of those addressed, 1 is a strong alignment, 1 is a partial alignment, and 4 are weak alignments. (Please see the high school graph and overview for information on rigor.)

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

** Modeling Standards

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Course (from Appendix A)	Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
High School — Number and Quantity					
The Real Number System					
Extend the properties of exponents to rational numbers					
A1	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>	Partial (knowledge type)	The NE content emphasizes the skill, while the CC content emphasizes the concept.	12.1.1.a Demonstrate multiple equivalent forms of irrational numbers (e.g., $= 8^{1/2} = 2\sqrt{2} = \sqrt{8}$)
A1	HS.N-RN.2	Rewrite expressions involving radicals and rational exponents using the properties of exponents	Strong		12.1.3.b Simplify exponential expressions (e.g., powers of -1, 0, $1/2$, $3^2 \times 3^2 = 3^4$)
Use properties of rational and irrational numbers.					
A1	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 nonzero rational number and an irrational number is irrational.	Partial (emphasis and phrasing)	Content is similar, with some difference in emphasis and phrasing.	12.1.1.b Compare, contrast and apply the properties of numbers and the real number system, including rational, irrational, imaginary, and complex numbers

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** Modeling Standards

Draft - Mathematics Alignment Study - Draft

Course (from Appendix A)	Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
Quantities**					
Reason quantitatively and use units to solve problems.					
A1	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.	Partial (scope)	CC includes using units as a way to understand problems and guide the solution.	Apply appropriate units and scales to solve problems involving measurement
A1	HS.N-Q.2	Define appropriate quantities for the purpose of descriptive modeling.	Not addressed		
A1	HS.N-Q.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	Partial (emphasis and phrasing)	Content is similar, with some difference in emphasis.	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 is approximately 31.4, square and cube roots)

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** Modeling Standards

Draft - Mathematics Alignment Study - Draft

Course (from Appendix A)	Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
The Complex Number System					
Perform arithmetic operations with complex numbers.					
A2	HS.N-CN.1	Know there is a complex number i such that $i^2 = -1$, and every complex number has the form $a + bi$ with a and b real.	Partial (specificity)	CC is more specific.	12.1.1.b Compare, contrast and apply the properties of numbers and the real number system, including rational, irrational, imaginary, and complex numbers
A2	HS.N-CN.2	Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.	Partial (emphasis and phrasing)	Content is similar, with some difference in emphasis and phrasing.	12.1.1.b Compare, contrast and apply the properties of numbers and the real number system, including rational, irrational, imaginary, and complex numbers
+	HS.N-CN.3	Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers.	Not addressed		
Represent complex numbers and their operations on the complex plane.					
+	HS.N-CN.4	Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number	Not addressed		

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** Modeling Standards

Draft - Mathematics Alignment Study - Draft

Course (from Appendix A)	Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
		represent the same number.			
+	HS.N-CN.5	Represent addition, subtraction, multiplication, and conjugation of complex numbers geometrically on the complex plane; use properties of this representation for computation. <i>For example, $(1 - \sqrt{3}i)^3 = 8$ because $(1 - \sqrt{3}i)$ has modulus 2 and argument 120°.</i>	Not addressed		
+	HS.N-CN.6	Calculate the distance between numbers in the complex plane as the modulus of the difference, and the midpoint of a segment as the average of the numbers at its endpoints.	Not addressed		
Use complex numbers in polynomial identities and equations.					
A2	HS.N-CN.7.	Solve quadratic equations with real coefficients that have complex solutions.	Partial (specificity)	CC specifies equations with complex solutions.	12.3.3.i Solve quadratic equations (e.g., factoring, graphing, quadratic formula)
+	HS.N-CN.8.	Extend polynomial identities to the complex numbers. <i>For example, rewrite $x^2 + 4$ as $(x + 2i)(x - 2i)$.</i>	Not addressed		
+	HS.N-CN.9.	Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials.	Not addressed		

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** Modeling Standards

Draft - Mathematics Alignment Study - Draft

Course (from Appendix A)	Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
Vectors and Matrix Quantities					
Represent and model with vector quantities.					
+	HS.N-VM.1	Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes (e.g., \mathbf{v} , $ \mathbf{v} $, $ \mathbf{v} $, v).		Not addressed	
+	HS.N-VM.2	Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point.		Not addressed	
+	HS.N-VM.3	Solve problems involving velocity and other quantities that can be represented by vectors.		Not addressed	
Perform operations on vectors.					
+	HS.N-VM.4	Add and subtract vectors. a. Add vectors end-to-end, component-wise, and by the parallelogram rule. Understand that the magnitude of a sum of two vectors is typically not the sum of the magnitudes. b. Given two vectors in magnitude and direction form, determine the magnitude and		Not addressed	

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** Modeling Standards

Draft - Mathematics Alignment Study - Draft

Course (from Appendix A)	Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
		direction of their sum.			
		<p>c. Understand that vector subtraction $\mathbf{v} - \mathbf{w}$ is defined as $\mathbf{v} + (-\mathbf{w})$, where $-\mathbf{w}$ is the additive inverse of \mathbf{w}, with the same magnitude as \mathbf{w} and pointing in the opposite direction. Represent vector subtraction graphically by connecting the tips in the appropriate order, and perform vector subtraction component-wise.</p>			
+	HS.N-VM.5	<p>Multiply a vector by a scalar.</p> <p>a. Represent scalar multiplication graphically by scaling vectors and possibly reversing their direction; perform scalar multiplication component-wise, e.g., as $c(v_x, v_y) = (cv_x, cv_y)$.</p> <p>b. Compute the magnitude of a scalar multiple $c\mathbf{v}$ using $\ c\mathbf{v}\ = c \mathbf{v}$. Compute the direction of $c\mathbf{v}$ knowing that when $c \mathbf{v} \neq 0$, the direction of $c\mathbf{v}$ is either along \mathbf{v} (for $c > 0$) or against \mathbf{v} (for $c < 0$).</p>		Not addressed	

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** Modeling Standards

Draft - Mathematics Alignment Study - Draft

Course (from Appendix A)	Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
Perform operations on matrices and use matrices in applications.					
+	HS.N-VM.6	Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network.		Not addressed	
+	HS.N-VM.7	Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled.		Not addressed	
+	HS.N-VM.8	Add, subtract, and multiply matrices of appropriate dimensions.		Not addressed	
+	HS.N-VM.9	Understand that, unlike multiplication of numbers, matrix multiplication for square matrices is not a commutative operation, but still satisfies the associative and distributive properties.		Not addressed	
+	HS.N-VM.10	Understand that the zero and identity matrices play a role in matrix addition and multiplication similar to the role of 0 and 1 in the real numbers. The determinant of a square matrix is nonzero if and only if the matrix has a multiplicative inverse.		Not addressed	
+	HS.N-	Multiply a vector (regarded as		Not addressed	

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** Modeling Standards

Draft - Mathematics Alignment Study - Draft

Course (from Appendix A)	Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
	VM.11	a matrix with one column) by a matrix of suitable dimensions to produce another vector. Understand a matrix as a transformation of vectors.			
+	HS.N-VM.12	Understand a 2×2 matrix as a transformation of the plane, and interpret the absolute value of the determinant in terms of area.		Not addressed	

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** Modeling Standards

Draft - Mathematics Alignment Study - Draft

Course (from Appendix A)	Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
High School — Algebra					
Seeing Structures in Expressions					
Interpret the structure of expressions					
A1/A2	HS.A-SSE.1	Interpret expressions that represent a quantity in terms of its context. ** a. Interpret parts of an expression, such as terms, factors, and coefficients. b. Interpret complicated expressions by viewing one or more of their parts as a single entity. <i>For example, interpret $P(1+r)^n$ as the product of P and a factor not depending on P.</i>	Weak	CC emphasizes interpreting parts of an expression in terms of the context of a quantitative relationship, while NE emphasizes interpreting functions with graphs, tables, and algebraic notation.	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)
A1/A2	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 $(x^2 - y^2)(x^2 + y^2)$.	Partial (specificity)	CC specifies that students use the structure of an expression to identify ways to simplify it.	12.3.3.b Simplify algebraic expressions involving exponents (e.g., $(3x^4)^2$) 12.3.3.e Factor polynomials 12.3.3.j Add, subtract, and simplify rational expressions

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** Modeling Standard

Draft - Mathematics Alignment Study - Draft

Course (from Appendix A)	Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
		approximate equivalent monthly interest rate if the annual rate is 15%.			
A2	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.*	Strong		12.3.3.m Derive and use the formulas for the general term and summation of finite arithmetic and geometric series
Arithmetic with Polynomials and Rational Exponents					
Perform arithmetic operations on polynomials					
A1/A2	HS.A-APR.1	Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials	Partial (scope)	CC includes understanding that polynomials form a system analogous to the integers and are closed under the four operations.	12.3.3.c Add and subtract 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)
Understand the relationship between zeros and factors polynomials					
A2	HS.A-APR.2	Know and apply the Remainder Theorem: For a polynomial $p(x)$ and a number a , the remainder on division by $x - a$ is $p(a)$, so $p(a) = 0$ if and only if $(x -$	Not addressed		

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** Modeling Standard

Draft - Mathematics Alignment Study - Draft

Course (from Appendix A)	Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
		<i>a</i> is a factor of $p(x)$.			
A2	HS.A-APR.3	Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.	Not addressed		
Use polynomial identities to solve problems					
A2	HS.A-APR.4	Prove polynomial identities and use them to describe numerical relationships. For example, the polynomial identity $(x^2 + y)^2 = (x^2 - y)^2 + (2xy)^2$ can be used to generate Pythagorean triples.	Not addressed		
+	HS.A-APR.5	Know and apply the Binomial Theorem gives the expansion of $(x + y)^n$ in powers of x and y for a positive integer n , where x and y are any numbers, with coefficients determined for example by Pascal's Triangle.	Not addressed		
Rewrite rational expressions					
A2	HS.A-APR.6	Rewrite simple rational expressions in different forms; write $a(x)/b(x)$ in the	Partial (scope)	CC includes using inspection and a computer algebra system to rewrite	12.3.3.d Multiply and divide polynomials (e.g., divide $x^3 - 8$ by $x - 2$, divide $x^4 - 5x^3$

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** Modeling Standard

Draft - Mathematics Alignment Study - Draft

Course (from Appendix A)	Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
		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.		rational expressions in different forms.	$- 2x$ by x^2)
+	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.	Partial (scope)	CC includes understanding that rational expressions form a system analogous to the rational numbers and are closed under the four operations by a nonzero rational expression.	12.3.3.j 12.3.3.k Add, subtract, and simplify rational expressions Multiply, divide, and simplify rational expressions
Creating Equations**					
Create equations that describe numbers or relationships					
A1/A2	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	Strong		12.3.2.b 12.3.3.g Represent a variety of quantitative relationships using linear equations and one variable inequalities Solve linear equations and inequalities including absolute value

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** Modeling Standard

Draft - Mathematics Alignment Study - Draft

Course (from Appendix A)	Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
		functions.			12.3.2.d Model contextualized problems using various representations for non-linear functions (e.g., quadratic, exponential, square root, and absolute value)
A1/A2	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.	Strong		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)
					12.3.1.e Graph linear and non-linear functions
					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)
A1/A2	HS.A-	Represent constraints by equations or inequalities,	Weak	CC specifies the representation of	12.3.2.b Represent a variety of quantitative relationships

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** Modeling Standard

Draft - Mathematics Alignment Study - Draft

Course (from Appendix A)	Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
	CED.3	and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. <i>For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.</i>		constraints with equations and inequalities and includes interpreting the solutions to systems of equations as viable or non-viable in a modeling context.	12.3.3.p using linear equations and one variable inequalities Analyze and solve systems of two linear equations in two variables algebraically and graphically
A1/A2	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>	Strong		12.3.3.o Solve an equation involving several variables for one variable in terms of the others
Reasoning with Equations and Inequalities					
Understand solving equations as a process of reasoning and explain the reasoning					
A1	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.	Partial (scope)	CC includes constructing an argument to justify a solution method.	12.3.3.h Identify and explain the properties used in solving equations and inequalities

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** Modeling Standard

Draft - Mathematics Alignment Study - Draft

Course (from Appendix A)	Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
A2	HS.A-REI.2	Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.	Weak	CC includes solving rational and radical equations and giving examples of how extraneous solutions may arise.	12.3.3.1 Evaluate polynomial and rational expressions and expressions containing radicals and absolute values at specified values of their variables
Solve equations and inequalities in one variable					
A1	HS.A-REI.3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	Partial (specificity)	CC specifies solving equations with coefficients represented by letters.	12.3.3.g Solve linear equations and inequalities including absolute value 12.3.3.o Solve an equation involving several variables for one variable in terms of the others
A1	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,	Partial (specificity)	CC is more specific.	12.3.3.i Solve quadratic equations (e.g., factoring, graphing, quadratic formula)

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** Modeling Standard

Draft - Mathematics Alignment Study - Draft

Course (from Appendix A)	Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
		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 numbers a and b .			
Solve systems of equations					
A1	HS.A-REI.5	Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.	Not addressed		
A1	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.	Strong		12.3.3.p Analyze and solve systems of two linear equations in two variables algebraically and graphically
A1	HS.A-REI.7	Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. <i>For example, find the points of intersection between</i>	Not addressed		

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** Modeling Standard

Draft - Mathematics Alignment Study - Draft

Course (from Appendix A)	Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
		<i>the line $y = -3x$ and the circle $x^2 + y^2 = 3$.</i>			
+	HS.A-REI.8	Represent a system of linear equations as a single matrix equation in a vector variable.		Not addressed	
+	HS.A-REI.9	Find the inverse of a matrix if it exists and use it to solve systems of linear equations (using technology for matrices of dimension 3×3 or greater).		Not addressed	
Represent and solve equations and inequalities graphically					
A1	HS.A-REI.10	Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).		Not addressed	
A1/A2	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		Not addressed	

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** Modeling Standard

Draft - Mathematics Alignment Study - Draft

Course (from Appendix A)	Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
		graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.**			
A1	HS.A.REI.1 2	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.	Partial (scope)	CC includes graphing the solution set to a system of linear inequalities.	12.3.1.g Graph and interpret linear inequalities

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** Modeling Standard

Draft - Mathematics Alignment Study - Draft

Course (from Appendix A)	Common Core Content Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
High School — Functions						
Interpreting Functions						
Understand the concept of a function and use function notation						
A1	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 $y = f(x)$.	Weak	CC includes an understanding what functions are and their notation. CC content emphasizes the concept, while the NE content emphasizes the skill. CC emphasizes inputs and outputs, while NE emphasizes identification of domain and range and determining if a relation is a function.	12.3.1.b 12.3.1.i	Identify domain and range of functions represented in either symbolic or graphical form (e.g., linear, non-linear) Determine if a relation is a function
A1	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.	Strong		12.3.1.a 12.3.1.h	Represent, interpret, and analyze functions with graphs, tables, and algebraic notation and convert among these representations (e.g., linear, non-linear) Represent, interpret, and analyze functions and their inverses

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** Modeling standard

Draft - Mathematics Alignment Study - Draft

Course (from Appendix A)	Common Core Content Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
					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)
A1	HS.F-IF.3	Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. <i>For example, the Fibonacci sequence is defined recursively by $f(0) = f(1) = 1$, $f(n+1) = f(n) + f(n-1)$ for $n \geq 1$.</i>	Not addressed		
Interpret functions that arise in applications in terms of the context					
A1/A2	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	Partial (scope)	CC includes sketching key features given a verbal description of the relationship.	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)

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** Modeling standard

Draft - Mathematics Alignment Study - Draft

Course (from Appendix A)	Common Core Content Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
		description of the relationship. <i>Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.*</i>			12.3.1.c	Identify the slope and intercepts of a linear relationship from an equation or graph
A1/A2	HS.F-IF.5	Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function $h(n)$ gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.*	Partial (scope)	CC includes relating the domain to the quantitative relationship it describes.	12.3.1.b	Identify domain and range of functions represented in either symbolic or graphical form (e.g., linear, non-linear)
A1/ A2	HS.F-IF.6	Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.*	Strong		12.3.1.f	Compare and analyze the rate of change by using ordered pairs, tables, graphs, and equations
Analyze functions using different representations						
A1/A2	HS.F-IF.7	Graph functions expressed symbolically and show key features of	Weak	CC is more specific. CC includes trigonometric and logarithmic	12.3.1.d	Identify characteristics of linear and non-linear functions

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** Modeling standard

Draft - Mathematics Alignment Study - Draft

Course (from Appendix A)	Common Core Content Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
	the graph, by hand in simple cases and using technology for more complicated cases.**			functions.	
	a. Graph linear and quadratic functions and show intercepts, maxima, and minima.				12.3.1.e Graph linear and non-linear functions
	b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.				
	c. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.				
+	d. Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.				
	e. Graph exponential and logarithmic functions, showing intercepts and				

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** Modeling standard

Draft - Mathematics Alignment Study - Draft

Course (from Appendix A)	Common Core Content Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
		end behavior, and trigonometric functions, showing period, midline, and amplitude.				
A1/A2	HS.F-IF.8	Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.	Partial (scope)	CC includes completing the square and interpreting characteristics of functions in terms of a context.	12.3.2.a	Identify characteristics of linear and non-linear functions
		a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.			12.3.3.e	Factor polynomials
		b. Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as $y = (1.02)^t$, $y = (0.97)^t$, $y = (1.01)^{12t}$, $y = (1.2)^{t/10}$, and classify them as representing exponential			12.3.2.d	Model contextualized problems using various representations for non-linear functions (e.g., quadratic, exponential, square root, and absolute value)
					12.3.2.c	Analyze situations to determine the type of algebraic relationship (e.g.,

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** Modeling standard

Draft - Mathematics Alignment Study - Draft

Course (from Appendix A)	Common Core Content Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
		growth or decay.			linear, nonlinear)
A1/A2	HS.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>	Weak	Content is similar, with significant differences in emphasis and phrasing.	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)

Building Functions

Build a function that models a relationship between two quantities

	HS.F-BF.1	Write a function that describes a relationship between two quantities.**	Partial (emphasis and phrasing)	Content is similar, with some difference in emphasis and phrasing.	
A1		a. Determine an explicit expression, a recursive process, or steps for calculation from a context.			12.3.3.m Derive and use the formulas for the general term and summation of finite arithmetic and geometric series

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

** Modeling standard

Draft - Mathematics Alignment Study - Draft

Course (from Appendix A)	Common Core Content Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
A1/A2	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.				12.3.3.n Combine functions by composition, as well as by addition, subtraction, multiplication, and division
+	c. Compose functions. For example, if $T(y)$ is the temperature in the atmosphere as a function of height, and $h(t)$ is the height of a weather balloon as a function of time, then $T(h(t))$ is the temperature at the location of the weather balloon as a function of time.				
A1	HS.F-BF.2 Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.**	Partial (scope)		CC includes using sequences to model situations and translating between the two forms.	12.3.3.m Derive and use the formulas for the general term and summation of finite arithmetic and geometric series

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** Modeling standard

Draft - Mathematics Alignment Study - Draft

Course (from Appendix A)	Common Core Content Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
Build new functions from existing functions					
A1/A2	HS.F-BF.3	Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. <i>Include recognizing even and odd functions from their graphs and algebraic expressions for them.</i>	Not addressed		
A1/A2	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	Weak	CC is more specific. CC includes verifying by composition that one function is the inverse of another and producing an invertible function from a non-invertible function by restricting the domain.	12.3.1.h Represent, interpret, and analyze functions and their inverses

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** Modeling standard

Draft - Mathematics Alignment Study - Draft

Course (from Appendix A)	Common Core Content Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
		graph or a table, given that the function has an inverse.			
+		d. Produce an invertible function from a non-invertible function by restricting the domain.			
+	HS.F-BF.5	Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.	Not addressed		

Linear, Quadratic, and Exponential Models**

Construct and compare linear and exponential models and solve problems

A1	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.	Partial (specificity)	CC specifies developing a proof about linear and exponential functions growth.	12.3.2.c	Analyze situations to determine the type of algebraic relationship (e.g., linear, nonlinear)
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** Modeling standard

Draft - Mathematics Alignment Study - Draft

Course (from Appendix A)	Common Core Content Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
		<p>b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.</p> <p>c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.</p>			
A1	HS.F-LE.2	Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).	Partial (specificity)	CC specifies construction of arithmetic and geometric sequences.	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)
A1	HS.F-LE.3	Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.	Partial (emphasis and phrasing)	CC emphasizes the behavior of exponential functions, while NE emphasizes comparing rates of change.	12.3.1.f Compare and analyze the rate of change by using ordered pairs, tables, graphs, and equations
A2	HS.F-LE.4	For exponential models, express as a logarithm the	Not addressed		

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** Modeling standard

Draft - Mathematics Alignment Study - Draft

Course (from Appendix A)	Common Core Content Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
		by the angle			
A2	HS.F-TF.2	Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.	Not addressed		
+	HS.F-TF.3	Use special triangles to determine geometrically the values of sine, cosine, tangent for $\pi/3$, $\pi/4$ and $\pi/6$, and use the unit circle to express the values of sine, cosine, and tangent for $\pi-x$, $\pi+x$, and $2\pi-x$ in terms of their values for x , where x is any real number.	Not addressed		
+	HS.F-TF.4	Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.	Not addressed		

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** Modeling standard

Draft - Mathematics Alignment Study - Draft

Course (from Appendix A)	Common Core Content Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
Model periodic phenomena with trigonometric functions					
A2	HS.F-TF.5	Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.**		Not addressed	
+	HS.F-TF.6	Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed.		Not addressed	
+	HS.F-TF.7	Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context.**		Not addressed	
Prove and apply trigonometric identities					
A2	HS.F-TF.8	Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to calculate trigonometric ratios.		Not addressed	
+	HS.F-TF.9	Prove the addition and subtraction formulas for		Not addressed	

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** Modeling standard

Draft - Mathematics Alignment Study - Draft

Course (from Appendix A)	Common Core Content Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
		sine, cosine, and tangent and use them to solve problems.			

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** Modeling standard

Draft - Mathematics Alignment Study - Draft

Course (from Appendix A)	Common Core Content Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
High School — Geometry						
Congruence						
Experiment with transformations in the plane						
G	HS.G-CO.1	Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.	Partial (specificity)	CC is more specific.	12.2.1.a	Identify and explain the necessity of and give examples of definitions and theorems
					12.2.1.g	Know the definitions and basic properties of a circle and use them to prove basic theorems and solve problems
G	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).	Partial (specificity)	CC is more specific.	12.2.3.a	Explain and justify the effects of simple transformations on the ordered pairs of two-dimensional shapes
					12.2.3.b	Perform and describe multiple transformations

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** Modeling standard

Draft - Mathematics Alignment Study - Draft

Course (from Appendix A)	Common Core Content Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
G	HS.G-CO.3	Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.	Partial (specificity)	CC is more specific.	12.2.3.b	Perform and describe multiple transformations
G	HS.G-CO.4	Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.	Weak	CC emphasizes the development of definitions in terms of angles, circles, and lines.	12.2.3.b	Perform and describe multiple transformations
G	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.	Partial (specificity)	CC is more specific.	12.2.3.b	Perform and describe multiple transformations
Understand congruence in terms of rigid motions						
G	HS.G-CO.6	Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure;	Weak	Content is similar, with significant differences in emphasis and phrasing. CC specifies predicting the effects of a transformation and	12.2.3.b 12.2.1.c	Perform and describe multiple transformations State and prove geometric theorems using deductive reasoning (e.g., parallel lines)

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** Modeling standard

Draft - Mathematics Alignment Study - Draft

Course (from Appendix A)	Common Core Content Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
		given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.		using the definition of congruence to determine if two figures are congruent.	with transversals, congruent triangles, similar triangles)
G	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.	Partial (specificity)	CC is more specific.	12.2.1.c State and prove geometric theorems using deductive reasoning (e.g., parallel lines with transversals, congruent triangles, similar triangles)
G	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.	Partial (specificity)	CC is more specific.	12.2.1.c State and prove geometric theorems using deductive reasoning (e.g., parallel lines with transversals, congruent triangles, similar triangles)
Prove geometric theorems					
G	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	Partial (specificity)	CC is more specific.	12.2.1.c State and prove geometric theorems using deductive reasoning (e.g., parallel lines with transversals, congruent triangles, similar triangles)

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** Modeling standard

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Course (from Appendix A)	Common Core Content Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
		congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.			
G	HS.G-CO.10	Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180° ; 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.	Partial (specificity)	CC is more specific.	12.2.1.c State and prove geometric theorems using deductive reasoning (e.g., parallel lines with transversals, congruent triangles, similar triangles)
G	HS.G-CO.11	Prove theorems about parallelograms. Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.	Strong		12.2.2.d Prove special types of triangles and quadrilaterals (e.g., right triangles, isosceles trapezoid, parallelogram, rectangle, square)

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** Modeling standard

Draft - Mathematics Alignment Study - Draft

Course (from Appendix A)	Common Core Content Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
Make geometric constructions					
G	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.). <i>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.</i>	Partial (specificity)	CC specifies formal geometric constructions	12.2.4.a Sketch and draw appropriate representations of geometric objects using ruler, protractor, or technology
G	HS.G-CO.13	Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.	Partial (specificity)	CC is more specific	12.2.1.g Know the definitions and basic properties of a circle and use them to prove basic theorems and solve problems 12.2.4.a Sketch and draw appropriate representations of geometric objects using ruler, protractor, or technology

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** Modeling standard

Draft - Mathematics Alignment Study - Draft

Course (from Appendix A)	Common Core Content Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards		
Similarity, Right Triangles, and Trigonometry							
Understand similarity in terms of similarity transformations							
G	HS.G-SRT.1	Verify experimentally the properties of dilations given by a center and a scale factor: a. A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged. b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.	Partial (specificity)	NE	CC is more specific. CC content is in high school; NE content is in grade 8.	8.2.3.b	Perform and describe positions and sizes of shapes under dilations (e.g., scale factor, ratios)
G	HS.G-SRT.2	Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of	Partial (specificity)	NE	CC is more specific.	8.2.3.a	Identify the similarity of dilated shapes

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** Modeling standard

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Course (from Appendix A)	Common Core Content Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
		sides.				
G	HS.G-SRT.3	Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.	Not addressed			
Prove theorems involving similarity						
G	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.	Partial (specificity)	CC is more specific.	12.2.1.c	State and prove geometric theorems using deductive reasoning (e.g., parallel lines with transversals, congruent triangles, similar triangles)
					12.2.2.d	Prove special types of triangles and quadrilaterals (e.g., right triangles, isosceles trapezoid, parallelogram, rectangle, square)

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Course (from Appendix A)	Common Core Content Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
G	HS.G-SRT.5	Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.	Strong		12.2.1.c	State and prove geometric theorems using deductive reasoning (e.g., parallel lines with transversals, congruent triangles, similar triangles)
					12.2.1.d	Apply geometric properties to solve problems (e.g., parallel lines, line transversals, similar triangles, congruent triangles, proportions)
Define trigonometric ratios and solve problems involving right triangles						
G	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 angles.	Partial (emphasis and phrasing)	Content is similar, with some difference emphasis and phrasing.	12.2.1.e	Identify and apply right triangle relationships (e.g., sine, cosine, tangent, special right triangles, converse of Pythagorean Theorem)
G	HS.G-SRT.7	Explain and use the relationship between the sine and cosine of complementary angles.	Not addressed			
G	HS.G-SRT.8	Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.	Strong		12.2.1.e	Identify and apply right triangle relationships (e.g., sine, cosine, tangent, special right triangles, converse of Pythagorean Theorem)

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Draft - Mathematics Alignment Study - Draft

Course (from Appendix A)	Common Core Content Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
Apply trigonometry to general triangles						
+	HS.G-SRT.9	Derive the formula $A = \frac{1}{2} ab \sin(C)$ for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.	Not addressed			
+	HS.G-SRT.10	Prove the Laws of Sines and Cosines and use them to solve problems.	Not addressed			
+	HS.G-SRT.11	Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces).	Not addressed			
Circles						
Translate between the geometric description and the equation for a conic section						
G	HS.G-C.1	Prove that all circles are similar.	Partial (specificity)	CC is more specific.	12.2.1.g	Know the definitions and basic properties of a circle and use them to prove basic theorems and solve problems
G	HS.G-C.2	Identify and describe relationships among inscribed angles, radii,	Partial (specificity)	CC is more specific.	12.2.1.g	Know the definitions and basic properties of a circle and use them to prove basic

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Course (from Appendix A)	Common Core Content Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
		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.			theorems and solve problems	
G	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.	Partial (specificity)	CC is more specific.	12.2.1.g Know the definitions and basic properties of a circle and use them to prove basic theorems and solve problems	
+	HS.G-C.4	Construct a tangent line from a point outside a given circle to the circle.	Partial (specificity)	CC is more specific.	12.2.1.d Apply geometric properties to solve problems (e.g., parallel lines, line transversals, similar triangles, congruent triangles, proportions)	
Find arc lengths and areas of sectors of circles						
G	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	Weak	CC	CC is more difficult. NE emphasizes the skill of finding arc lengths and areas, while CC emphasizes derivations and definitions.	12.2.5.e Find arc length and area of sectors of a circle

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** Modeling standard

Draft - Mathematics Alignment Study - Draft

Course (from Appendix A)	Common Core Content Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
		angle as the constant of proportionality; derive the formula for the area of a sector.				
Expressing Geometric Properties with Equations						
Translate between the geometric description and the equation for a conic section						
G	HS.G-GPE.1	Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.	Weak	CC includes completing the square to find the center and radius of a circle. CC is more specific.	12.2.2.a	Use coordinate geometry to analyze geometric situations (e.g., parallel lines, perpendicular lines, circle equations)
G	HS.G-GPE.2	Derive the equation of a parabola given a focus and directrix.	Not addressed			
+	HS.G-GPE.3	Derive the equations of ellipses and hyperbolas given foci and directrices.	Not addressed			
Use coordinates to prove simple geometric theorems algebraically						
G	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	Partial (emphasis and phrasing)	Content is similar, with some difference emphasis and phrasing.	12.2.2.a	Use coordinate geometry to analyze geometric situations (e.g., parallel lines, perpendicular lines, circle equations)

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Draft - Mathematics Alignment Study - Draft

Course (from Appendix A)	Common Core Content Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
		or disprove that the point $(1, \sqrt{3})$ lies on the circle centered at the origin and containing the point $(0, 2)$.			
G	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).	Partial (specificity)	CC is more specific.	12.2.2.a Use coordinate geometry to analyze geometric situations (e.g., parallel lines, perpendicular lines, circle equations)
G	HS.G-GPE.6	Find the point on a directed line segment between two given points that partitions the segment in a given ratio.	Partial (emphasis and phrasing)	Content is similar, with some difference emphasis and phrasing.	12.2.2.b Apply the midpoint formula
G	HS.G-GPE.7	Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.	Partial (scope)	CC includes using other methods in addition to the distance formula to compute perimeters and areas.	12.2.2.c Apply the distance formula
Geometric Measurement and Dimension					
Explain volume formulas and use them to solve problems					
G	HS.G-GMD.1	Give an informal argument for the	Weak	CC includes giving an informal argument for	12.2.1.g Know the definitions and basic properties of a circle

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Draft - Mathematics Alignment Study - Draft

Course (from Appendix A)	Common Core Content Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
		formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. <i>Use dissection arguments, Cavalieri's principle, and informal limit arguments.</i>		volume formulas.	and use them to prove basic theorems and solve problems
+	HS.G-GMD.2	Give an informal argument using Cavalieri's principle for the volume of a sphere and other solid figures.	Not addressed		
G	HS.G-GMD.3	Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.**	Strong		12.2.5.f Determine surface area and volume of three-dimensional objects (e.g., spheres, cones, pyramids)
Visualize relationships between two-dimensional and three-dimensional objects					
G	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.	Partial (emphasis and phrasing)	Content is similar, with some difference in emphasis and phrasing.	12.2.1.b Analyze properties and relationships among classes of two and three dimensional geometric objects using inductive reasoning and counterexamples

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** Modeling standard

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Course (from Appendix A)	Common Core Content Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
Modeling with Geometry					
Apply geometric concepts in modeling situations**					
G	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).	Strong		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)
G	HS.G-MG.2	Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).	Not addressed		
G	HS.G-MG.3	Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).	Partial (specificity)	CC specifies solving design problems.	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)

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Course (from Appendix A)	Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
High School — Statistics and Probability**						
Interpreting Categorical and Quantitative Data						
Summarize, represent, and interpret data on a single count or measurement variable						
A1	HS.S-ID.1	Represent data with plots on the real number line (dot plots, histograms, and box plots).	Partial (specificity)	CC specifies the real number line. CC content for representing data with plots is also found in elementary grades.	8.4.1.a	Represent data using circle graphs and box plots with and without the use of technology
					6.4.1.a	Represent data using stem and leaf plots, histograms, and frequency charts
					4.4.1.a	Represent data using dot/line plots
A1	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.	Strong		12.4.1.b	Compute, identify, and interpret measures of central tendency (mean, median, mode) when provided a graph or data set
					12.4.1.d	Describe the shape and determine spread (variance, standard deviation) and outliers of a data set
					8.4.1.c	Find, interpret, and compare measures of central tendency (mean, median, mode) and the quartiles for sets of data
			NE	CC content is in high school, NE content is in grade 8.		

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** All standards in this Conceptual Category are considered to be modeling standards.

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Course (from Appendix A)	Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
A1	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).	Strong		12.4.1.b	Compute, identify, and interpret measures of central tendency (mean, median, mode) when provided a graph or data set
					12.4.1.c	Explain how sample size and transformations of data affect measures of central tendency
					12.4.1.d	Describe the shape and determine spread (variance, standard deviation) and outliers of a data set
A2	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.	Weak		12.4.1.a	Interpret data represented by the normal distribution and formulate conclusions
					12.4.1.e	Explain how statistics are used or misused in the world

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Course (from Appendix A)	Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards	
Summarize, represent, and interpret data on two categorical and quantitative variables						
A1	HS.S-ID.5	Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.	Not addressed			
A1	HS.S-ID.6	<p>Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.</p> <p>a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear and exponential models.</p> <p>b. Informally assess the fit of a function by plotting and analyzing residuals.</p>	Partial (scope)	CC includes the plotting and analysis of residuals.	12.4.1.f	Create scatter plots, analyze patterns, and describe relationships in paired data
					12.4.2.c	Develop linear equations for linear models to predict unobserved outcomes using regression line and correlation coefficient
					12.3.2.d	Model contextualized problems using various representations for non-linear functions (e.g., quadratic, exponential, square root, and absolute value)

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Course (from Appendix A)	Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
	c. Fit a linear function for a scatter plot that suggests a linear association.				12.4.2.c Develop linear equations for linear models to predict unobserved outcomes using regression line and correlation coefficient
Interpret linear models					
A1	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.	Partial (specificity)	CC specifies interpretation of slope and intercepts in terms of a context.	12.3.1.c Identify the slope and intercepts of a linear relationship from an equation or graph 12.3.1.f Compare and analyze the rate of change by using ordered pairs, tables, graphs, and equations
A1	HS.S-ID.8	Compute (using technology) and interpret the correlation coefficient of a linear fit.	Partial (emphasis and phrasing)	CC emphasizes the use of technology to interpret the correlational coefficient of a linear fit, while NE emphasizes the development of linear equation for linear models.	12.4.2.c Develop linear equations for linear models to predict unobserved outcomes using regression line and correlation coefficient
A1	HS.S-ID.9	Distinguish between correlation and causation.	Strong		12.4.2.d Recognize when arguments based on data confuse correlation with causation

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Course (from Appendix A)	Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
Making Inferences and Justifying Conclusions					
Understand and evaluate random processes underlying statistical experiments					
A2	HS.S-IC.1	Understand statistics as a process for making inferences about population parameters based on a random sample from that population.	Weak	Content is similar, with significant differences in emphasis and phrasing.	12.4.2.b 12.4.1.e Support inferences with valid arguments Explain how statistics are used or misused in the world
A2	HS.S-IC.2	Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. <i>For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model?</i>	Weak	Content is similar, with significant differences in emphasis and phrasing.	12.4.1.h Explain the differences between randomized experiment and observational studies
Make inferences and justify conclusions from sample surveys, experiments, and observational studies					
A2	HS.S-IC.3	Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.	Strong		12.4.1.g 12.4.1.h Explain the impact of sampling methods, bias, and the phrasing of questions asked during data collection and the conclusions that can rightfully be made Explain the differences between randomized experiment and observational studies
A2	HS.S-IC.4	Use data from a sample survey to estimate a	Not addressed		

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Course (from Appendix A)	Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
		population mean or proportion; develop a margin of error through the use of simulation models for random sampling.			
A2	HS.S-IC.5	Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.	Not addressed		
A2	HS.S-IC.6	Evaluate reports based on data.	Partial (emphasis and phrasing)	CC emphasizes the evaluation of reports, while NE emphasizes the comparison of data sets and the support of inferences.	12.4.2.a Compare data sets and evaluate conclusions using graphs and summary statistics 12.4.2.b Support inferences with valid arguments
Conditional Probability and the Rules of Probability					
Understand independence and conditional probability and use them to interpret data					
G	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”).	Weak	CC NE content is in grade 8, but is less difficult.	12.4.3.a Construct a sample space and a probability distribution 8.4.3.a Identify complementary events and calculate their probabilities
G	HS.S-CP.2	Understand that two events A and B are independent if	Partial (knowledge)	The CC content emphasizes the concept,	12.4.3.b Identify dependent and independent events and

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Course (from Appendix A)	Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
		the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.	type)	while the NE content emphasizes the skill.	calculate their probabilities
G	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 .	Partial (knowledge type)	The CC content emphasizes the concept, while the NE content emphasizes the skill.	12.4.3.b Identify dependent and independent events and calculate their probabilities
G	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</i>	Weak	Content is similar, with some differences in emphasis and phrasing. CC includes the construction of a frequency table.	12.4.3.e Determine the relative frequency of a specified outcome of an event to estimate the probability of the outcome 12.4.3.b Identify dependent and independent events and calculate their probabilities

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Course (from Appendix A)	Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
		<i>randomly selected student from your school will favor science given that the student is in tenth grade. Do the same for other subjects and compare the results.</i>			
G	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.	Partial (specificity)	CC specifies everyday language and situations.	12.4.3.b Identify dependent and independent events and calculate their probabilities 12.4.3.d Analyze events to determine if they are mutually exclusive
Use the rules of probability to compute probabilities of compound events in a uniform probability model					
G	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.	Partial (specificity)	CC specifies interpretation of the answer in terms of the model.	12.4.3.b Identify dependent and independent events and calculate their probabilities
G	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.	Partial (specificity)	CC specifies the use of the Addition Rule and interpretation of the answer in terms of the model.	12.4.3.b Identify dependent and independent events and calculate their probabilities
+	HS.S-CP.8	Apply the general Multiplication Rule in a	Partial (specificity)	CC specifies the use of the Multiplication Rule and	12.4.3.b Identify dependent and independent events and

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Course (from Appendix A)	Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
		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.		interpretation of the answer in terms of the model.	calculate their probabilities
+	HS.S-CP.9	Use permutations and combinations to compute probabilities of compound events and solve problems.	Strong		12.4.3.c Use the appropriate counting techniques to determine the probability of an event (e.g., combinations, permutations)

Using Probability to Make Decisions

Calculate expected values and use them to solve problems

+	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.	Not addressed		
+	HS.S-MD.2	Calculate the expected value of a random variable; interpret it as the mean of the probability distribution.	Not addressed		
+	HS.S-MD.3	Develop a probability distribution for a random variable defined for a sample space in which	Not addressed		

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		theoretical probabilities can 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>			
+	HS.S-MD.4	Develop a probability distribution for a random variable defined for a sample space in which probabilities are assigned empirically; find the expected value. <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>		Not addressed	
Use probability to evaluate outcomes of decisions					
+	HS.S-MD.5	Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values.		Not addressed	

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Course (from Appendix A)	Common Core Standards	Content Alignment	More Rigor*	Comments	Nebraska Mathematics Standards
		<p>a. Find the expected payoff for a game of chance. For example, find the expected winnings from a state lottery ticket or a game at a fast-food restaurant.</p> <p>b. Evaluate and compare strategies on the basis of expected values. For example, compare a high-deductible versus a low-deductible automobile insurance policy using various, but reasonable, chances of having a minor or a major accident.</p>			
+	HS.S-MD.6	Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).		Not addressed	
+	HS.S-MD.7	Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).		Not addressed	

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