



Rio Rancho Public Schools

Math Standards

Revised 2007

PROCESS STANDARDS

PROBLEM SOLVING

- Build new mathematical knowledge through problem solving
- Solve problems that arise in mathematics and in other contexts
- Apply and adapt a variety of appropriate strategies to solve problems
- Monitor and reflect on the process of mathematical problem solving.

REASONING AND PROOF

- Recognize reasoning and proof as fundamental aspects of mathematics
- Make and investigate mathematical conjectures
- Develop and evaluate mathematical arguments and proofs
- Select and use various types of reasoning and methods of proof

COMMUNICATION

- Organize and consolidate their mathematical thinking through communication.
- Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.
- Analyze and evaluate the mathematical thinking and strategies of others.
- Use the language of mathematics to express mathematical ideas precisely.

CONNECTIONS

- Recognize and use connections among mathematical ideas
- Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.
- Recognize and apply mathematics in contexts outside of mathematics

REPRESENTATION

- Create and use representations to organize, record, and communicate mathematical ideas.
- Select, apply, and translate among mathematical representations to solve problems
- Use representations to model and interpret physical, social, and mathematical phenomena.

RRPS District Standards: MATHEMATICS

Grade 4

STRAND I: NUMBERS AND OPERATIONS

NM State Content Standard I: Students will understand numerical concepts and mathematical operations.

NM State Benchmarks Grades K-4

RRPS Grade 4 Power Standards

While all benchmarks are taught, Power Standards are consistently emphasized and regularly assessed.

NM State Benchmark I-A: Grades K-4

Understand numbers, ways of representing numbers, relationships among numbers, and number systems.

Power Standard 1 (Benchmark I-A):

Understand, relate, and represent fractions by identifying fractions and solving problems involving fractions.

NM Grade 4 Performance Standards

1. Exhibit an understanding of the place-value structure of the base-ten number system by reading, modeling, writing, and interpreting whole numbers up to **1,000,000***; compare and order the numbers:
 - recognize equivalent representations for the same number and generate them by decomposing and combining numbers (e.g., $853 = 8 \times 100 + 5 \times 10 + 3$; $853 = 85 \times 10 + 3$; $853 = 900 - 50 + 3$)
 - identify the numbers less than 0 by extending the number line and using negative numbers through familiar applications (e.g., temperature, money)
2. Identify fractions as parts of unit wholes, as parts of groups, and as locations on number lines:
 - use visual models and other strategies to compare and order commonly used fractions
 - use models to show how whole numbers and decimals (to the hundredths place) relate to simple fractions (e.g., $\frac{1}{2}$, $\frac{5}{10}$, 0.5)
 - identify different interpretations of fractions:
 - division of whole numbers by whole numbers
 - ratio
 - equivalence
 - ordering of fractions
 - parts of a whole or parts of a set
3. Add and subtract fractions with common and uncommon denominators using a variety of strategies (e.g., manipulatives, numbers, pictures):
 - recognize and generate equivalent decimal forms of commonly used fractions (e.g., halves, quarters, tenths, fifths)
 - identify the numbers less than 0 by extending the number line and using negative numbers through familiar applications (e.g., temperature, money)
4. Recognize classes of numbers (e.g., odd, even, factors, multiples, square numbers) and apply these concepts in problem-solving situations.

Performance Indicators:

- a. Identify the whole for fractions.
- b. Identify fractional parts of a collection of objects.
- c. Identify fractional parts of a region.
- d. Rename fractions with denominators of 10 and 100 as decimals.
- e. Compare and order fractions.
- f. Add and subtract fractions *with common denominators*.
- g. Explain and justify answers using pictures, numbers, and words (appropriate vocabulary).
- h. Apply knowledge to solve real life situations.

STRAND I: NUMBERS AND OPERATIONS

NM State Content Standard I: Students will understand numerical concepts and mathematical operations.

NM State Benchmark I-B: Grades K-4

Understand the meaning of operations and how they relate to one another.

NM Grade 4 Performance Standards

1. Demonstrate an understanding of and the ability to use:
 - standard ***and alternative****algorithms for the addition and subtraction of multi-digit numbers
 - standard ***and alternative****algorithms for multiplying a multi-digit by a two-digit number and for dividing a multi-digit number by a one-digit number
 - ***explore dividends of three-digits or less with two-digit divisor (ex. math games, Math Boxes [Everyday Math Journals], and Home Links).****
2. Select and use appropriate operations (addition, subtraction, multiplication, and division) to solve problems.
3. Extend the uses of whole numbers to the addition and subtraction of simple decimals (positive numbers to two places).
4. Demonstrate commutative, associative, identity, and zero properties of operations on whole numbers (e.g., $37 \times 46 = 46 \times 37$ and $(6 \times 2) \times 5 = 6 \times (2 \times 5)$).
Demonstrate the concept of distributivity of multiplication over addition and subtraction (e.g., 7×28 is equivalent to $(7 \times 20) + (7 \times 8)$ or $(7 \times 30) - (7 \times 2)$).

RRPS Grade 4 Power Standards

While all benchmarks are taught, Power Standards are consistently emphasized and regularly assessed.

Power Standard 2 (Benchmark I-B):

Understand and use addition and subtraction of multi-digit numbers and decimal problems to two places; multiplication of multi-digit numbers; and division of multi-digit numbers by one-digit numbers to solve problems and show how they are related.

Performance Indicators:

- a. Know addition and subtraction facts
- b. Subtract multi-digit numbers.
- c. Add multi-digit numbers.
- d. Solve addition and subtraction number stories.
- e. Know division facts.
- f. Know multiplication facts.
- g. Understand the relationship between multiplication and division.
- h. Solve 1- and 2-place decimal addition and subtraction problems and number stories.
- i. Know extended multiplication facts.
- j. Solve whole-number division problems.
- k. Solve multiplication and division number stories.
- l. Explain and justify answers using pictures, numbers, and words (appropriate vocabulary).
- m. Apply knowledge to solve real life situations.

NM State Benchmark I-C: Grades K-4

Compute fluently and make reasonable estimates.

NM Grade 4 Performance Standards

1. Demonstrate multiplication combinations through 12×12 and related division facts, and use them to solve problems mentally and compute related problems (e.g., 4×5 is related to 40×50 , 400×5 , and 40×500).
2. Add, subtract, and multiply up to two double-digits accurately and efficiently. Use a variety of strategies (e.g., rounding and regrouping) to estimate the results of whole number computations and judge the reasonableness of the answers ***up to 1,000,000****.
3. Use strategies to estimate computations involving fractions and decimals.

STRAND II: ALGEBRA

NM State Content Standard II: Students will understand algebraic concepts and applications.

<p>NM State Benchmark II-A: Grades K-4 Understand patterns, relations, and functions</p>	<p>RRPS Grade 4 Power Standards <i>While all benchmarks are taught, Power Standards are consistently emphasized and regularly assessed.</i></p>
<p>NM Grade 4 Performance Standards</p> <ol style="list-style-type: none"> 1. Represent and analyze patterns and simple functions using words, tables, and graphs. 2. Create and describe numeric and geometric patterns including multiplication and division patterns. 3. Express mathematical relationships using equations. 4. Use and interpret variables, mathematical symbols, and properties to write and simplify expressions and sentences; <ul style="list-style-type: none"> • Use letters, boxes or other symbols to stand for any number in simple expression or equations (e.g., demonstrate and understanding of the concept of a variable) • Interpret and evaluate mathematical expressions using parentheses <p>Use and interpret formulas (e.g., Area= Length x Width or $A = L \times W$) to answer questions about quantities and their relationships</p>	<p>Power Standard 3 (Benchmark II – A, B, C, &D): Use and interpret variables to analyze and solve problems while investigating change, proportional relationships, and formulas as shown in graphs, data tables, pictures, and equations.</p> <p>Performance Indicators:</p> <ol style="list-style-type: none"> a. analyze patterns of change to determine relationships b. express mathematical relationships using equations c. use and interpret variables in expressions and equations d. solve problems involving proportional relationships e. use, interpret and develop simple formulas f. model problem situations using charts, graphs, data tables, input/output tables, T-tables, and pictures. g. explain and justify answers using pictures, numbers, and words (appropriate vocabulary). h. apply knowledge to solve real life situations.
<p>NM State Benchmark II-B: Grades K-4 Represent and analyze mathematical situations and structures using algebraic symbols.</p>	<p>RRPS Grade 4 Power Standards <i>While all benchmarks are taught, Power Standards are consistently emphasized and regularly assessed.</i></p>
<p>NM Grade 4 Performance Standards</p> <ol style="list-style-type: none"> 1. Identify symbols and letters that represent the concept of a variable as an unknown quantity. 2. Explore the uses of properties (commutative, distributive, associative) in the computation of whole numbers. 3. Express mathematical relationships using equations. 4. Determine the value of variables in simple equations (e.g., $80 \times 15 = 40 \times \square$). 5. Develop simple formulas in exploring quantities and their relationships (e.g. $A = L \times W$). 	
<p>NM State Benchmark II-C: Grades K-4 Use mathematical models to represent and understand quantitative relationships.</p>	<p>RRPS Grade 4 Power Standards <i>While all benchmarks are taught, Power Standards are consistently emphasized and regularly assessed.</i></p>
<p>NM Grade 4 Performance Standards</p> <ol style="list-style-type: none"> 1. Solve problems involving proportional relationships (including unit pricing and map interpretations; e.g., one inch = five miles; therefore, five inches = \square miles). 1. Model problem situations and use graphs, tables, pictures, and equations to draw conclusions (e.g., different patterns of change). 3. Use and interpret formulas (e.g., Area = Length x Width or $A = L \times W$) to answer questions about quantities and their relationships 	

STRAND II: ALGEBRA

NM State Content Standard II: Students will understand algebraic concepts and applications.

NM State Benchmark II-D: Grades K-4

Analyze changes in various contexts

RRPS Grade 4 Power Standards

While all benchmarks are taught, Power Standards are consistently emphasized and regularly assessed.

NM Grade 4 Performance Standards

1. Identify and describe situations with constant or varying rates of change and compare them.
1. Determine how a change in one variable relates to a change in a second variable (e.g., data tables, input-output machines).
2. Find and analyze patterns using data tables (e.g., T tables).
4. Demonstrate and describe varying rates of change in relation to real-world situations (e.g., plant growth, students' heights).

STRAND III: GEOMETRY

NM State Content Standard III: Students will understand geometric concepts and applications.

NM State Benchmarks Grades K-4

RRPS Grade 4 Power Standards

While all benchmarks are taught, Power Standards are consistently emphasized and regularly assessed.

NM State Benchmark III-A: Grades K-4

Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships.

Power Standard 4 (Benchmark III-A):

Analyze attributes of points, segments, perpendicular and parallel lines, rays, angles, and planes; and classify and define two-dimensional shapes and three-dimensional solids according to side and angle properties to develop logical arguments and test conjectures of properties and relationships.

NM Grade 4 Performance Standards

1. Identify, compare, and analyze attributes of two- and three-dimensional shapes and develop vocabulary to describe the attributes:
 - build, draw, create, and describe geometric objects (*e.g., point, segment, line, ray, plane*)*
 - identify lines that are parallel or perpendicular
 - identify and compare congruent and similar figures
 - **identify right, acute, and obtuse angles***
2. Classify two- and three-dimensional shapes according to their properties and develop definitions of classes like triangles and pyramids:
 - visualize, describe, and make models of geometric solids in terms of the number of faces, edges, and vertices
 - interpret two-dimensional representations of three-dimensional objects
3. Make and test conjectures about geometric properties and relationships and develop logical arguments to justify conclusions.

Performance Indicators:

- a. Name, draw, and label line segments, lines, and rays.
- b. Name, draw, and label angles, triangles, and quadrangles.
- c. Identify and describe right angles, parallel lines, and line segments.
- d. Identify properties of polygons.
- e. Classify quadrangles according to side and angle properties.
- f. Identify acute, right, obtuse, straight, and reflex angles.
- g. Describe properties of geometric solids.
- h. Explain and justify answers using pictures, numbers, and words (appropriate vocabulary)
- i. Apply knowledge to solve real life situations.

NM State Benchmark III-B: Grade K-4

Specify locations and describe spatial relationships using coordinate geometry and other representational systems

NM Grade 4 Performance Standards

1. Describe location and movement using common language and geometric vocabulary (*e.g., (x, y) to (x-2,y+4)*)*.
2. Use ordered pairs to graph, locate, identify points, and describe paths in the first quadrant of the coordinate plane.
3. Use a variety of methods for measuring distances between locations on a grid.

STRAND III: GEOMETRY

NM State Content Standard III: Students will understand geometric concepts and applications.

NM State Benchmark III-C: Grades K-4

Apply transformations and use symmetry to analyze mathematical situations.

NM Grade 4 Performance Standards

1. Create and describe rotational designs using language of transformational symmetry.
2. Describe a motion or set of motions that will show that two shapes are congruent.

NM State Benchmark III-D: Grades K-4

Use visualization, spatial reasoning, and geometric modeling to solve problems.

NM Grade 4 Performance Standards

1. Develop and use mental images of geometric shapes to solve problems (e.g., represent three-dimensional shapes in two dimensions).
2. Use geometric models such as number lines, arrays, and computer simulations to investigate number relationships (e.g., patterns).
3. Explore relationships involving perimeter and area:
 - measure area of rectangular shapes and use appropriate units
 - recognize that area can have the same perimeter but different areas and vice versa
 - use models and formulas to solve problems involving perimeter and area of rectangles and squares (e.g., arrays)

STRAND IV: MEASUREMENT

NM State Content Standard IV: Students will understand measurement systems and applications.

NM State Benchmarks Grades K-4

RRPS Grade 4 Power Standards

While all benchmarks are taught, Power Standards are consistently emphasized and regularly assessed.

NM State Benchmark IV-A: Grades K-4

Understand measurable attributes of objects and the units, systems, and process of measurement.

Power Standard 5 (Benchmark IV-B):

Estimate, measure, and solve problems involving length, perimeter, area, and time using appropriate standard units and tools; identify common measurements of turns.

NM Grade 4 Performance Standards

1. Select the appropriate type of unit for measuring perimeter and size of an angle.
2. Understand the need for measuring with standard units and become familiar with the standard units in customary and metric system.
3. Identify the inverse relationship between the size of the units and the number of units.
4. Develop formulas to determine the surface areas of rectangular solids.
5. Develop, understand, and use formulas to find the area of rectangles and related triangles and parallelograms.
6. Carry out simple conversions within a system of measurement (e.g., hours to minutes, meters to centimeters).

Performance Indicators:

- a. Draw and measure line segments to the nearest centimeter.
- b. Draw and measure line segments to the nearest millimeter.
- c. Use personal references to estimate lengths in metric units.
- d. Make turns and fractions of turns; relate turns and angles.
- e. Use formulas to find areas of rectangles, parallelograms, and triangles.
- f. Find the perimeter of a polygon.
- g. Find the area of a figure by counting unit squares and fractions of unit squares inside the figure.
- h. Calculate elapsed time.
- i. Solve time number stories.

7. Compare customary units of measure to metric units of measure.*

NM State Benchmark IV-B: Grades K-4

Apply appropriate techniques, tools, and formulas to determine measurements.

NM Grade 4 Performance Standards

1. Estimate perimeters, areas of rectangles, triangles, and irregular shapes.
2. Find the area of rectangles, related triangles, and parallelograms.
3. Estimate, measure, and solve problems involving length, area, mass, time, and temperature using appropriate standard units and tools.
4. ***Recognize freezing and boiling points of water in Celsius and Fahrenheit.****
5. Identify common measurements of turns (e.g., 360 degrees in one turn, 90 degrees in a quarter-turn).
6. Compute elapsed time and make and interpret schedules.
7. Use tools to measure angles (e.g., protractor, compass).

STRAND V: DATA ANALYSIS AND PROBABILITY

NM State Content Standard V: Students will understand how to formulate questions, analyze data, and determine probabilities.

NM State Benchmarks Grades K-4

RRPS Grade 4 Power Standards

While all benchmarks are taught, Power Standards are consistently emphasized and regularly assessed.

NM State Benchmark V-A: Grades K-4

Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them.

Power Standard 6 (Benchmark V-B):

Analyze data using median, mode, maximum, minimum, and range to make predictions/inferences and to draw conclusions using a variety of formats. Understand and apply basic concepts of probability.

NM Grade 4 Performance Standards

1. Organize, represent, and interpret numerical and categorical data and clearly communicate findings:
 - choose and construct representations that are appropriate for the data set
 - recognize the differences in representing categorical and numerical data
2. Design investigations and represent data using tables and graphs (e.g., line plots, bar graphs, line graphs).

Performance Indicators:

- a. Use the statistical landmarks maximum and minimum.
- b. Display data with a line plot, bar graph, or tally chart.
- c. Use the statistical landmarks median, mode, and range.
- d. Explain and justify answers using pictures, numbers, and words (appropriate vocabulary).
- e. Apply knowledge to solve real life situations.
- f. Describe events using certain, very likely, likely, equally likely, 50-50, less likely, very unlikely, impossible, and other basic probability terms to compare events.
- g. Predict the outcomes of experiments and test predictions using manipulatives.
- h. Summarize results/outcomes numerically and use them to predict future events.

NM State Benchmark V-B: Grades K-4

Select and use appropriate statistical methods to analyze data.

NM Grade 4 Performance Standards

1. Compare and describe related data sets.
2. Use the concepts of median, mode, maximum, minimum, and range and draw conclusions about a data set.
3. Use data analysis to make reasonable inferences/predictions and to develop convincing arguments from data described in a variety of formats (e.g. bar graphs, Venn diagrams, charts, tables, line graphs, and pictographs).

NM State Benchmark V-C: Grades K-4

Develop and evaluate inferences and predictions that are based on data.

NM Grade 4 Performance Standards

1. Propose and justify conclusions and predictions based on data.
2. Develop convincing arguments from data displayed in a variety of formats.

NM State Benchmark V-D: Grades K-4

Understand and apply basic concepts of probability.

NM Grade 4 Performance Standards

1. Describe events as “likely,” “unlikely,” or “impossible” and quantify simple probability situations:
 - represent all possible outcomes for a simple probability situation in an organized way (e.g., tables, grids, tree diagrams)
 - express outcomes of experimental probability situations verbally and numerically (e.g., three out of four, $\frac{3}{4}$)
2. List all the possible combinations of objects from three sets (e.g., spinners, number of outfits from three different shirts, two skirts, and two hats).