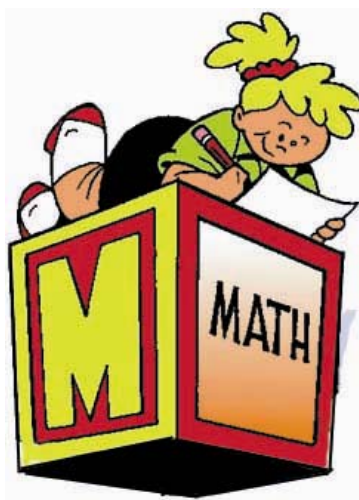


Nebraska



Mathematics Standards

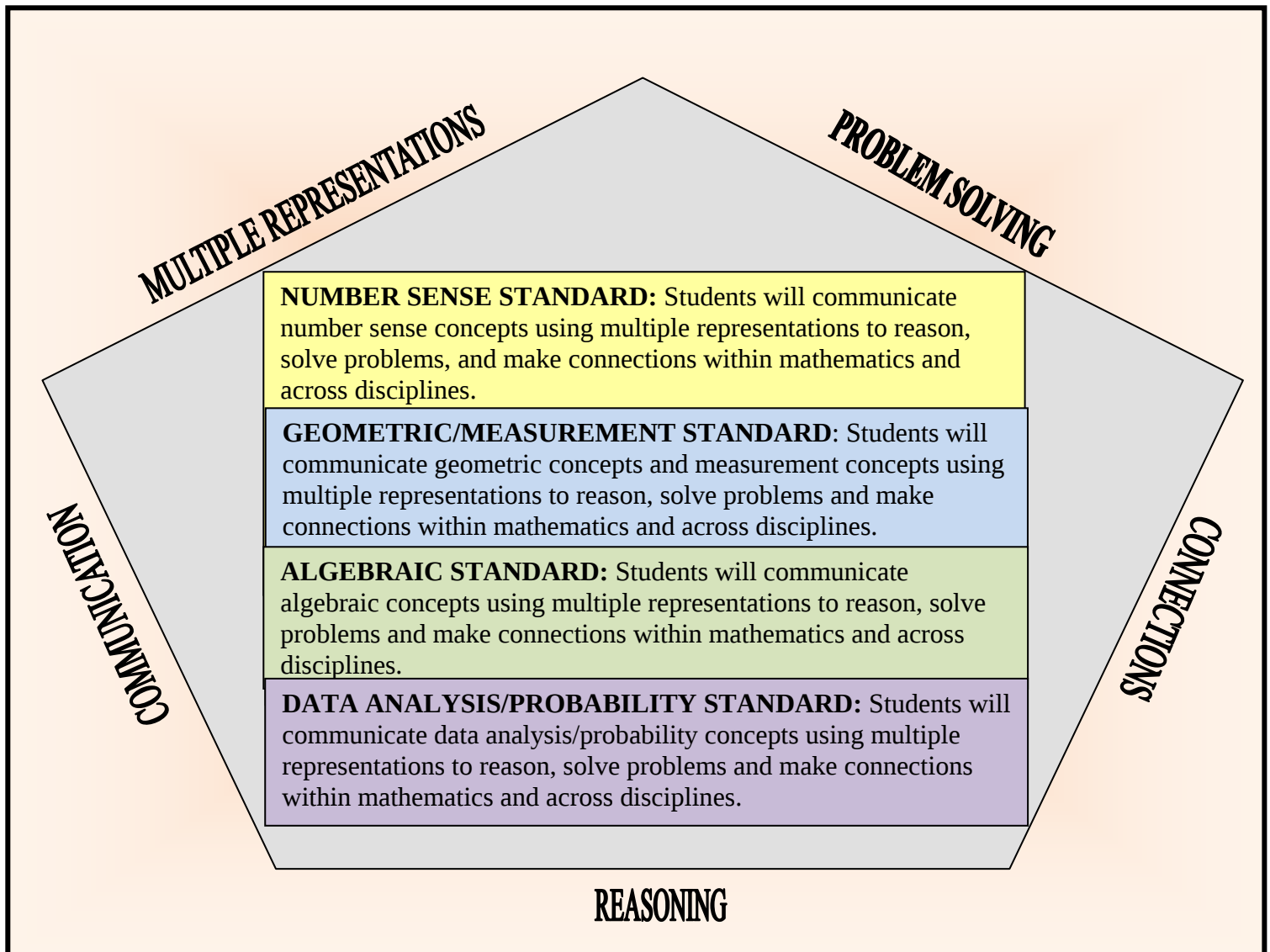
As Approved By State Board
October 08, 2009

Nebraska Mathematics Standards

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Nebraska Mathematics Standards Overview



Nebraska Mathematics Standards Concepts

K-12 Comprehensive Number Sense Standard:

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

Number System

Operations

Computation

Estimation

K-12 Comprehensive Geometric/Measurement Standard:

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

Characteristics

Coordinate Geometry

Transformations

Spatial Modeling

Measurement

K-12 Comprehensive Algebraic Standard:

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

Relationships

Modeling in Context

Procedures

K-12 Comprehensive Data Analysis/Probability Standard:

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

Display and Analysis

Predictions and Inferences

Probability

Nebraska Mathematics Standards Kindergarten

MA 0.1 Students will communicate number sense concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

MA 0.1.1 Number System: Students will demonstrate, represent, and show relationships among whole numbers within the base-ten number system.

MA 0.1.1.a Count, read and write numbers 0 – 20

MA 0.1.1.b Count objects using one-to-one correspondence 0 – 20

MA 0.1.1.c Sequence objects using ordinal numbers (first through fifth)

MA 0.1.1.d Match numerals to the quantities they represent 0 – 20, using a variety of models and representations

MA 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)

MA 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)

MA 0.1.2 Operations: Students will demonstrate the meaning of addition and subtraction with whole numbers.

MA 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?)

MA 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?)

MA 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?)

MA 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?)

MA 0.1.3 Computation: Mastery not expected at this level.

MA 0.1.4 Estimation: Mastery not expected at this level.

MA 0.2 Students will communicate geometric concepts and measurement concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

MA 0.2.1 Characteristics: Students will identify two-dimensional geometric shapes.

MA 0.2.1.a Sort and name two-dimensional shapes (e.g., square, circle, rectangle, triangle)

MA 0.2.2 Coordinate Geometry: Mastery not expected at this level.

MA 0.2.3 Transformations: Mastery not expected at this level.

MA 0.2.4 Spatial Modeling: Students will communicate relative positions in space.

MA 0.2.4.a Demonstrate positional words (e.g., above/below, near/far, over/ under, in/out, down/up, around/through)

MA 0.2.5 Measurement: Students will measure using nonstandard units and time.

MA 0.2.5.a Identify the name and amount of a penny, nickel, dime, and quarter

MA 0.2.5.b Identify time to the hour

MA 0.2.5.c Measure using nonstandard units

MA 0.2.5.d Compare objects according to length

MA 0.3 Students will communicate algebraic concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

MA 0.3.1 Relationships: Students will sort, classify, and order objects by relationships.

MA 0.3.1.a Sort by color, shape, or size

MA 0.3.1.b Create own rule for sorting other than color, shape, and size

MA 0.3.2 Modeling in Context: Students will use objects as models to represent mathematical situations.

MA 0.3.2.a Model situations that involve the addition and subtraction of whole numbers 0 – 10 using objects

MA 0.3.3 Procedures: Students will use concrete and verbal representations to solve number stories.

MA 0.3.3.a Use objects to solve addition and subtraction of whole numbers 0 – 10

MA 0.4 Students will communicate data analysis/probability concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

MA 0.4.1 Display and Analysis: Students will sort, classify, represent, describe, and compare sets of objects.

MA 0.4.1.a Sort and classify objects according to an attribute (e.g., size, color, shape)

MA 0.4.1.b Identify the attributes of sorted data

MA 0.4.1.c Compare the attributes of the data (e.g., most, least, same)

MA 0.4.2 Predictions and Inferences: Mastery not expected at this level.

MA 0.4.3 Probability: Mastery not expected at this level.

Nebraska Mathematics Standards Grade 1

MA 1.1 Students will communicate number sense concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

MA 1.1.1 Number System: Students will demonstrate, represent, and show relationships among whole numbers within the base-ten number system.

MA 1.1.1.a Count, read, and write numbers 0 – 100

MA 1.1.1.b Count by multiples of 2 up to 50

MA 1.1.1.c Count by multiples of 5 up to 100

MA 1.1.1.d Count by multiples of 10 up to 100

MA 1.1.1.e Sequence objects using ordinal numbers (first through tenth)

MA 1.1.1.f Count backwards from 10 – 0

MA 1.1.1.g Connect number words to the quantities they represent 0 – 20

MA 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)

MA 1.1.1.i Compare and order whole numbers 0 – 100

MA 1.1.1.j Demonstrate relative position of whole numbers 0 – 100 (e.g., 52 is between 50 and 60; 83 is greater than 77)

MA 1.1.2 Operations: Students will demonstrate the meaning of addition and subtraction with whole numbers.

MA 1.1.2.a Use objects, drawings, words, and symbols to explain addition as a joining action

MA 1.1.2.b Use objects, drawings, words, and symbols to explain addition as parts of a whole

MA 1.1.2.c Use objects, drawings, words, and symbols to explain subtraction as a separation action

MA 1.1.2.d Use drawings, words, and symbols to explain subtraction as finding part of a whole

MA 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?)

MA 1.1.3 Computation: Students will compute fluently and accurately using appropriate strategies and tools.

MA 1.1.3.a Fluently add whole number sums up to 10

MA 1.1.3.b Fluently subtract whole number differences from 10

MA 1.1.3.c Add and subtract two-digit numbers without regrouping

MA 1.1.3.d Use a variety of methods and tools to compute sums and differences (e.g., models, mental computation, paper-pencil)

MA 1.1.4 Estimation: Mastery not expected at this level.

MA 1.2 Students will communicate geometric concepts and measurement concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

MA 1.2.1 Characteristics: Students will identify characteristics of two-dimensional geometric shapes.

MA 1.2.1.a Compare two-dimensional shapes (e.g., square, circle, rectangle, triangle)

MA 1.2.1.b Describe attributes of two-dimensional shapes (e.g., square, circle, rectangle, triangle)

MA 1.2.2 Coordinate Geometry: Students will identify locations on a number line.

MA 1.2.2.a Identify the position of a whole number on a horizontal number line

MA 1.2.3 Transformations: Students will identify a line of symmetry.

MA 1.2.3.a Identify one line of symmetry in two-dimensional shapes (e.g., circle, square, rectangle, triangle)

MA 1.2.4 Spatial Modeling: Students will communicate relative positions in space and create two-dimensional shapes.

MA 1.2.4.a Demonstrate positional words (e.g., left/right)

MA 1.2.4.b Sketch two-dimensional shapes (e.g., square, circle, rectangle, triangle)

MA 1.2.5 Measurement: Students will measure using standard units, time, and money.

MA 1.2.5.a Count like coins to \$1.00

MA 1.2.5.b Identify time to the half hour

MA 1.2.5.c Identify past, present, and future as orientation in time

MA 1.2.5.d Select an appropriate tool for the attribute being measured (e.g., clock, calendar, thermometer, scale, ruler)

MA 1.2.5.e Measure length using inches

MA 1.2.5.f Compare and order objects according to length

MA 1.3 Students will communicate algebraic concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

MA 1.3.1 Relationships: Students will identify and describe relationships.

MA 1.3.1.a Sort or order objects by their attributes (e.g., color, shape, size, number) then identify the classifying attribute

MA 1.3.1.b Create multiple rules for sorting beyond color, shape, and size

MA 1.3.1.c Identify, describe, and extend patterns (e.g., patterns with a repeating core)

MA 1.3.1.d Use $<$, $=$, $>$ to compare quantities

MA 1.3.2 Modeling in Context: Students will use objects and pictures as models to represent mathematical situations.

MA 1.3.2.a Model situations that involve the addition and subtraction of whole numbers 0 – 20, using objects and pictures

MA 1.3.2.b Describe and model qualitative change (e.g., a student growing taller)

MA 1.3.3 Procedures: Students will use concrete, verbal, and visual representations to solve number sentences.

MA 1.3.3.a Write number sentences to represent fact families

MA 1.3.3.b Use concrete, pictorial, and verbal representations of the commutative property of addition

MA 1.4 Students will communicate data analysis/probability concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

MA 1.4.1 Display and Analysis: Students will sort, classify, organize, describe, and compare data.

MA 1.4.1.a Sort and classify objects by more than one attribute

MA 1.4.1.b Organize data by using concrete objects

MA 1.4.1.c Represent data by using tally marks

MA 1.4.1.d Compare and interpret information from displayed data (e.g., more, less, fewer)

MA 1.4.2 Predictions and Inferences: Mastery not expected at this level.

MA 1.4.3 Probability: Mastery not expected at this level.

Nebraska Mathematics Standards Grade 2

MA 2.1 Students will communicate number sense concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

MA 2.1.1 Number System: Students will demonstrate, represent, and show relationships among whole numbers within the base-ten number system.

MA 2.1.1.a Read and write numbers 0 – 1,000 (e.g., count numbers from 400 – 500; write numbers from 400 – 500)

MA 2.1.1.b Count by multiples of 2 up to 100

MA 2.1.1.c Count backwards from 20 – 0

MA 2.1.1.d Connect number words to the quantities they represent 0 – 100

MA 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)

MA 2.1.1.f Compare and order whole numbers 0 – 1,000

MA 2.1.1.g Demonstrate relative position of whole numbers 0 – 1,000 (e.g., 624 is between 600 and 700; 593 is greater than 539)

MA 2.1.1.h Use visual models to represent fractions of one-half as a part of a whole

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

MA 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 $5 - 3 = 2$)

MA 2.1.2.b Use objects, drawings, words, and symbols to explain the use of subtraction to find a missing addend (e.g., if $3 + \underline{\quad} = 7$, then $7 - 3 = \underline{\quad}$.)

MA 2.1.3 Computation: Students will compute fluently and accurately using appropriate strategies and tools.

MA 2.1.3.a Fluently add whole number facts with sums to 20

MA 2.1.3.b Fluently subtract whole number facts with differences from 20

MA 2.1.3.c Add and subtract three-digit whole numbers with regrouping

MA 2.1.3.d Use a variety of methods and tools to compute sums and differences (e.g., models, mental computation, paper–pencil)

MA 2.1.4 Estimation: Students will estimate and check reasonableness of answers using appropriate strategies and tools.

MA 2.1.4.a Estimate the results of two-digit whole number sums and differences and check the reasonableness of such results

MA 2.1.4 b Estimate the number of objects in a group

MA 2.2 Students will communicate geometric concepts and measurement concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

MA 2.2.1 Characteristics: Students will describe characteristics of two-dimensional shapes and identify three-dimensional objects.

MA 2.2.1.a Describe attributes of two-dimensional shapes (e.g., trapezoid, parallelogram)

MA 2.2.1.b Determine if two shapes are congruent

MA 2.2.1.c Compare two-dimensional shapes (e.g., trapezoid, parallelogram)

MA 2.2.1.d Identify solid shapes (e.g., triangular prism, rectangular prisms, cones, cylinders, pyramids, spheres)

MA 2.2.2 Coordinate Geometry: Students will describe direction on a positive number line.

MA 2.2.2.a Identify numbers using location on a vertical number line

MA 2.2.2.b Compare whole numbers using location on a horizontal number line

MA 2.2.2.c Identify the direction moved for adding and subtracting using a horizontal number line

MA 2.2.3 Transformations: Students will identify lines of symmetry.

MA 2.2.3.a Identify lines of symmetry in two-dimensional shapes

MA 2.2.3.b Draw a line of symmetry in two-dimensional shapes

MA 2.2.4 Spatial Modeling: Students will create two-dimensional shapes.

MA 2.2.4.a Sketch two-dimensional shapes (e.g., trapezoid, parallelogram)

MA 2.2.5 Measurement: Students will measure using standard units, time and money.

MA 2.2.5.a Count mixed coins to \$1.00

MA 2.2.5.b Identify time to 5 minute intervals

MA 2.2.5.c Identify and use appropriate tools for the attribute being measured (e.g., clock, calendar, thermometer, scale, ruler)

MA 2.2.5.d Measure length using feet and yards

MA 2.2.5.e Compare and order objects using inches, feet and yards

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

MA 2.3.1 Relationships: Students will identify, describe, and extend relationships.

MA 2.3.1.a Create and describe patterns using concrete and pictorial representations

MA 2.3.2 Modeling in Context: Students will use objects, pictures, and symbols as models to represent mathematical situations.

MA 2.3.2.a Model situations that involve the addition and subtraction of whole numbers 0 – 100, using objects and number lines

MA 2.3.2.b Describe and model quantitative change involving addition (e.g., a student grew 2 inches)

MA 2.3.3 Procedures: Students will use concrete, verbal, visual, and symbolic representations to solve number sentences.

MA 2.3.3.a Use symbolic representations of the commutative property of addition (e.g., $2 + 3 = 3 + 2$)

MA 2.4 Students will communicate data analysis/probability concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

MA 2.4.1 Display and Analysis: Students will organize, display, compare, and interpret data.

MA 2.4.1.a Represent data using pictographs

MA 2.4.1.b Interpret data using pictographs (e.g., 7 more; 2 less; 12 all together)

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

MA 2.4.3 Probability: Mastery not expected at this level.

Nebraska Mathematics Standards Grade 3

MA 3.1 Students will communicate number sense concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

MA 3.1.1 Number System: Students will represent and show relationships among positive rational numbers within the base-ten number system.

MA 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)

MA 3.1.1.b Count by multiples of 5 to 200

MA 3.1.1.c Count by multiples of 10 to 400

MA 3.1.1.d Count by multiples of 100 to 1,000

MA 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)

MA 3.1.1.f Demonstrate multiple equivalent representations for decimal numbers through the tenths place (e.g., 3 and 6 tenths is 3.6; 7.4 is 7 + .4)

MA 3.1.1.g Compare and order whole numbers through the thousands

MA 3.1.1.h Find parts of whole and parts of a set for $\frac{1}{2}$, $\frac{1}{3}$, or $\frac{1}{4}$

MA 3.1.1.i Round a given number to tens, hundreds, or thousands

MA 3.1.2 Operations: Students demonstrate the meaning of multiplication with whole numbers.

MA 3.1.2.a Represent multiplication as repeated addition using objects, drawings, words, and symbols (e.g., $3 \times 4 = 4 + 4 + 4$)

MA 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 $12 \div 3 = 4$.)

MA 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.)

MA 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 $3 \times 4 = 12$)

MA 3.1.3 Computation: Students will compute fluently and accurately using appropriate strategies and tools.

MA 3.1.3.a Compute whole number multiplication facts 0 – 10 fluently

MA 3.1.3.b Add and subtract through four-digit whole numbers with regrouping

MA 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)

MA 3.1.4 Estimation: Students will estimate and check reasonableness of answers using appropriate strategies and tools.

MA 3.1.4.a Estimate the two-digit product of whole number multiplication and check the reasonableness

MA 3.2 Students will communicate geometric concepts and measurement concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

MA 3.2.1 Characteristics: Students will identify characteristics and describe properties of two-dimensional shapes and three-dimensional objects.

MA 3.2.1.a Identify the number of sides, angles, and vertices of two-dimensional shapes

MA 3.2.1.b Identify congruent two-dimensional figures given multiple two-dimensional shapes

MA 3.2.1.c Identify lines, line segments, rays, and angles

MA 3.2.1.d Describe attributes of solid shapes (e.g., triangular prism, rectangular prisms, cones, cylinders, pyramids, spheres)

MA 3.2.2 Coordinate Geometry: Students will identify distances on a number line.

MA 3.2.2.a Draw a number line and plot points

MA 3.2.2.b Determine the distance between two whole number points on a number line

MA 3.2.3 Transformations: Students will draw all lines of symmetry.

MA 3.2.3.a Draw all possible lines of symmetry in two-dimensional shapes

MA 3.2.4 Spatial Modeling: Students will create two-dimensional shapes and three-dimensional objects.

MA 3.2.4.a Sketch and label lines, rays, line segments, and angles

MA 3.2.4.b Build three-dimensional objects (e.g., using clay for rectangular prisms, cone, cylinder)

MA 3.2.5 Measurement: Students will apply appropriate procedures and tools to determine measurements using customary and metric units.

MA 3.2.5.a Select and use appropriate tools to measure perimeter of simple two-dimensional shapes (e.g., triangle, square, rectangle)

MA 3.2.5.b Count mixed coins and bills greater than \$1.00

MA 3.2.5.c Identify time of day (e.g., am, pm, noon, midnight)

MA 3.2.5.d State multiple ways for the same time using 15 minute intervals (e.g., 2:15, or quarter past 2, 2:45 or a quarter until 3)

MA 3.2.5.e Identify the appropriate customary unit for measuring length, weight, and capacity/volume

MA 3.2.5.f Measure length to the nearest $\frac{1}{2}$ inch and centimeter (e.g., requires rounding)

MA 3.2.5.g Compare and order objects according to length using centimeters and meters

MA 3.3 Students will communicate algebraic concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

MA 3.3.1 Relationships: Students will represent relationships.

MA 3.3.1.a Identify, describe, and extend numeric and non-numeric patterns

MA 3.3.1.b Identify patterns using words, tables, and graphs

MA 3.3.2 Modeling in Context: Students will create and use models to represent mathematical situations.

MA 3.3.2.a Model situations that involve the addition and subtraction of whole numbers using objects, number lines, and symbols

MA 3.3.2.b Describe and model quantitative change involving subtraction (e.g., temperature dropped two degrees)

MA 3.3.3 Procedures: Students will identify and apply properties of whole numbers to solve equations involving addition and subtraction.

MA 3.3.3.a Use symbolic representation of the identity property of addition (e.g., $3 = 0 + 3$)

MA 3.3.3.b Solve simple one-step whole number equations involving addition and subtraction (e.g., $\Delta + 2 = 3$)

MA 3.3.3.c Explain the procedure(s) used in solving simple one-step whole number equations involving addition and subtraction

MA 3.4 Students will communicate data analysis/probability concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

MA 3.4.1 Display and Analysis: Students will organize, display, compare, and interpret data.

MA 3.4.1.a Represent data using horizontal and vertical bar graphs

MA 3.4.1.b Use comparative language to describe the data (e.g., increasing, decreasing)

MA 3.4.1.c Interpret data using horizontal and vertical bar graphs

MA 3.4.2 Predictions and Inferences: Mastery not expected at this level.

MA 3.4.3 Probability: Students will find and describe experimental probability.

MA 3.4.3.a Perform simple experiments (e.g., flip a coin, toss a number cube, spin a spinner) and describe outcomes as possible, impossible, or certain

Nebraska Mathematics Standards Grade 4

MA 4.1 Students will communicate number sense concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

MA 4.1.1 Number System: Students will represent and show relationships among positive rational numbers within the base-ten number system.

MA 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)

MA 4.1.1.b Demonstrate multiple equivalent representations for decimal numbers through the hundredths place (e.g., 2 and 5 hundredths is 2.05; 6.23 is 6 + .2 + .03)

MA 4.1.1.c Compare and order whole numbers and decimals through the hundredths place (e.g., money)

MA 4.1.1.d Classify a number as even or odd

MA 4.1.1.e Represent a fraction as parts of a whole and/or parts of a set

MA 4.1.1.f Use visual models to find equivalent fractions (e.g.,
 $\frac{2}{4} = \frac{1}{2}, \frac{2}{8} = \frac{1}{4}, 1 = \frac{2}{2} = \frac{5}{5}, \frac{3}{3}$)

MA 4.1.1.g Determine the size of a fraction relative to one half using equivalent forms (e.g., Is $\frac{3}{8}$ more or less than one half?)

MA 4.1.1.h Locate fractions on a number line

MA 4.1.1.i Round a whole number to millions

MA 4.1.2 Operations: Students will demonstrate the meaning of division with whole numbers.

MA 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?)]

MA 4.1.3 Computation: Students will compute fluently and accurately using appropriate strategies and tools.

MA 4.1.3.a Compute whole number division facts 0 – 10 fluently

MA 4.1.3.b Add and subtract decimals to the hundredths place (e.g., money)

MA 4.1.3.c Multiply two-digit whole numbers

MA 4.1.3.d Divide a three-digit number with one digit divisor with and without a remainder

MA 4.1.3.e Mentally compute multiplication and division involving powers of 10

MA 4.1.3.f Select and apply the appropriate method of computation when problem solving (e.g., models, mental computation, paper-pencil)

MA 4.1.4 Estimation: Students will estimate and check reasonableness of answers using appropriate strategies and tools.

MA 4.1.4.a Estimate the three-digit product and the two-digit quotient of whole number multiplication and division and check the reasonableness

MA 4.2 Students will communicate geometric concepts and measurement concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

MA 4.2.1 Characteristics: Students will classify two-dimensional shapes and three-dimensional objects.

MA 4.2.1.a Identify two- and three-dimensional shapes according to their sides and angle properties

MA 4.2.1.b Classify an angle as acute, obtuse, and right

MA 4.2.1.c Identify parallel, perpendicular, and intersecting lines

MA 4.2.1.d Identify the property of congruency when dealing with plane geometric shapes

MA 4.2.2 Coordinate Geometry: Students will describe locations using coordinate geometry.

MA 4.2.2.a Identify the ordered pair of a plotted point in first quadrant by its location (e.g., (2, 3) is a point two right and three up from the origin)

MA 4.2.3 Transformations: Students will identify simple transformations.

MA 4.2.3.a Given two congruent geometric shapes, identify the transformation (e.g., translation, rotation, reflection) applied to an original shape to create a transformed shape

MA 4.2.4 Spatial Modeling: Student will use geometric models to solve problems.

MA 4.2.4.a Given a geometric model, use it to solve a problem (e.g., what shapes make a cylinder; streets run parallel and perpendicular)

MA 4.2.5 Measurement: Students will apply appropriate procedures and tools to estimate and determine measurement using customary and metric units.

MA 4.2.5.a Select and use appropriate tools to measure perimeter of polygons

MA 4.2.5.b Identify time to the minute on an analog clock

MA 4.2.5.c Solve problems involving elapsed time

MA 4.2.5.d Identify the appropriate metric unit for measuring length, weight, and capacity/volume (e.g., cm, m, Km; g, Kg; mL, L)

MA 4.2.5.e Estimate and measure length using customary (nearest $\frac{1}{2}$ inch) and metric (nearest centimeter) units

MA 4.2.5.f Measure weight and temperature using customary units

MA 4.2.5.g Compute simple unit conversions for length within a system of measurement

MA 4.3 Students will communicate algebraic concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

MA 4.3.1 Relationships: Students will represent and analyze relationships.

MA 4.3.1.a Describe, extend, and apply rules about numeric patterns

MA 4.3.1.b Represent and analyze a variety of patterns using words, tables, and graphs

MA 4.3.1.c Use $\geq$, $\leq$ symbols to compare quantities

MA 4.3.1.d Select appropriate operational and relational symbols to make a number sentence true

MA 4.3.2 Modeling in Context: Students will create and use models to represent mathematical situations.

MA 4.3.2.a Model situations that involve the multiplication of whole numbers using number lines and symbols

MA 4.3.2.b Describe and model quantitative change involving multiplication (e.g., money doubling)

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

MA 4.3.3.a Represent the idea of a variable as an unknown quantity using a letter or a symbol (e.g., $n + 3$, $b - 2$)

MA 4.3.3.b Use symbolic representation of the identity property of multiplication (e.g., $5 * 1 = 5$)

MA 4.3.3.c Use symbolic representations of the commutative property of multiplication (e.g., $2 * 3 = 3 * 2$)

MA 4.3.3.d Solve simple one-step whole number equations (e.g., $x + 2 = 3$, $3 * y = 6$)

MA 4.3.3.e Explain the procedure(s) used in solving simple one-step whole number equations

MA 4.4 Students will communicate data analysis/probability concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

MA 4.4.1 Display and Analysis: Students will organize, display, compare, and interpret data.

MA 4.4.1.a Represent data using dot/line plots

MA 4.4.1.b Compare different representations of the same data

MA 4.4.1.c Interpret data and draw conclusions using dot/line plots

MA 4.4.1.d Find the mode and range for a set of whole numbers

MA 4.4.1.e Find the whole number mean for a set of whole numbers

MA 4.4.2 Predictions and Inferences: Students will construct predictions based on data.

MA 4.4.2.a Make predictions based on data to answer questions from tables and bar graphs

MA 4.4.3 Probability: Students will find, describe, and compare experimental probabilities.

MA 4.4.3.a Perform simple experiments and compare the degree of likelihood (e.g., more likely, equally likely, or less likely)

Nebraska Mathematics Standards Grade 5

MA 5.1 Students will communicate number sense concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

MA 5.1.1 Number System: Students will represent and show relationships among positive rational numbers.

MA 5.1.1.a Demonstrate multiple equivalent representations for whole numbers and decimals through the thousandths place (e.g., 3.125 is $3 + .1 + .02 + .005$)

MA 5.1.1.b Compare and order whole numbers, fractions, and decimals through the thousandths place

MA 5.1.1.c Identify and name fractions in their simplest form and find common denominators for fractions

MA 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)

MA 5.1.1.e Classify a number as prime or composite

MA 5.1.1.f Identify factors and multiples of any whole number

MA 5.1.1.g Round whole numbers and decimals to any given place

MA 5.1.2 Operations: Students will demonstrate the meaning of arithmetic operations with whole numbers.

MA 5.1.2.a Use words and symbols to explain the meaning of the identity properties for addition and multiplication

MA 5.1.2.b Use words and symbols to explain the meaning of the commutative and associative properties of addition and multiplication

MA 5.1.2.c Use words and symbols to explain the distributive property of multiplication over addition (e.g., $5(y + 2) = 5y + 5 \times 2$)

MA 5.1.3 Computation: Students will compute fluently and accurately using appropriate strategies and tools.

MA 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)

MA 5.1.3.b Select, apply and explain the appropriate method of computation when problem solving (e.g., models, mental computation, paper-pencil, technology)

MA 5.1.3.c Multiply decimals

MA 5.1.3.d Divide a decimal by a whole number

MA 5.1.4 Estimation: Students will estimate and check reasonableness of answers using appropriate strategies and tools.

MA 5.1.4.a Estimate the sums and differences of positive rational numbers to check the reasonableness of such results

MA 5.2 Students will communicate geometric concepts and measurement concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

MA 5.2.1 Characteristics: Students will describe relationships among two-dimensional shapes and three-dimensional objects.

MA 5.2.1.a Identify the number of edges, faces, and vertices of triangular and rectangular prisms

MA 5.2.1.b Justify congruence of two-dimensional shapes

MA 5.2.1.c Justify the classification of two-dimensional shapes (e.g., triangles by angles and sides)

MA 5.2.1.d Identify degrees on a circle (e.g., 45, 90, 180, 270, 360)

MA 5.2.2 Coordinate Geometry: Students will identify locations using coordinate geometry.

MA 5.2.2.a Plot the location of an ordered pair in the first quadrant

MA 5.2.3 Transformations: Students will identify and use simple transformations.

MA 5.2.3.a Perform one-step transformations on two dimensional shapes (e.g., translation, rotation, reflection, of 90, 180, and 270)

MA 5.2.4 Spatial Modeling: Students will create and use geometric models to solve problems.

MA 5.2.4.a Build or sketch a geometric model to solve a problem

MA 5.2.4.b Sketch congruent shapes

MA 5.2.4.c Build rectangular prisms using cubes

MA 5.2.5 Measurement: Students will apply appropriate procedures, tools, and formulas to determine measurements using customary and metric units.

MA 5.2.5.a Select and use appropriate tools to measure perimeter and angles

MA 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)

MA 5.2.5.c Estimate and measure length with customary units to the nearest $\frac{1}{4}$ inch

MA 5.2.5.d Measure capacity/volume with customary units

MA 5.2.5.e Measure weight (mass) and temperature using metric units

MA 5.2.5.f Determine the area of rectangles and squares

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

MA 5.3.1 Relationships: Students will represent, analyze, and generalize relationships.

MA 5.3.1.a Describe, extend, apply rules, and make generalizations about numeric, and geometric patterns

MA 5.3.1.b Create and analyze numeric patterns using words, tables, and graphs

MA 5.3.1.c Communicate relationships using expressions and equations

MA 5.3.2 Modeling in Context: Students will create, use, and compare models representing mathematical situations.

MA 5.3.2.a Model situations that involve the addition, subtraction, and multiplication of positive rational numbers using words, graphs, and tables

MA 5.3.2.b Represent a variety of quantitative relationships using tables and graphs

MA 5.3.2.c Compare different models to represent mathematical situations

MA 5.3.3 Procedures: Students will apply properties of simple positive rational numbers to solve one-step equations.

MA 5.3.3.a Explain the addition property of equality (e.g., if $a = b$, then $a + c = b + c$)

MA 5.3.3.b Use symbolic representations of the associative property (e.g., $(2 + 3) + 4 = 2 + (3 + 4)$, $(2 * 3) * 4 = 2 * (3 * 4)$)

MA 5.3.3.c Evaluate numerical expressions by using parentheses with respect to order of operations (e.g., $6 + (3 * 5)$)

MA 5.3.3.d Evaluate simple algebraic expressions involving addition and subtraction

MA 5.3.3.e Solve one-step addition and subtraction equations involving common positive rational numbers

MA 5.3.3.f Identify and explain the properties of equality used in solving one-step equations involving common positive rational numbers

MA 5.4 Students will communicate data analysis/probability concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

MA 5.4.1 Display and Analysis: Students will organize, display, compare, and interpret data.

MA 5.4.1.a Represent data using line graphs

MA 5.4.1.b Represent the same set of data in different formats (e.g., table, pictographs, bar graphs, line graphs)

MA 5.4.1.c Draw conclusions based on a set of data

MA 5.4.1.d Find the mean, median, mode, and range for a set of whole numbers

MA 5.4.1.e Generate questions and answers from data sets and their graphical representations

MA 5.4.2 Predictions and Inferences: Students will construct predictions based on data.

MA 5.4.2.a Make predictions based on data to answer questions from tables, bar graphs, and line graphs

MA 5.4.3 Probability: Students will determine theoretical probabilities.

MA 5.4.3.a Perform and record results of probability experiments

MA 5.4.3.b Generate a list of possible outcomes for a simple event

MA 5.4.3.c Explain that the likelihood of an event that can be represented by a number from 0 (impossible) to 1 (certain)

Nebraska Mathematics Standards Grade 6

MA 6.1 Students will communicate number sense concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

MA 6.1.1 Number System: Students will represent and show relationships among positive rational numbers and integers.

MA 6.1.1.a Show equivalence among common fractions and non-repeating decimals and percents

MA 6.1.1.b Compare and order positive and negative integers

MA 6.1.1.c Identify integers less than 0 on a number line

MA 6.1.1.d Represent large numbers using exponential notation (e.g., $1,000 = 10^3$)

MA 6.1.1.e Identify the prime factorization of numbers (e.g., $12 = 2 \times 2 \times 3$ or $2^2 \times 3$)

MA 6.1.1.f Classify numbers as natural, whole, or integer

MA 6.1.2 Operations: Students will demonstrate the meaning of arithmetic operations with positive fractions and decimals.

MA 6.1.2.a Use drawings, words, and symbols to explain the meaning of addition and subtraction of fractions

MA 6.1.2.b Use drawings, words, and symbols to explain the meaning of addition and subtraction of decimals

MA 6.1.3 Computation: Students will compute fluently and accurately using appropriate strategies and tools.

MA 6.1.3.a Multiply and divide positive rational numbers

MA 6.1.3.b Select and apply the appropriate method of computation when problem solving (e.g., models, mental computation, paper-pencil, technology, divisibility rules)

MA 6.1.4 Estimation: Students will estimate and check reasonableness of answers using appropriate strategies and tools.

MA 6.1.4.a Use appropriate estimation methods to check the reasonableness of solutions for problems involving positive rational numbers

MA 6.2 Students will communicate geometric concepts and measurement concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

MA 6.2.1 Characteristics: Students will compare and contrast properties among two-dimensional shapes and among three-dimensional objects.

MA 6.2.1.a Justify the classification of three dimensional objects

MA 6.2.2 Coordinate Geometry: Students will label points using coordinate geometry.

MA 6.2.2.a Identify the ordered pair of a plotted point in the coordinate plane

MA 6.2.3 Transformations: Students will use and describe results of transformations on geometric shapes.

MA 6.2.3.a Perform and describe positions and orientation of shapes under single transformations (translation, rotation, reflection) not on a coordinate plane

MA 6.2.4 Spatial Modeling: Students will use visualization of geometric models to solve problems.

MA 6.2.4.a Identify two-dimensional drawings of three-dimensional objects

MA 6.2.5 Measurement: Students will apply appropriate procedures, tools, and formulas to determine measurements.

MA 6.2.5.a Estimate and measure length with customary and metric units to the nearest $\frac{1}{16}$ inch and mm

MA 6.2.5.b Measure volume/capacity using the metric system

MA 6.2.5.c Convert length, weight (mass), and liquid capacity from one unit to another within the same system

MA 6.2.5.d Determine the perimeter of polygons

MA 6.2.5.e Determine the area of parallelograms and triangles

MA 6.2.5.f Determine the volume of rectangular prisms

MA 6.3 Students will communicate algebraic concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

MA 6.3.1 Relationships: Students will represent, analyze, and use relationships to make generalizations.

MA 6.3.1.a Describe and create simple algebraic expressions (e.g., one operation, one variable) from words and tables

MA 6.3.1.b Use a variable to describe a situation with an equation (e.g., one-step, one variable)

MA 6.3.1.c Identify relationships as increasing, decreasing, or constant

MA 6.3.2 Modeling in Context: Students will create, use, and interpret models of quantitative relationships.

MA 6.3.2.a Model contextualized problems using various representations (e.g., graphs, tables)

MA 6.3.2.b Represent a variety of quantitative relationships using symbols and words

MA 6.3.3 Procedures: Students will apply properties to solve equations.

MA 6.3.3.a Explain the multiplication property of equality (e.g., if $a = b$, then $ac = bc$)

MA 6.3.3.b Evaluate numerical expressions containing multiple operations with respect to order of operations (e.g., $2 + 4 \times 5$)

MA 6.3.3.c Evaluate simple algebraic expressions involving multiplication and division

MA 6.3.3.d Solve one-step equations involving positive rational numbers

MA 6.3.3.e Identify and explain the properties of equality used in solving one-step equations (e.g., addition, subtraction, division)

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

MA 6.4.1 Display and Analysis: Students will organize, display, compare, and interpret data.

MA 6.4.1.a Represent data using stem and leaf plots, histograms, and frequency charts

MA 6.4.1.b Compare and interpret data sets and their graphical representations

MA 6.4.1.c Find the mean, median, mode, and range for a set of data

MA 6.4.1.d Compare the mean, median, mode, and range from two sets of data

MA 6.4.2 Predictions and Inferences: Students will construct predictions based on data.

MA 6.4.2.a Make predictions based on data and create questions to further investigate the quality of the predictions

MA 6.4.3 Probability: Students will apply basic concepts of probability.

MA 6.4.3.a Describe the theoretical probability of an event using a fraction, percentage, decimal, or ratio

MA 6.4.3.b Compute theoretical probabilities for independent events

MA 6.4.3.c Find experimental probability for independent events

Nebraska Mathematics Standards Grade 7

MA 7.1 Students will communicate number sense concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

MA 7.1.1 Number System: Students will represent and show relationships among rational numbers.

MA 7.1.1.a Show equivalence among fractions, decimals, and percents

MA 7.1.1.b Compare and order rational numbers (e.g., fractions, decimals, percents)

MA 7.1.1.c Represent large numbers using scientific notation

MA 7.1.1.d Classify numbers as natural, whole, integer, or rational

MA 7.1.1.e Find least common multiple and greatest common divisor given two numbers

MA 7.1.2 Operations: Students will demonstrate the meaning of arithmetic operations with positive fractions, decimals, and integers.

MA 7.1.2.a Use drawings, words, and symbols to explain the meaning of multiplication and division of fractions (e.g., $\frac{2}{3} \times 6$ as two-thirds of six, or $6 \times \frac{2}{3}$ as 6 groups of two-thirds, or $6 \div \frac{2}{3}$ as how many two-thirds there are in six.)

MA 7.1.2.b Use drawings, words, and symbols to explain the meaning of multiplication and division of decimals

MA 7.1.2.c Use drawings, words, and symbols to explain the addition and subtraction of integers

MA 7.1.3 Computation: Students will compute fluently and accurately using appropriate strategies and tools.

MA 7.1.3.a Compute accurately with integers

MA 7.1.3.b Select, apply, and explain the method of computation when problem solving using integers and positive rational numbers (e.g., models, mental computation, paper-pencil, technology, divisibility rules)

MA 7.1.3.c Solve problems involving percent of numbers (e.g., percent of, % increase, % decrease)

MA 7.1.4 Estimation: Students will estimate and check reasonableness of answers using appropriate strategies and tools.

MA 7.1.4.a Use estimation methods to check the reasonableness of solutions for problems involving integers and positive rational numbers

MA 7.2 Students will communicate geometric concepts and measurement concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

MA 7.2.1 Characteristics: Students will describe, compare, and contrast characteristics, properties, and relationships of geometric shapes and objects.

MA 7.2.1.a Identify and describe similarity of two-dimensional shapes using side and angle measurements

MA 7.2.1.b Name line, line segment, ray, and angle (e.g., $\overleftrightarrow{AB}$, $\overline{PR}$, $\angle LMN$)

MA 7.2.2 Coordinate Geometry: Students will specify locations and describe relationships using coordinate geometry.

MA 7.2.2.a Plot the location of an ordered pair in the coordinate plane

MA 7.2.2.b Identify the quadrant of a given point in the coordinate plane

MA 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))

MA 7.2.3 Transformations: Students will use transformations and symmetry to analyze geometric shapes.

MA 7.2.3.a Identify lines of symmetry for a reflection

MA 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

MA 7.2.4 Spatial Modeling: Students will use visualization to create geometric models in solving problems.

MA 7.2.4.a Identify the shapes that make up the three-dimensional object

MA 7.2.4.b Create two-dimensional representations of three-dimensional objects to visualize and solve problems (e.g., perspective drawing of surface area)

MA 7.2.4.c Draw angles to given degree

MA 7.2.5 Measurement: Students will select and apply appropriate procedures, tools, and formulas to determine measurements.

MA 7.2.5.a Measure angles to the nearest degree

MA 7.2.5.b Determine the area of trapezoids and circles, and the circumference of circles

MA 7.2.5.c Recognize the inverse relationship between the size of a unit and the number of units used when measuring

MA 7.3 Students will communicate algebraic concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

MA 7.3.1 Relationships: Students will represent and analyze relationships using algebraic symbols.

MA 7.3.1.a Describe and create algebraic expressions from words, tables, and graphs

MA 7.3.1.b Use a variable to describe a situation with an inequality (e.g., one-step, one variable)

MA 7.3.1.c Recognize and generate equivalent forms of simple algebraic expressions

MA 7.3.2 Modeling in Context: Students will create, use, and interpret models of quantitative relationships.

MA 7.3.2.a Model contextualized problems using various representations (e.g., one-step/variable expressions, one-step/variable equations)

MA 7.3.2.b Represent a variety of quantitative relationships using algebraic expressions and one-step equations

MA 7.3.3 Procedures: Students will apply properties to solve equations and inequalities.

MA 7.3.3.a Explain additive inverse of addition (e.g., $7 + -7 = 0$)

MA 7.3.3.b Use symbolic representation of the distributive property (e.g., $2(x + 3) = 2x + 6$)

MA 7.3.3.c Given the value of the variable(s), evaluate algebraic expressions with respect to order of operations

MA 7.3.3.d Solve two-step equations involving integers and positive rational numbers

MA 7.3.3.e Solve one-step inequalities involving positive rational numbers

MA 7.3.3.f Identify and explain the properties used in solving two-step equations (e.g., addition, subtraction, multiplication and division)

MA 7.4 Students will communicate data analysis/probability concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

MA 7.4.1 Display and Analysis: Students will formulate questions that can be addressed with data and then organize, display, and analyze the relevant data to answer their questions.

MA 7.4.1.a Analyze data sets and interpret their graphical representations

MA 7.4.1.b Find and interpret mean, median, mode, and range for sets of data

MA 7.4.1.c Explain the difference between a population and a sample

MA 7.4.1.d List biases that may be created by various data collection processes

MA 7.4.1.e Formulate a question about a characteristic within one population that can be answered by simulation or a survey

MA 7.4.2 Predictions and Inferences: Students will evaluate predictions and make inferences based on data.

MA 7.4.2.a Determine if data collected from a sample can be used to make predictions about a population

MA 7.4.3 Probability: Students will apply and interpret basic concepts of probability.

MA 7.4.3.a Find the probability of independent compound events (e.g., tree diagram, organized list)

MA 7.4.3.b Compare and contrast theoretical and experimental probabilities

Nebraska Mathematics Standards Grade 8

MA 8.1 Students will communicate number sense concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

MA 8.1.1 Number System: Students will represent and show relationships among real numbers.

MA 8.1.1.a Compare and order real numbers

MA 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)

MA 8.1.1.c Represent small numbers using scientific notation

MA 8.1.1.d Classify numbers as natural, whole, integer, rational, irrational, or real

MA 8.1.2 Operations: Students will demonstrate the meaning of arithmetic operations with integers.

MA 8.1.2.a Use drawings, words, and symbols to explain the meaning of addition, subtraction, multiplication, and division of integers.

MA 8.1.2.b Use words and symbols to explain the zero property of multiplication (e.g., if $ab = 0$ then a or b or both must be zero)

MA 8.1.2.c Use words and symbols to explain why division by zero is undefined

MA 8.1.3 Computation: Students will compute fluently and accurately using appropriate strategies and tools.

MA 8.1.3.a Compute accurately with rational numbers

MA 8.1.3.b Evaluate expressions involving absolute value of integers

MA 8.1.3.c Calculate squares of integers, the square roots of perfect squares, and the square roots of whole numbers using technology

MA 8.1.3.d Select, apply, and explain the method of computation when problem solving using rational numbers (e.g., models, mental computation, paper-pencil, technology, divisibility rules)

MA 8.1.3.e Solve problems involving ratios and proportions (e.g., $\frac{x}{5} = \frac{10}{17}$)

MA 8.1.4 Estimation: Students will estimate and check reasonableness of answers using appropriate strategies and tools.

MA 8.1.4.a Use estimation methods to check the reasonableness of solutions for problems involving rational numbers

MA 8.2 Students will communicate geometric concepts and measurement concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

MA 8.2.1 Characteristics: Students will describe, compare, and contrast characteristics, properties, and relationships of geometric shapes and objects.

MA 8.2.1.a Identify and describe similarity of three-dimensional objects

MA 8.2.1.b Compare and contrast relationships between similar and congruent objects

MA 8.2.1.c 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)

MA 8.2.1.d Identify pairs of angles (e.g., adjacent, complementary, supplementary, vertical)

MA 8.2.1.e Examine the relationships of the interior angles of a triangle (e.g., the sum of the angles is 180 degrees)

MA 8.2.2 Coordinate Geometry: Students will specify locations and describe relationships using coordinate geometry.

MA 8.2.2.a Use coordinate geometry to represent and examine the properties of rectangles and squares using horizontal and vertical segments

MA 8.2.3 Transformations: Students will perform transformations and use them to analyze the orientation and size of geometric shapes.

MA 8.2.3.a Identify the similarity of dilated shapes

MA 8.2.3.b Perform and describe positions and sizes of shapes under dilations (e.g., scale factor, ratios)

MA 8.2.4 Spatial Modeling: Students will use visualization, spatial reasoning, and geometric modeling to solve problems.

MA 8.2.4.a Draw geometric objects with specified properties (e.g., parallel sides, number of sides, angle measures, number of faces)

MA 8.2.5 Measurement: Students will select and apply appropriate procedures, tools, and formulas to determine measurements.

MA 8.2.5.a Use strategies to find the perimeter and area of complex shapes

MA 8.2.5.b Determine surface area and volume of three-dimensional objects (e.g., rectangular prisms, cylinders)

MA 8.2.5.c Apply the Pythagorean theorem to find missing lengths in right triangles and to solve problems

MA 8.2.5.d Use scale factors to find missing lengths in similar shapes

MA 8.2.5.e Convert between metric and standard units of measurement, given conversion factors (e.g., meters to yards)

MA 8.3 Students will communicate algebraic concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

MA 8.3.1 Relationships: Students will represent and analyze relationships using algebraic symbols.

MA 8.3.1.a Represent and analyze a variety of patterns with tables, graphs, words, and algebraic equations

MA 8.3.1.b Describe relationships using algebraic expressions, equations, and inequalities (e.g., two-step, one variable)

MA 8.3.1.c Identify constant slope from tables and graphs

MA 8.3.2 Modeling in Context: Students will create, use, and interpret models of quantitative relationships.

MA 8.3.2.a Model contextualized problems using various representations (e.g., two-step/one variable equations)

MA 8.3.2.b Represent a variety of quantitative relationships using algebraic expressions and two-step/one variable equations

MA 8.3.3 Procedures: Students will apply properties to solve equations and inequalities.

MA 8.3.3.a Explain the multiplicative inverse (e.g., $4 \cdot \frac{1}{4} = 1$)

MA 8.3.3.b Evaluate numerical expressions containing whole number exponents (e.g., if $x = 4$, then $(x + 3)^2 + 5x = ?$)

MA 8.3.3.c Solve multi-step equations involving rational numbers

MA 8.3.3.d Solve two-step inequalities involving rational numbers

MA 8.3.3.e Identify and explain the properties used in solving two-step inequalities and multi-step equations

MA 8.4 Students will communicate data analysis/probability concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

MA 8.4.1 Display and Analysis: Students will formulate questions that can be addressed with data, and then organize, display, and analyze the relevant data to answer their questions.

MA 8.4.1.a Represent data using circle graphs and box plots with and without the use of technology

MA 8.4.1.b Compare characteristics between sets of data or within a given set of data

MA 8.4.1.c Find, interpret, and compare measures of central tendency (mean, median, mode) and the quartiles for sets of data

MA 8.4.1.d Select the most appropriate unit of central tendency for sets of data

MA 8.4.1.e Identify misrepresentation and misinterpretation of data represented in circle graphs and box plots

MA 8.4.2 Predictions and Inferences: Students will evaluate predictions and make inferences based on data.

MA 8.4.2.a Evaluate predictions to formulate new questions and plan new studies

MA 8.4.2.b Compare and contrast two sets of data to make inferences

MA 8.4.3 Probability: Students will apply and interpret basic concepts of probability.

MA 8.4.3.a Identify complementary events and calculate their probabilities

MA 8.4.3.b Compute probabilities for independent compound events

Nebraska Mathematics Standards Grade 12

MA 12.1 Students will communicate number sense concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

MA 12.1.1 Number System: Students will represent and show relationships among real numbers.

MA 12.1.1.a Demonstrate multiple equivalent forms of irrational numbers (e.g., $\sqrt{8} = 8^{1/2} = 2\sqrt{2}$)

MA 12.1.1.b Compare, contrast and apply the properties of numbers and the real number system, including rational, irrational, imaginary, and complex numbers

MA 12.1.2 Operations: Students will demonstrate the meaning and effects of arithmetic operations with real numbers.

MA 12.1.2.a Use drawings, words, and symbols to explain the effects of such operations as multiplication and division, and computing positive powers and roots on the magnitude of quantities (e.g., if you take the square root of a number, will the result always be smaller than the original number? (e.g., $\sqrt{1/4} = 1/2$))

MA 12.1.2.b Use drawings, words, and symbols to explain that the distance between two numbers on the number line is the absolute value of their difference

MA 12.1.3 Computation: Students will compute fluently and accurately using appropriate strategies and tools.

MA 12.1.3.a Compute accurately with real numbers

MA 12.1.3.b Simplify exponential expressions (e.g., powers of -1, 0, $\frac{1}{2}$, $3^2 * 3^2 = 3^4$)

MA 12.1.3.c Multiply and divide numbers using scientific notation

MA 12.1.3.d Select, apply, and explain the method of computation when problem solving using real numbers (e.g., models, mental computation, paper-pencil, or technology)

MA 12.1.4 Estimation: Students will estimate and check reasonableness of answers using appropriate strategies and tools.

MA 12.1.4.a Use estimation methods to check the reasonableness of real number computations and decide if the problem calls for an approximation or an exact number (e.g., 10π (pi) is approximately 31.4, square and cube roots)

MA 12.1.4.b Distinguish relevant from irrelevant information, identify missing information and either find what is needed or make appropriate estimates

MA 12.2 Students will communicate geometric concepts and measurement concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

MA 12.2.1 Characteristics: Students will analyze characteristics, properties, and relationships among geometric shapes and objects.

MA 12.2.1.a Identify and explain the necessity of and give examples of definitions and theorems

MA 12.2.1.b Analyze properties and relationships among classes of two and three dimensional geometric objects using inductive reasoning and counterexamples

MA 12.2.1.c State and prove geometric theorems using deductive reasoning (e.g., parallel lines with transversals, congruent triangles, similar triangles)

MA 12.2.1.d Apply geometric properties to solve problems (e.g., parallel lines, line transversals, similar triangles, congruent triangles, proportions)

MA 12.2.1.e Identify and apply right triangle relationships (e.g., sine, cosine, tangent, special right triangles, converse of Pythagorean Theorem)

MA 12.2.1.f Recognize that there are geometries, other than Euclidean geometry, in which the parallel postulate is not true

MA 12.2.1.g Know the definitions and basic properties of a circle and use them to prove basic theorems and solve problems

MA 12.2.2 Coordinate Geometry: Student will use coordinate geometry to analyze and describe relationships in the coordinate plane.

MA 12.2.2.a Use coordinate geometry to analyze geometric situations (e.g., parallel lines, perpendicular lines, circle equations)

MA 12.2.2.b Apply the midpoint formula

MA 12.2.2.c Apply the distance formula

MA 12.2.2.d Prove special types of triangles and quadrilaterals (e.g., right triangles, isosceles trapezoid, parallelogram, rectangle, square)

MA 12.2.3 Transformations: Students will apply and analyze transformations.

MA 12.2.3.a Explain and justify the effects of simple transformations on the ordered pairs of two-dimensional shapes

MA 12.2.3.b Perform and describe multiple transformations

MA 12.2.4 Spatial Modeling: Students will use visualization, spatial reasoning, and geometric modeling to solve problems.

MA 12.2.4.a Sketch and draw appropriate representations of geometric objects using ruler, protractor, or technology

MA 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)

MA 12.2.5 Measurement: Students will apply the units, systems, and formulas to solve problems.

MA 12.2.5.a Use strategies to find surface area and volume of complex objects

MA 12.2.5.b Apply appropriate units and scales to solve problems involving measurement

MA 12.2.5.c Convert between various units of area and volume, such as square feet to square yards

MA 12.2.5.d Convert equivalent rates (e.g., feet/second to miles/hour)

MA 12.2.5.e Find arc length and area of sectors of a circle

MA 12.2.5.f Determine surface area and volume of three-dimensional objects (e.g., spheres, cones, pyramids)

MA 12.2.5.g Know that the effect of a scale factor k on length, area and volume is to multiply each by k , k^2 and k^3 , respectively

MA 12.3 Students will communicate algebraic concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

MA 12.3.1 Relationships: Students will generalize, represent, and analyze relationships using algebraic symbols.

NON LINEAR FUNCTIONS INCLUDE: QUADRATIC, ABSOLUTE VALUE, SQUARE ROOT, EXPOTENTIAL

MA 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)

MA 12.3.1.b Identify domain and range of functions represented in either symbolic or graphical form (e.g., linear, non-linear)

MA 12.3.1.c Identify the slope and intercepts of a linear relationship from an equation or graph

MA 12.3.1.d Identify characteristics of linear and non-linear functions

MA 12.3.1.e Graph linear and non-linear functions

MA 12.3.1.f Compare and analyze the rate of change by using ordered pairs, tables, graphs, and equations

MA 12.3.1.g Graph and interpret linear inequalities

MA 12.3.1.h Represent, interpret, and analyze functions and their inverses

MA 12.3.1.i Determine if a relation is a function

MA 12.3.2 Modeling in Context: Students will model and analyze quantitative relationships.

CONTEXTUALIZED PROBLEM – A MATHEMATICAL SITUATION PLACED IN A PARTICULAR CONTEXT (E.G., USING WORDS, DIAGRAMS, TABLES, DRAWINGS, ETC.)

MA 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)

MA 12.3.2.b Represent a variety of quantitative relationships using linear equations and one variable inequalities

MA 12.3.2.c Analyze situations to determine the type of algebraic relationship (e.g., linear, nonlinear)

MA 12.3.2.d Model contextualized problems using various representations for non-linear functions (e.g., quadratic, exponential, square root, and absolute value)

MA 12.3.3 Procedures: Students will represent and solve equations and inequalities.

MA 12.3.3.a Explain/apply the reflexive, symmetric, and transitive properties of equality

MA 12.3.3.b Simplify algebraic expressions involving exponents (e.g., $(3x^4)^2$)

MA 12.3.3.c Add and subtract polynomials

MA 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)

MA 12.3.3.e Factor polynomials

MA 12.3.3.f Identify and generate equivalent forms of linear equations

MA 12.3.3.g Solve linear equations and inequalities including absolute value

MA 12.3.3.h Identify and explain the properties used in solving equations and inequalities

MA 12.3.3.i Solve quadratic equations (e.g., factoring, graphing, quadratic formula)

MA 12.3.3.j Add, subtract, and simplify rational expressions

MA 12.3.3.k Multiply, divide, and simplify rational expressions

MA 12.3.3.l Evaluate polynomial and rational expressions and expressions containing radicals and absolute values at specified values of their variables

MA 12.3.3.m Derive and use the formulas for the general term and summation of finite arithmetic and geometric series

MA 12.3.3.n Combine functions by composition, as well as by addition, subtraction, multiplication, and division

MA 12.3.3.o Solve an equation involving several variables for one variable in terms of the others

MA 12.3.3.p Analyze and solve systems of two linear equations in two variables algebraically and graphically

MA 12.4 Students will communicate data analysis/probability concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

MA 12.4.1 Display and Analysis: Students will formulate a question and design a survey or an experiment in which data is collected and displayed in a variety of formats, then select and use appropriate statistical methods to analyze the data.

MA 12.4.1.a Interpret data represented by the normal distribution and formulate conclusions

MA 12.4.1.b Compute, identify, and interpret measures of central tendency (mean, median, mode) when provided a graph or data set

MA 12.4.1.c Explain how sample size and transformations of data affect measures of central tendency

MA 12.4.1.d Describe the shape and determine spread (variance, standard deviation) and outliers of a data set

MA 12.4.1.e Explain how statistics are used or misused in the world

MA 12.4.1.f Create scatter plots, analyze patterns, and describe relationships in paired data

MA 12.4.1.g Explain the impact of sampling methods, bias, and the phrasing of questions asked during data collection and the conclusions that can rightfully be made

MA 12.4.1.h Explain the differences between randomized experiment and observational studies

MA 12.4.2 Predictions and Inferences: Students will develop and evaluate inferences to make predictions.

MA 12.4.2.a Compare data sets and evaluate conclusions using graphs and summary statistics

MA 12.4.2.b Support inferences with valid arguments

MA 12.4.2.c Develop linear equations for linear models to predict unobserved outcomes using regression line and correlation coefficient

MA 12.4.2.d Recognize when arguments based on data confuse correlation with causation

MA 12.4.3 Probability: Students will apply and analyze concepts of probability.

MA 12.4.3.a Construct a sample space and a probability distribution

MA 12.4.3.b Identify dependent and independent events and calculate their probabilities

MA 12.4.3.c Use the appropriate counting techniques to determine the probability of an event (e.g., combinations, permutations)

MA 12.4.3.d Analyze events to determine if they are mutually exclusive

MA 12.4.3.e Determine the relative frequency of a specified outcome of an event to estimate the probability of the outcome