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.**

~~R~~RPS District Standards: MATHEMATICS

Grade 3

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 3 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. **NM Grade 3 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 10,000 • comparing and ordering numbers up to 1,000 • recognizing the position of a given number in the base-ten number system and its relationship to benchmark numbers such as 10, 50, 100, 500 2. Use whole numbers by using a variety of contexts and models (e.g., exploring the size of 1,000 by skip-counting to 1,000 using hundred charts or strips 10 or 100 centimeters long). 3. Identify some representations for some numbers and generate them by decomposing and recombining numbers (e.g., 853 = 8 x 100 + 5 x 10 + 3; 85 x 10 + 3 = 853; 853 = 900 – 50 + 3). 4. Identify the relationship among commonly encountered factors and multiples (e.g., factor pairs of 12 are 1 x 12, 2 x 6, 3 x 4; multiples of 12 are 12, 24, 36). 5. Use visual models and other strategies to recognize and generate equivalents of commonly used fractions and mixed numbers (e.g., halves, thirds, fourths, sixths, eighths, and tenths). 6. Demonstrate an understanding of fractions as parts of unit wholes, parts of a collection or set, and as locations on a number line. 7. Use common fractions for measuring and money (e.g., using fractions and decimals as representations of the same concept, such as half of a dollar = 50 cents). 8. Explore making change for amounts less than five dollars.*	**Power Standard 1** **(Benchmark I-A & C)** Understand, relate, and represent whole numbers up to 10,000 and fractions; add and subtract with and without regrouping know multiplication facts fluently and make reasonable estimates using a variety of strategies in measurement, problem solving, and computation. **Performance Indicators** a. Identify and use number patterns to solve problems. b. Count by 10s and 100s. c. Apply place-value concepts in 4-digit numbers. d. Find equivalent names for numbers. e. Know multiplication facts fluently, 0-12 with emphasis on 0, 1, 2, 5, 10. f. Complete addition/subtraction fact and number families. g. Add multi-digit numbers, up to 5 digits with and without regrouping. h. Subtract multi-digit numbers, 0-10,000, with and without regrouping. i. Solve addition and subtraction multi-digit numbers stories. ~~j~~j. Complete multiplication/division fact families. k. Read, write and compare whole numbers up to 5 digits. l. Identify place value in whole numbers up to 5 digits. m. Solve equal grouping and equal sharing number stories. n. Identify fractional parts of sets.

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 3 Power Standards** *While all benchmarks are taught, Power Standards are consistently emphasized and regularly assessed.*
NM State Benchmark I-B: Grades K-4 Understand the meaning of operations and how they relate to one another. **NM Grade 3 Performance Standards** 1. Use a variety of models to show an understanding of multiplication and division of whole numbers (e.g., charts, arrays, diagrams, and physical models (i.e., modeling multiplication with a variety of pictures, diagrams, and concrete tools to help students learn what the factors and products represent in various contexts). 2. Find the sum of difference of two whole numbers between 0 and 10,00. 3. Solve simple multiplication and division problems (e.g., 135 / 5 =?). 4. Identify how the number of groups and the number of items in each group equals a product. 5. Demonstrate the effects of multiplying and dividing on whole numbers (e.g., to find the total number of legs on 12 cats, 4 represents the number of each (cat) unit, so 12 x 4 =4 8 (leg) units). 6. Identify and use relationship between multiplication and division (e.g. division is the inverse of multiplication) to solve problems. 7. Select and use operations (e.g., addition, multiplication, subtraction, division) to solve problems. 8.	**(Performance Indicators Continued)** o. Identify fractional parts of a region. p. Students must be able to apply knowledge to solve real life situations. q. Be able to explain and justify answers using pictures, numbers, and words (appropriate vocabulary). **Power Standard 5** **(Benchmark IV-B)** Calculate the values of combinations of bills and coins and write the total in dollars-and-cents notation up to five dollars. **Performance Indicators** a. Calculate the values of combinations of bills and coins and write the total in dollars-and-cents notations b. Students must be able to apply knowledge to solve real life situations. c. Be able to explain and justify answers using pictures, numbers, and words (appropriate vocabulary).
NM State Benchmark I-C: Grades K-4 Compute fluently and make reasonable estimates..	
NM Grade 3 Performance Standards 1. Choose computational methods based on understanding the bases-ten number system, properties or multiplication and division, and number relationships. 2. Use strategies (e.g., 6 X 8 is double 3 X 8) to become fluent with the multiplication pairs up to 10 x 10. 3. Compute with basic number combinations (e.g., multiplication pairs up to 10 x 10 and their division counterparts). 4. Demonstrate reasonable estimation for measurement, computation, and problem solving.	

STRAND II: ALGEBRA

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

NM State Benchmark II-B: Grades K-4
Represent and analyze mathematical situations and structures using algebraic symbols.

NM State Benchmark II-A: Grades K-4
Understand patterns, relations, and functions.

NM Grade 3 Performance Standards

1. Represent relationships of quantities in the form of mathematical expressions, equations, or inequalities.
2. Solve problems involving numeric equations.
3. Select appropriate operational and relational symbols to make an expression true (e.g., "If 4 □ 3 = 12, what operational symbol goes in the box?").
4. Use models of feet and inches to express simple unit conversions in symbolic form (e.g., 36 inches = □ feet x 12) that develop conceptual understanding versus procedural skills.
5. Recognize and use the commutative property of multiplication (e.g., if 5 x 7 = 35, then what is 7 x 5?).
6. Create, describe, and extend numeric and geometric patterns including multiplication patterns.
7. Represent simple functional relationships:
   - solve simple problems involving a functional relationship between two quantities (e.g., find the total cost of multiple items given the cost per unit)
   - extend and recognize a linear pattern by its rules (e.g., the number of legs on a given number of horses may be calculated by counting by 4s, by multiplying the number of horses by 4, or through the use of tables)

NM Grade 3 Performance Standards

1. Determine the value of variables in missing part problems (e.g., 139 + □ = 189).
2. Recognize and use the commutative and associative properties of addition and multiplication (e.g., "If 5 x 7 = 35, then what is 7 x 5? And if 5 x 7 x 3 = 105, then what is 7 x 3 x 5?").

Explore the ways that commutative, distributive, identity, and zero properties are useful in computing with numbers.

RRPS Grade 3 Power Standards
While all benchmarks are taught, Power Standards are consistently emphasized and regularly assessed.

Power Standard 2
(Benchmark II-A & B)
Represent and analyze problems using the distributive, commutative, associative, identity, and zero properties in addition, subtraction and multiplication and determine the value of variables in missing-part problems of addition and subtraction.

Performance Indicators
a. Complete "What's My Rule" tables
b. Use basic facts to solve fact extensions.
c. Students must be able to apply knowledge to solve real life situations.
d. Be able to explain and justify answers using pictures, numbers, and words (appropriate vocabulary).
e. Complete multi-digit addition and subtraction problems with missing addends.

STRAND II: ALGEBRA	
NM State Content Standard II: Students will understand algebraic concepts and applications.	
NM State Benchmark II-C: Grades K-4 Use mathematical models to represent and understand quantitative relationships.	
NM Grade 3 Performance Standards 1. Model problem situations with objects and use representations such as pictures, graphs, tables, and equations to draw conclusions. 2. Solve problems involving proportional relationships including unit pricing (e.g., four apples cost 80 cents; therefore, one apple costs 20 cents). 3. Describe relationships of quantities in the form of mathematical expressions, equations, or inequalities. 4. Select appropriate operational and relational symbols to make an expression true (e.g.," If 4 □ 3 = 12, what operational symbol goes in the box?").	
NM State Benchmark II-D: Grades K-4 Analyze changes in various contexts.	
NM Grade 3 Performance Standards 1. Demonstrate how change in one variable can relate to a change in a second variable (e.g., input-output machines, data tables).	

<table>
<tr><th colspan="2">STRAND III: GEOMETRY</th></tr>
<tr><th colspan="2">NM State Content Standard III: Students will understand geometric concepts and applications.</th></tr>
<tr><td>NM State Benchmarks Grades K-4</td><td>RRPS Grade 3 Power Standards
While all benchmarks are taught, Power Standards are consistently emphasized and regularly assessed.</td></tr>
<tr><td>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.</td><td rowspan="2">Power Standard 3
(Benchmark III-C) Predict and describe the results of sliding, flipping, turning, and identify and describe the line of symmetry in two- and three-dimensional shapes.

Performance Indicators
a. Identify symmetric figures and draw lines of symmetry.
b. Students must be able to apply knowledge to solve real life situations.
c. Be able to explain and justify answers using pictures, numbers, and words (appropriate vocabulary).
d. Predict and describe the results of sliding, flipping, and turning of shapes.</td></tr>
<tr><td>NM Grade 3 Performance Standards
1. Describe and compare the attributes of plane and solid geometric figures to show relationships and solve problems:
• identify, describe, and classify polygons (e.g., pentagons, hexagons, and octagons)
• identify lines of symmetry in two-dimensional shapes
• explore attributes of quadrilaterals (e.g., parallel and perpendicular sides for the parallelogram, right angles for the rectangle, equal sides and right angles for the square)
• identify right angles
identify, describe, and classify common three-dimensional geometric objects (e.g., cube, rectangular solid, sphere, prism, pyramid, cone, cylinder)</td></tr>
<tr><td>NM State Benchmark III-B: Grade K-4
Specify locations and describe spatial relationships using coordinate geometry and other representational systems.</td><td></td></tr>
<tr><td>NM Grade 3 Performance Standards
1. Describe location and movement using common language and geometric vocabulary (e.g., directions from classroom to gym).
2. Use ordered pairs to graph, locate specific points, create paths, and measure distances within the first quadrant of *a coordinate grid system.
3. Use a two-dimensional grid system (e.g., a map) to locate positions representing actual places.</td><td></td></tr>
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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 3 Performance Standards** 1. Predict and describe the results of sliding, flipping, and turning two-dimensional shapes. 2. Identify and describe the line of symmetry in two- and three-dimensional shapes.	

NM State Benchmark III-D: Grades K-4 Use visualization, spatial reasoning, and geometric modeling to solve problems. **NM Grade 3 Performance Standards** 1. Visualize, build, and draw geometric objects. 2. Create and describe mental images of objects, patterns, and paths. 3. Recognize geometric shapes and structures (e.g., in the environment). 4. Use geometric models to solve problems in other areas of mathematics (e.g., using arrays as models of multiplication or area). 5. Identify and build three-dimensional objects from two-dimensional representations of that object. 6. Investigate two-dimensional representations of three-dimensional shapes. 7. Explore geometric ideas and relationships as they apply to other disciplines and to problems that arise in the classroom or in everyday life.	

STRAND IV: MEASUREMENT

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

NM State Benchmarks Grades K-4	**RRPS Grade 3 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. **NM Grade 3 Performance Standards** 1. Demonstrate understanding of the need for measuring with standard units and become familiar with standard units in the U.S. customary system *and the metric system**. 2. Choose and use the appropriate units and measurement tools to quantify the properties of objects (e.g., length [ruler], width [ruler], or mass [balance scale]). 3. Identify time to the nearest minute (elapsed time) and relate time to everyday events. 4. Identify and use time intervals (e.g., hours, days, weeks, months, years). 5. Identify properties (e.g., length, *perimeter**,area, weight, volume) and select the appropriate type of unit for measuring each property. 6. Demonstrate understanding that measurements are approximations, investigate differences in units and their effect on precision, and consider the degree of accuracy for different situations. 7. Explore measuring length to fractional parts.*	**Power Standard 4** **(Benchmark IV-A & B)**Recognize a 90-degree angle and use it as a strategy to estimate the size of other angles. Choose and use the appropriate units and measurement tools to quantify the properties of objects (e.g., length[ruler], width[ruler], or mass[balance]). Explore measuring length to fractional parts. Identify time to the nearest minute (elapsed time) and relate time to everyday events. **Performance Indicators** a. Tell and show times to the nearest minute. b. Measure line segments to the nearest inch and ¼ inch. c. Measure line segments to the nearest cm. e. Know units of measure for length, weight, and capacity. f. Students must be able to apply knowledge to solve real life situations. g. Be able to explain and justify answers using pictures, numbers, and words (appropriate vocabulary).
NM State Benchmark IV-B: Grades K-4 Apply appropriate techniques, tools, and formulas to determine measurements. **NM Grade 3 Performance Standards** 1. Find the area of rectangles using appropriate tools (e.g., grid paper, tiles). 2. Estimate measurements. 3. Use appropriate standard units and tools to estimate, measure, and solve problems (e.g., length, area, weight). 4. Recognize a 90-degree angle and use it as a strategy to estimate the size of other angles. 5. Compare and contrast customary with metric units of measure.*	

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

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.

NM Grade 3 Performance Standards

1. Collect and organize data using observations, measurements, surveys, or experiments.
2. Represent data using tables and graphs (e.g., line plots, bar graphs, and line graphs).
3. Conduct simple experiments by determining the number of possible outcomes and make simple predictions:
   - identify whether events are certain, likely, unlikely, or impossible
   - record the outcomes for a simple event and keep track of repetitions
   - summarize and record the results in a clear and organized way
   - use the results to predict future events

NM State Benchmark V-B: Grades K-4

Select and use appropriate statistical methods to analyze data.

NM Grade 3 Performance Standards

1. Apply and explain the uses of sampling techniques (e.g., observations, polls, tally marks) for gathering data.

NM State Benchmark V-C: Grades K-4

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

NM Grade 3 Performance Standards

1. Analyze data displayed in a variety of formats to make reasonable inferences and predictions, answer questions, and make decisions.

NM State Benchmark V-D: Grades K-4

Understand and apply basic concepts of probability

NM Grade 3 Performance Standards

1. Discuss the degree of likelihood of events and use terminology such as "certain," "likely," "unlikely".
2. Predict the outcomes of simple experiments (e.g., coin tossing) and test the predictions using concrete objects (e.g., coins, counters, number cubes, spinners).
3. Record the probability of a specific outcome for a simple probability situation (e.g., probability is three out of seven for choosing a black ball; 3/7).

RRPS Grade 3 Power Standards

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

Power Standard 6

(Benchmark V-B & D) Discuss and predict the degree of likelihood and probability of an event's outcome using terminology such as certain, likely, and unlikely. Test and record outcomes, using data collected through observations, polls, and tally marks.

Performance Indicators

a. Identify whether events are certain, likely, unlikely, or impossible.
b. Predict the outcomes of simple experiments.
c. Test predictions.
d. Be able to explain and justify answers using pictures, numbers, and words (appropriate vocabulary).