

# NEW MEXICO Grade 3 MATHEMATICS STANDARDS

## PROCESS STANDARDS

To help New Mexico students achieve the Content Standards enumerated below, teachers are encouraged to base instruction on the following Process Standards;

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| <p><b>Problem Solving</b></p> <ul style="list-style-type: none"> <li>• Build new mathematical knowledge through problem solving</li> <li>• Solve problems that arise in mathematics and other contexts</li> <li>• Apply and adapt a variety of appropriate strategies to solve problems, and</li> <li>• Monitor and reflect on the process of problem solving.</li> </ul> | <ul style="list-style-type: none"> <li>• Analyze and evaluate the mathematical thinking and strategies of others,</li> <li>• Use the language of mathematics to express mathematical ideas precisely, and</li> <li>• Describe mathematical concepts using developmentally appropriate definitions.</li> </ul>  |
| <p><b>Reasoning and Proof</b></p> <ul style="list-style-type: none"> <li>• Recognize reasoning and proof as fundamental aspects of mathematics,</li> <li>• Make and investigate mathematical conjectures,</li> <li>• Develop and evaluate mathematical arguments and proofs, and</li> <li>• Select and use various types of reasoning and methods of proof.</li> </ul>    | <p><b>Connections</b></p> <ul style="list-style-type: none"> <li>• Recognize and use connections among mathematical ideas,</li> <li>• Understand how mathematical ideas interconnect and build on one another to produce a coherent whole, and</li> <li>• Recognize and apply mathematics in contexts outside of mathematics.</li> </ul>                                       |
| <p><b>Communication</b></p> <ul style="list-style-type: none"> <li>• Organize and consolidate their thinking through communication,</li> <li>• Communicate their mathematical thinking coherently and clearly to peers, teachers, and others,</li> </ul>  | <p><b>Representation</b></p> <ul style="list-style-type: none"> <li>• Create and use representations to organize, record, and communicate mathematical ideas,</li> <li>• Select, apply, and translate among mathematical representations to solve problems, and</li> <li>• Use representations to model and interpret physical, social, and mathematical phenomena.</li> </ul> |

## CONTENT STANDARDS

**Strand: NUMBER AND OPERATIONS**

**Standard:** Students will understand numerical concepts and mathematical operations.

**K-4 Benchmark N.1:** Understand numbers, ways of representing numbers, relationships among numbers, and number systems.

**Performance Standards**

**3.N.1.1** Exhibit an understanding of the place-value structure of the base-ten number system by:

- a. reading, modeling, writing, and interpreting whole numbers up to 10,000
- b. comparing and ordering numbers up to 1,000
- c. 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

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- 3.N.1.2 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.N.1.3 Identify some representations for some numbers and generate them by decomposing and recombining numbers (e.g.,  $853 = 8 \times 100 + 5 \times 10 + 3$ ;  $85 \times 10 + 3 = 853$ ;  $853 = 900 - 50 + 3$ ).
- 3.N.1.4 Identify the relationship among commonly encountered factors and multiples (e.g., factor pairs of 12 are  $1 \times 12$ ,  $2 \times 6$ ,  $3 \times 4$ ; multiples of 12 are 12, 24, 36).
- 3.N.1.5 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).
- 3.N.1.6 Demonstrate an understanding of fractions as parts of unit wholes, parts of a collection or set, and as locations on a number line.
- 3.N.1.7 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).

## **K-4 Benchmark N.2: Understand the meaning of operations and how they relate to one another.**

### **Performance Standards**

- 3.N.2.1 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]).
- 3.N.2.2 Find the sum or difference of two whole numbers between 0 and 10,000.
- 3.N.2.3 Solve simple multiplication and division problems (e.g.,  $135 \div 5 = \square$ ).
- 3.N.2.4 Identify how the number of groups and the number of items in each group equals a product.
- 3.N.2.5 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  $12 \times 4 = 48$  [leg] units).
- 3.N.2.6 Identify and use relationship between multiplication and division (e.g., division is the inverse of multiplication) to solve problems.
- 3.N.2.7 Select and use operations (e.g., addition, multiplication, subtraction, division) to solve problems.

## **K-4 Benchmark N.3: Compute fluently and make reasonable estimates.**

### **Performance Standards**

- 3.N.3.1 Choose computational methods based on understanding the base-ten number system, properties of multiplication and division, and number relationships.
- 3.N.3.2 Use strategies (e.g.,  $6 \times 8$  is double  $3 \times 8$ ) to become fluent with the multiplication pairs up to  $10 \times 10$ .
- 3.N.3.3 Compute with basic number combinations (e.g., multiplication pairs up to  $10 \times 10$  and their division counterparts).
- 3.N.3.4 Demonstrate reasonable estimation strategies for measurement, computation, and problem solving.

# NEW MEXICO Grade 3 MATHEMATICS STANDARDS

**Strand: ALGEBRA**

**Standard:** Students will understand algebraic concepts and applications.

**K-4 Benchmark A.1: Understand patterns, relations, and functions.****Performance Standards**

- 3.A.1.1** Represent relationships of quantities in the form of mathematical expressions, equations, or inequalities.
- 3.A.1.2** Solve problems involving numeric equations.
- 3.A.1.3** Select appropriate operational and relational symbols to make an expression true (e.g., “If  $4 \square 3 = 12$ , what operational symbol goes in the box?”).
- 3.A.1.4** Use models of feet and inches to express simple unit conversions in symbolic form (e.g., 36 inches =  $\square$  feet  $\times$  12) that develop conceptual understanding versus procedural skills.
- 3.A.1.5** Recognize and use the commutative property of multiplication (e.g., if  $5 \times 7 = 35$ , then what is  $7 \times 5$ ?).
- 3.A.1.6** Create, describe, and extend numeric and geometric patterns including multiplication patterns.
- 3.A.1.7** 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)

**K-4 Benchmark A.2: Represent and analyze mathematical situations and structures using algebraic symbols.****Performance Standards**

- 3.A.2.1** Determine the value of variables in missing part problems (e.g.,  $139 + \square = 189$ ).
- 3.A.2.2** Recognize and use the commutative and associative properties of addition and multiplication (e.g., “If  $5 \times 7 = 35$ , then what is  $7 \times 5$ ? And if  $5 \times 7 \times 3 = 105$ , then what is  $7 \times 3 \times 5$ ?”).
- 3.A.2.3** Explore the ways that commutative, distributive, identity, and zero properties are useful in computing with numbers.

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**K-4 Benchmark A.3:** Use mathematical models to represent and understand quantitative relationships.

**Performance Standards**

**3.A.3.1** Model problem situations with objects and use representations such as pictures, graphs, tables, and equations to draw conclusions.

**3.A.3.2** Solve problems involving proportional relationships including unit pricing (e.g., four apples cost 80 cents; therefore, one apple costs 20 cents).

**3.A.3.3** Describe relationships of quantities in the form of mathematical expressions, equations, or inequalities.

**3.A.3.4** Select appropriate operational and relational symbols to make an expression true (e.g., "If  $4 \square 3 = 12$ , what operational symbol goes in the box?").

**K-4 Benchmark A.4:** Analyze changes in various contexts.

**Performance Standards**

**3.A.4.1** Demonstrate how change in one variable can relate to a change in a second variable (e.g., input-output machines, data tables).

# NEW MEXICO Grade 3 MATHEMATICS STANDARDS

**Strand: GEOMETRY**

**Standard:** Students will understand geometric concepts and applications.

**K-4 Benchmark G.1:** Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships.

**Performance Standards**

**3.G.1.1** Describe and compare the attributes of plane and solid geometric figures to show relationships and solve problems:

- a. identify, describe, and classify polygons (e.g., pentagons, hexagons, and octagons)
- b. identify lines of symmetry in two-dimensional shapes
- c. 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)
- d. identify right angles
- e. identify, describe, and classify common three-dimensional geometric objects (e.g., cube, rectangular solid, sphere, prism, pyramid, cone, cylinder)

**K-4 Benchmark G.2:** Specify locations and describe spatial relationships using coordinate geometry and other representational systems.

**Performance Standards**

- 3.G.2.1** Describe location and movement using common language and geometric vocabulary (e.g., directions from classroom to gym).
- 3.G.2.2** Use ordered pairs to graph, locate specific points, create paths, and measure distances within a coordinate grid system.
- 3.G.2.3** Use a two-dimensional grid system (e.g., a map) to locate positions representing actual places.

**K-4 Benchmark G.3:** Apply transformations and use symmetry to analyze mathematical situations.

**Performance Standards**

- 3.G.3.1** Predict and describe the results of sliding, flipping, and turning two-dimensional shapes.
- 3.G.3.2** Identify and describe the line of symmetry in two- and three-dimensional shapes.

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**K-4 Benchmark G.4:** Use visualization, spatial reasoning, and geometric modeling to solve problems.

## **Performance Standards**

- 3.G.4.1** Visualize, build, and draw geometric objects.
- 3.G.4.2** Create and describe mental images of objects, patterns, and paths.
- 3.G.4.3** Recognize geometric shapes and structures (e.g., in the environment).
- 3.G.4.4** Use geometric models to solve problems in other areas of mathematics (e.g., using arrays as models of multiplication or area).
- 3.G.4.5** Identify and build three-dimensional objects from two-dimensional representations of that object.
- 3.G.4.6** Investigate two-dimensional representations of three-dimensional shapes.
- 3.G.4.7** Explore geometric ideas and relationships as they apply to other disciplines and to problems that arise in the classroom or in everyday life.

## **Strand: MEASUREMENT**

**Standard:** Students will understand measurement systems and applications.

**K-4 Benchmark M.1:** Understand measurable attributes of objects and the units, systems, and process of measurement.

## **Performance Standards**

- 3.M.1.1** Demonstrate understanding of the need for measuring with standard units and become familiar with standard units in the U.S. customary system.
- 3.M.1.2** 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.M.1.3** Identify time to the nearest minute (elapsed time) and relate time to everyday events.
- 3.M.1.4** Identify and use time intervals (e.g., hours, days, weeks, months, years).
- 3.M.1.5** Identify properties (e.g., length, area, weight, volume) and select the appropriate type of unit for measuring each property.
- 3.M.1.6** Demonstrate understanding that measurements are approximations, investigate differences in units and their effect on precision, and consider the degree of accuracy for different situations.

**K-4 Benchmark M.2:** Apply appropriate techniques, tools, and formulas to determine measurements.

## **Performance Standards**

- 3.M.2.1** Find the area of rectangles using appropriate tools (e.g., grid paper, tiles).
- 3.M.2.2** Estimate measurements.
- 3.M.2.3** Use appropriate standard units and tools to estimate, measure, and solve problems (e.g., length, area, weight).
- 3.M.2.4** Recognize a 90-degree angle and use it as a strategy to estimate the size of other angles.

# NEW MEXICO Grade 3 MATHEMATICS STANDARDS

**Strand: DATA ANALYSIS AND PROBABILITY**

**Standard:** Students will understand how to formulate questions, analyze data, and determine probabilities.

**K-4 Benchmark D.1:** Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them.

**Performance Standards**

**3.D.1.1** Collect and organize data using observations, measurements, surveys, or experiments.

**3.D.1.2** Represent data using tables and graphs (e.g., line plots, bar graphs, and line graphs).

**3.D.1.3** Conduct simple experiments by determining the number of possible outcomes and make simple predictions:

- a. identify whether events are certain, likely, unlikely, or impossible
- b. record the outcomes for a simple event and keep track of repetitions
- c. summarize and record the results in a clear and organized way
- d. use the results to predict future events

**K-4 Benchmark D.2:** Select and use appropriate statistical methods to analyze data.

**Performance Standards**

**3.D.2.1** Apply and explain the uses of sampling techniques (e.g., observations, polls, tally marks) for gathering data.

**K-4 Benchmark D.3:** Develop and evaluate inferences and predictions that are based on data.

**Performance Standards**

**3.D.3.1** Analyze data displayed in a variety of formats to make reasonable inferences and predictions, answer questions, and make decisions.

**K-4 Benchmark D.4:** Understand and apply basic concepts of probability.

**Performance Standards**

**3.D.4.1** Discuss the degree of likelihood of events and use terminology such as “certain,” “likely,” “unlikely”.

**3.D.4.2** 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.D.4.3** 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;  $3/7$ ).