

Nebraska Mathematics Standards

**Approved December 2000, By State Board of Education
Approved as part of Rule 10, effective March 10, 2002**

GRADE 1

1.1 NUMERATION/NUMBER SENSE

1.1.1 By the end of first grade, students will recognize, write, and orally express the sequential order of the number system.

Example Indicators:

- Recognize and write numerals from 0-100.
- Count forward by 1s, 2s, 5s and 10s up to 100.
- Count backward from 10 to 0 by 1s.
- Identify ordinal positions of first, second, third, through tenth.

Suggested Parent Activities:

- Use newspapers to find numbers from zero to 100, cut the numbers out and glue them in order onto a large piece of paper. Ask the child to write down the numbers, which are between those gathered from the newspaper.
- Make a statement with a number included and ask the child to write the numeral on a piece of paper, like "I saw 52 birds fly by the window."
- Use 100 items of choice like beans, buttons, or rocks to have the child count out groups of 2s, 5s, or 10s and then practice counting by the selected value up to 100.
- Share the poems or songs like "Ten Little Monkeys Jumping on a Bed" and ask the child to count backwards with fingers or stuffed animals to represent the monkeys.

1.1.2 By the end of first grade, students will demonstrate ways of representing numbers and compare relations among numbers.

Example Indicators:

- Count objects to demonstrate one-to-one correspondence.
- Use comparison vocabulary (bigger, smaller, more, less, equal, higher, and lower).
- Identify and represent wholes into equal parts for the fractions of one-half and one-fourth.
- Connect number words and numerals to the quantities they represent.
- Demonstrate place value in the base-ten number system using models.

Suggested Parent Activities:

- Ask the child "how many" questions like, "How many chairs do we have or how many doorknobs?" and have the child count out loud indicating the numerical value of each one found during the counting process.
- Select any items that can be compared in terms of bigger or smaller, more, less or equal, and higher or lower and have the child indicate with examples such as "Which shoe is bigger or smaller for different family members?" or "Who has more or less milk in their drinking cup than I do?"
- Use 10 paper cups or small containers that you can label one through ten and line them up. Place a small item like a button under one of the cups then have the child try to find it by asking "Is the button under the fifth cup?" you will indicate the button is before or after that position and the child is to try again until the button is found. Beginning with five cups is a good idea until the child understands they are to guess the location of the object in the least amount of questions.
- Use any item that can be divided into two or four equal parts, have the child assist if possible to separate the whole item into halves or fourths and also have the child put the item back together to represent the whole. Section candy bars and apples are easy to show as well as a nice treat for working on math.

1.1.3 By the end of first grade, students will identify numbers and applications in everyday situations.

Example Indicators:

- Identify how numbers are used in counting situations (setting the table and passing out candy treats).
- Identify how numbers are used for identification (room numbers and phone numbers).
- Recognize and demonstrate the value of a collection of pennies, nickels, dimes, and quarters whose total value is 100 cents or less.

Suggested Parent Activities:

- Have the child experience with you counting situations like setting the table, selecting fruit at the grocery store, and picking out party favors for a celebration.
- Have the child experience with you how numbers are used for identification like room numbers at school, phone numbers and house numbers of their friends.
- Put coins out on the table and have a discussion about what color and pictures are found on a penny, nickel, dime, and quarter and their value. Select a combination of coins less than one dollar and have the child count the coins and determine the total value.
- Use only pennies, dimes, and one dollar bills and have you and the child take turns rolling die to collect money with the goal of each of you trying to reach one dollar. After ten pennies are collected, it must be traded in for one dime and continued until ten dimes are used to exchange for the one dollar bill.

1.1.4 By the end of first grade, students will demonstrate the value of numbers (0-20) using concrete objects.

Suggested Parent Activities:

- Choose a number between zero and twenty such as five, then ask the child to demonstrate using objects how the number five can be represented like two buttons and three rocks or one shell and four blocks.

1.2 COMPUTATION/ESTIMATION

1.2.1 By the end of first grade, students will demonstrate the concepts of addition and subtraction up to 10.

Example Indicators:

- Demonstrate the value of basic facts using concrete objects.
- Recognize the symbols + and - as representing the operations of addition and subtraction.
- Recognize the symbol = represents equal quantities.
- Solve problems involving one-step solutions related to children's experiences.
- Demonstrate strategies for whole number computation.
- Compute efficiently and accurately basic number facts for addition and subtraction.

Suggested Parent Activities:

- Describe a number statement like five boys and three girls are in the park and have the child tell you how many children are in the park and show you the total with five red marbles representing the boys and three green blocks representing the girls for a total of eight items.
- Using two decks of cards (remove the face cards), each person turns over one card and then the child tells if his or her card is more, less or equal and then how many more or less to learn about adding and subtracting. The child can then practice making statements such as 5 (diamonds on my card) + 2 (more diamonds) = 7 (hearts on your card).

1.2.2 By the end of first grade, students will justify estimations to mathematical problems.

Example Indicator:

- Make estimations and comparisons to actual results.

Suggested Parent Activities:

- Give the child a container and ask how many items like marbles would fit. Have the child begin estimating a range of possibilities like 20-40, then actually fill the container and compare the estimate to the actual result. Continue the process with the same container and different sized items and ask for the estimation ranges to get smaller.

1.3 MEASUREMENT

1.3.1 By the end of first grade, students will measure two or more items or sets using nonstandard units of measure and compare attributes.

Example Indicators:

- Compare attributes of items (length-shorter/longer, height-taller/shorter, weight-heavier/lighter, and temperature-hotter/colder).
- Measure items using nonstandard units (human foot, hand span, new pencil, toothpick, block, and paper clip).

Suggested Parent Activities:

- Use a variety of items and opportunities to ask the child to compare the length (shorter/longer), height (taller/shorter), weight (heavier/lighter), and temperature (hotter/colder). To practice measuring with nonstandard units like a new pencil, a shoe string, or toothpick, select an object such as a table and ask the child to first estimate how many pencils long might the table be then determine its length using a pencil.

1.3.2 By the end of first grade, students will identify tools of measurement and their appropriate use (clocks, calendar, ruler, balance scale, and thermometer).

Suggested Parent Activities:

- Show a measuring tool like a clock to the child and ask what it measures. In reverse, ask the child what tool or tools measure time in which the response could be a clock and/or calendar.

1.3.3 By the end of first grade, students will tell time to the half-hour using an analog and digital clock.

Suggested Parent Activities:

- Use both digital and analog (face dial) clocks to practice reading with the child half-hour by learning the value of 30 minutes on a digital clock and the large hand on the six on the analog clock.

1.3.4 By the end of first grade, students will identify the different units of measurement used in their environment (cents, dollars, pounds, gallons, liters, meters, miles, minutes, and hours).

Suggested Parent Activities:

- Discuss with the child what units of measurement are used with different items like gallons of milk or gasoline, liters of soda pop, and miles to a relative's home.

1.3.5 By the end of first grade, students will identify past, present, and future as orientations in time.

Suggested Parent Activities:

- Talk with the child about events that occurred during the child's life in terms of past, present, and future. An example would be attendance of school – in the past you attended preschool, in the present you attend elementary school and in the future, you will attend high school.

1.4 GEOMETRY/SPATIAL CONCEPTS

1.4.1 By the end of first grade, students will compare relative position (left/right, above/below, over/under, up/down, and near/far).

Suggested Parent Activities:

- Use naturally occurring situations to reinforce the child's location of objects and their position, such as putting on left and right shoes and mittens, going up and down the stairs, and running under or over the play bridge.

1.4.2 By the end of first grade, students will identify, describe, and create circles, squares, triangles, and rectangles.

Example Indicators:

- Construct congruent shapes and designs using manipulatives.
- Identify and describe common geometric shapes in their environment.

Suggested Parent Activities:

- Talk with the child about the different shapes that can be seen, cut, and colored so the child becomes comfortable with the geometric shapes of circles, squares, triangles, and rectangles.
- Use objects that when traced form a geometric shape, a large piece of clean paper and crayons, and let the child create a colorful design by locating the shapes on the paper.
- Look around your home with the child and see what geometric shapes can be identified on walls, floors, ceilings, furniture, and fabric coverings.

1.5 DATA ANALYSIS, PROBABILITY, AND STATISTICAL CONCEPTS

1.5.1 By the end of first grade, students will collect information about objects and events in their environment (favorite candy bar, number of siblings, and number of pets).

1.5.2 By the end of first grade, students will organize and display collected information using objects and pictures.

1.5.3 By the end of first grade, students will compare and interpret information from displayed data (more, less, and fewer).

1.5.4 By the end of first grade, students will describe the process used in data collection and analysis.

Suggested Parent Activities:

(One continuous activity is described below to represent the standards for Data Analysis, Probability, and Statistical Concepts.)

- Have the child select a type of candy or cereal that has different colors and possibly different shapes that the family would be willing to eat later.
- On a piece of lined paper, use the selected candy or cereal and have the child organize about $\frac{1}{2}$ cup full into rows of similar color or shape.
- Ask the child to make comparisons of the candy or cereal that is displayed such as there are more red candies than orange ones.
- Listen to the child's description of what the child did to collect, organize, and talk about the displayed items.

1.6 ALGEBRAIC CONCEPTS

1.6.1 By the end of first grade, students will identify, describe, extend, and create patterns (objects, sounds, movements, shapes, numbers, and colors).

Suggested Parent Activities:

- Create simple patterns with sounds, movements, shapes, and colors and have the child continue the pattern. The sounds and movements can be generated by you and repeated by the child. Stamps and stamping pads are a fun way to make patterns with different shapes and/or colors. The child also enjoys creating the pattern and asking the adult to finish it.

1.6.2 By the end of first grade, students will sort and classify objects according to one or more attributes (size, shape, color, and thickness).

Suggested Parent Activities:

- Use a bag of groceries to have the child sort the purchased products. Let the child chose one attribute/characteristic to put the like items all together like these are all cans. Then have the child take all the items and sort them again like these all go in the freezer.

1.6.3 By the end of first grade, students will identify and describe patterns in their environment.

Suggested Parent Activities:

- Look around the neighborhood on the way to school or in the child's room and have the child find and tell about patterns they see like all the garages are on the right on this street.

SOURCES FOR SUGGESTED PARENT ACTIVITIES:

Family Math, Lawrence Hall of Science, University of California, Berkeley, CA 94720

Family Math for Young Children: Comparing, Lawrence Hall of Science, University of California, Berkeley, CA 94720

Helping Your Child Learn Math, U.S. Department of Education, Office of Educational Research and Improvement, Washington, D.C. 20208. Copies and pricing information are available from D.C. Heath by calling 1-800-334-3284

Math Matters, National PTA and Exxon Foundation.

Focus Issue: Beyond the Classroom: Linking Mathematics Learning with Parents, Communities, and Business and Industry, *Teaching Children Mathematics*, February 1998, National Council of Teachers of Mathematics, 1906 Association Drive, Reston, VA 22091-1593 (1-800-235-7566).

Addenda Series Grades K-6, National Council of Teachers of Mathematics, 1906 Association Drive, Reston, VA 22091-1593 (1-800-235-7566).

GRADE 4

4.1 NUMERATION/NUMBER SENSE

4.1.1 By the end of fourth grade, students will demonstrate place value of whole numbers through the millions and decimals to the hundredth place.

Example Indicators:

- Read and write numerals (in digits and words) through the one millions place and decimals to the hundredth place.
- Order and compare whole numbers through the one millions place and decimals to the hundredths place using the symbols $<$, $>$, and $=$.
- Round whole numbers to the nearest named place, such as rounding 1,234 to the nearest hundred would be 1,200.

Suggested Parent Activities:

- Use vehicle license plates to have the child read and write in words the value of the license without the letters.
- Order the license plate values and compare using greater than, less than, and equal to your own family's vehicle.
- Ask the child to round the next license plates, for example, to the nearest one hundred, so a license plate of 23-475 would be rounded to 23,500 since 475 is closer to 500 than to 400.
- Repeat the same steps above using a store receipt to practice reading, writing, ordering, comparing, and rounding decimals.

4.1.2 By the end of fourth grade, students will write and illustrate equivalences of whole numbers in expanded form, decimals, and fractions.

Example Indicators:

- Write numbers in expanded form, such as $432 = 400 + 30 + 2$.
- Represent equivalent fractions with denominators of 2, 4, 5, 8 and 10 ($1/2 = 2/4$) using concrete objects.
- Write equivalent decimals ($.4 = .40$).
- Write decimals as fractions using denominators of 10 and 100 ($.68 = 68/100$).

Suggested Parent Activities:

- Give the child a number such as 5,410 and ask the child what value is represented by the numeral 4 (answer being 4×100 or 400).
- Use some candy bars that can be divided into two equal parts, four equal parts and eight equal parts to have the child represent equivalent fractions like $4/8 = 2/4 = 1/2$ and the decimal of .5.

4.1.3 By the end of fourth grade, students will describe and apply relationships between whole numbers, decimals, and fractions by order, comparison, and operation.

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Example Indicators:

- Order and compare whole numbers, common fractions, and decimals using the symbols $<$, $>$, and $=$.
- Illustrate mathematical concepts by using objects and drawing pictures or diagrams (subtraction as the opposite of addition and multiplication as repeated addition).
- Solve and check a mathematical problem by using the related facts.

Suggested Parent Activities:

- Use a receipt from a grocery store and give an amount like \$1.67, have the child go through the items purchased and indicate if the amounts are greater than, less than, or equal to the given amount.
- Ask the child to draw a picture or use objects to show you how the child got an answer to a word problem from their math materials or one that you created.
- Continue the receipt idea above by asking the child questions like “How much more money would you need from the given amount to purchase a selected item? Or How much money would you get back if the item cost less? Or How many items could you buy and still have money left?”

4.1.4 By the end of fourth grade, students will identify examples of positive and negative numbers and zero.

Example Indicator:

- Demonstrate simple concepts of positive and negative numbers (a thermometer for temperature or distances to the right or left of zero on a number line.)

Suggested Parent Activities:

- Discuss with the child when negative values occur like during the winter when the wind chill is ten below zero or a loss of five yards on the football field.

4.1.5 By the end of fourth grade, students will make change and count out in amounts up to \$20.00.

Example Indicators:

- Count back change from purchase price to amount given using fewest coins possible.
- Calculate change through subtraction and choose correct bills and coins to make this amount.

Suggested Parent Activities:

- Practice with the child making change starting with one dollar and increasing to twenty dollars and listening to the child count it back to you. Count back change with the child from a store purchase.

4.2 COMPUTATION/ESTIMATION

4.2.1 By the end of fourth grade, students will estimate, add, subtract, multiply, and divide whole numbers without and with calculators and solve word problems.

Example Indicators:

- Demonstrate with accuracy and reasonable speed the basic facts of addition (1-20), subtraction (1-20), multiplication (1-144), and division (1-144).
- Add and subtract accurately five-digit numbers including columns of numbers.
- Multiply up to a three-digit number by a two-digit number.
- Divide up to a three-digit number by a one-digit divisor.
- Choose correct operation and solve word problems.

Suggested Parent Activities:

- Use a deck of cards (with out the face cards) and give four cards to the child and ask that all four cards and any choice of the four operations (addition, subtraction, division and multiplication) be used to make as many different answers as the child can get applying the order of operations.
- Use license plates and rules on the amount of digits to practice adding, subtracting, multiplying, and dividing with the child.

4.2.2 By the end of fourth grade, students will estimate, add, and subtract decimals without and with calculators and solve word problems.

Example Indicator:

- Add and subtract decimals to the hundredths place.

Suggested Parent Activities:

- Ask the child to first estimate the total bill by looking at only the items purchased on store receipts and then practice adding and subtracting decimals with the child.

4.2.3 By the end of fourth grade, students will estimate, add, and subtract fractions with like denominators without calculators and solve word problems.

Example Indicator:

- Solve problems involving fractions of halves, fourths, and eighths using the operations of addition and subtraction.

Suggested Parent Activities:

- Use coupons and grocery ads to have the child estimate what fraction of the cost is saved using the coupon.
- Cook with your child and have the child help measure the ingredients for the recipes. This is excellent fraction practice.
- Use a deck of cards (without the face cards) to draw four cards to form two proper fractions (the denominator (bottom) is larger than the numerator (top) then have the child add and subtract the values of the fractions. Examples might be to select cards of 2, 5, 6, and 3 and $(2/5 + 3/6)$ and $3/6 - 2/5)$ or $3/5 + 2/6$ and $3/5 - 2/6)$ would be tow possible problems formed.

4.3 MEASUREMENT

4.3.1 By the end of fourth grade, students will estimate, measure, and solve word problems using metric units for linear measure, area, mass/weight, capacity, and temperature.

Example Indicators:

- Use the appropriate units of measurement.
- Estimate and accurately measure length to the nearest meter or centimeter and calculate area.
- Estimate and accurately measure mass/weight to the nearest gram.
- Estimate and accurately measure capacity to the nearest milliliter.
- Measure and read temperature accurately to the nearest degree using Celsius thermometer.

Suggested Parent Activities:

- Ask the child to estimate and measure items using the metric units of measure for a variety of items such as the length of the child's favorite book in centimeters, the temperature on the bank Celsius temperature display, and the amount of medicine in milliliters.

4.3.2 By the end of fourth grade, students will estimate, measure, and solve word problems using standard units for linear measure, area, mass/weight, capacity, and temperature.

Example Indicators:

- Use the appropriate units of measurement.
- Estimate and accurately measure length to the nearest yard, foot, inch, and quarter inch and calculate area.
- Estimate and accurately measure mass/weight to the nearest ounce and pound.
- Estimate and accurately measure capacity to the nearest fluid ounce.
- Measure and read temperature accurately to the nearest degree using Fahrenheit thermometer.

Suggested Parent Activities:

- Ask the child to estimate and measure items using the standard unit of measure for a variety of items such as estimating if six apples weigh more than a pound before actually weighing them, the length of the child's bed in inches, and the amount of liquid that your child's favorite glass holds in ounces.

Students should begin to make "ballpark" comparisons and not memorize conversion factors between U.S. and metric units such as one quart is a little less than one liter, one meter is a little longer than one yard, one inch is about 2.5 centimeters, one kilometer is slightly farther than a half mile, one ounce is about 28 grams or one gram is about the weight of a paper clip, and one kilogram is a little more than two pounds.

4.3.3 By the end of fourth grade, students will tell and write correct time to the minute using an analog clock.

Example Indicators:

- Set an analog clock to a given time.
- State time in different ways (8:35, 35 minutes after 8:00, or 25 minutes until 9:00).
- Identify time of day (am, pm, noon, and midnight).

Suggested Parent Activities:

- Ask the child to tell time to the nearest minute on an analog (face dial) clock periodically during the day and evening.

4.3.4 By the end of fourth grade, students will measure and determine the perimeter of a many-sided figure without a formula using standard and metric units of measure.

Suggested Parent Activities:

- Ask the child to measure the distance around a variety of objects with multiple sides using inches and nonstandard units like pencils or toothpicks.

4.4 GEOMETRY/SPATIAL CONCEPTS

4.4.1 By the end of fourth grade, students will identify, describe, and create two- and three-dimensional geometric shapes.

Suggested Parent Activities:

- Use items at a store to explore geometric shapes, have the child identify items that are in the shape of a cube, rectangular prism (box), cylinder, cone, and pyramid. The child can also tell what shapes are found on the sides of packages like squares, rectangles, circles, and triangles.

4.4.2 By the end of fourth grade, students will identify and draw points, lines, line segments, rays, and angles.

Suggested Parent Activities:

- Ask the child to identify and draw outlines of objects that would form parallel lines or perpendicular lines. Examples might be (for parallel lines) the opposite sides of the doorway and (for perpendicular lines) the sides of a picture frame that forms the corner.

4.4.3 By the end of fourth grade, students will identify, analyze, and compare two-dimensional geometric figures using congruence, symmetry, similarity, and simple transformations.

Suggested Parent Activities:

- Use the books like *Grandfather Tang's Story* by Ann Tompert and *The Bedspread* by Sylvia Fair with tangram puzzle pieces and geometric shapes to have the child create the tangram animals and geometric bedspread designs.

4.5 DATA ANALYSIS, PROBABILITY, AND STATISTICAL CONCEPTS

4.5.1 By the end of fourth grade, students will collect, organize, record, and interpret data and describe the findings.

Example Indicators:

- Collect, organize, and interpret data in line plots, tables, charts, and graphs (pie graphs, bar graphs, and pictographs).
- Draw valid conclusions from displayed data.
- Investigate and record patterns in a simple probability situation in an organized way.

Suggested Parent Activities:

- Use popular magazines or newspapers and ask the child to find examples of charts and graphs and talk about how they are helpful to understand the information presented.
- Ask the child to explain about the topic that was chosen to collect data and what information was concluded from the display.
- Ask the child to create a table to record some results of a four-colored spinner or toss the coin for a tally of heads or tails.

4.6 ALGEBRAIC CONCEPTS

4.6.1 By the end of fourth grade, students will use and interpret variables and mathematical symbols to write and solve one-step equations.

Example Indicators:

- Use letters, boxes, or other symbols to stand for any number, measured quantity, or object in simple situations to demonstrate the beginning concept of a variable and writing formulas.
- Identify and use various indicators of multiplication (parentheses, \times , $*$) and division, ($/$, \div).

Suggested Parent Activities:

- Ask the child to write simple equations using letters, boxes or other symbols representing some situation like the animals at our house include two fish and three hamsters might be written as $F + H = A$.

4.6.2 By the end of fourth grade, students will identify, describe, and extend arithmetic patterns, using concrete materials and tables.

Example Indicator:

- Use Input/Output or function box to identify and extend patterns.

Suggested Parent Activities:

- Ask the child to use the multiplication table (12 by 12) and identify different patterns found.
- Another example you can experience with your child is King's Rule (computer software by O'Brien 1985), which provides patterns examples. You and the child are to determine the rule used in the pattern.

SOURCES FOR SUGGESTED PARENT ACTIVITIES:

Family Math, Lawrence Hall of Science, University of California, Berkeley, CA 94720

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Helping Your Child Learn Math, U.S. Department of Education, Office of Educational Research and Improvement, Washington, D.C. 20208. Copies and pricing information are available from D.C. Heath by calling 1-800-334-3284

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