

# NEW MEXICO Grade 5 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;

<b>Problem Solving</b> <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>
<b>Reasoning and Proof</b> <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>	<b>Connections</b> <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>
<b>Communication</b> <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>	<b>Representation</b> <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.

**5-8 Benchmark N.1:** Understand numbers, ways of representing numbers, relationships among numbers, and number systems.

### **Performance Standards**

- 5.N.1.1** Compare and order using concrete or illustrated models:
- a. whole numbers (to millions)
  - b. common fractions (halves, thirds, fourths, eighths)
  - c. decimals (thousandths)

# NEW MEXICO Grade 5 MATHEMATICS STANDARDS

- 5.N.1.2 Demonstrate understanding of the magnitude of the value of numbers from thousandths to millions, including common fractions.
- 5.N.1.3 Represent place value using concrete or illustrated models up to one billion (1,000,000,000).
- 5.N.1.4 Interpret percents as part of a hundred (i.e., find decimal and percent equivalents for common fractions, explain how they represent the same value, and compute a given percent of a whole number).
- 5.N.1.5 Identify and represent on a number line decimals, fractions, and mixed numbers.
- 5.N.1.6 Identify prime and composite numbers to 50.

## **5-8 Benchmark N.2: Understand the meaning of operations and how they relate to one another.**

### **Performance Standards**

- 5.N.2.1 Explain and perform whole number division and express remainders as a whole number or a fractional part as appropriate to the context of real-life problems.
- 5.N.2.2 Add and subtract decimals.
- 5.N.2.3 Add and subtract fractions and mixed numbers without regrouping and express answers in simplest form.
- 5.N.2.4 Find the factors and multiples of whole numbers.
- 5.N.2.5 Use arithmetic operations and inverse relationships to represent and solve real-world problems.
- 5.N.2.6 Identify and represent on a number line decimals, fractions, and mixed numbers.
- 5.N.2.7 Demonstrate proficiency with division, including one- and two-digit divisors.
- 5.N.2.8 Solve simple problems involving the addition and subtraction of fractions and mixed numbers.
- 5.N.2.9 Represent and use fractions and decimals in equivalent forms.

## **5-8 Benchmark N.3: Compute fluently and make reasonable estimates.**

### **Performance Standards**

- 5.N.3.1 Add, subtract, multiply, and divide whole numbers.
- 5.N.3.2 Add and subtract decimals.
- 5.N.3.3 Use estimation strategies to verify the reasonableness of calculated results.
- 5.N.3.4 Explain how the estimation strategy impacts the result.
- 5.N.3.5 Relate the basic arithmetic operations to one another (e.g., multiplication and division are inverse operations).
- 5.N.3.6 Simplify numerical expressions using order of operations.
- 5.N.3.7 Recognize and explain the differences between exact and approximate values.

# NEW MEXICO Grade 5 MATHEMATICS STANDARDS

**Strand: ALGEBRA**

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

**5-8 Benchmark A.1: Understand patterns, relations, and functions.****Performance Standards**

**5.A.1.1** Identify and graph ordered pairs in the first quadrant of the coordinate plane.

**5.A.1.2** Describe, represent, and analyze patterns and relationships.

**5.A.1.3** Identify, describe, and continue patterns presented in a variety of formats (e.g., numeric, visual, oral, written, kinesthetic, pictorial).

**5.A.1.4** Generate a pattern using a written description.

**5-8 Benchmark A.2: Represent and analyze mathematical situations and structures using algebraic symbols.****Performance Standards**

**5.A.2.1** Compute the value of the expression for specific numerical values of the variable.

**5.A.2.2** Use a letter to represent an unknown number.

**5.A.2.3** Understand the differences between the symbols for “less than”, “less than or equal to”, “greater than”, and “greater than or equal to”.

**5-8 Benchmark A.3: Use mathematical models to represent and understand quantitative relationships.****Performance Standards**

**5.A.3.1** Use mathematical models to represent and explain mathematical concepts and procedures.

**5.A.3.2** Understand and use mathematical models such as:

- a. the number line to model the relationship between rational numbers and rational number operations
- b. pictorial representation of addition and subtraction of rational numbers with regrouping
- c. manipulatives or pictures to model computational procedures
- d. graphs, tables, and charts to describe data
- e. diagrams or pictures to model problem situations

**5.A.3.3** Demonstrate how a situation can be represented in more than one way.

**5-8 Benchmark A.4: Analyze changes in various contexts.****Performance Standards**

**5.A.4.1** Recognize and create patterns of change from everyday life using numerical or pictorial representations.

**5.A.4.2** Generalize patterns of change and recognize the same general patterns presented in different representations.

# NEW MEXICO Grade 5 MATHEMATICS STANDARDS

**Strand: GEOMETRY**

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

**5-8 Benchmark G.1:** Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematics arguments about geometric relationships.

**Performance Standards**

**5.G.1.1** Identify, describe, and classify two-dimensional shapes and three-dimensional figures by their properties.

**5.G.1.2** Recognize and describe properties of regular polygons having up to ten sides.

**5.G.1.3** Identify faces, edges, and bases on three-dimensional objects.

**5-8 Benchmark G.2:** Specify locations and describe spatial relationships using coordinate geometry and other representational systems.

**Performance Standards**

**5.G.2.1** Recognize perpendicular and parallel lines.

**5-8 Benchmark G.3:** Apply transformations and use symmetry to analyze mathematical situations.

**Performance Standards**

**5.G.3.1** Identify line of symmetry in simple geometric figures.

**5-8 Benchmark G.4:** Use visualization, spatial reasoning, and geometric modeling to solve problems.

**Performance Standards**

**5.G.4.1** Understand and compute the perimeter of regular polygons.

**5.G.4.2** Identify and explain circumference, radius, and diameter.

# NEW MEXICO Grade 5 MATHEMATICS STANDARDS

**Strand: MEASUREMENT**

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

**5-8 Benchmark M.1:** Understand measurable attributes of objects and the units, systems, and processes of measurement.

**Performance Standards**

- 5.M.1.1** Understand properties (e.g., length, area, weight, volume) and select the appropriate type of unit for measuring each using both U.S. customary and metric systems.
- 5.M.1.2** Select and use appropriate units and tools to measure according to the degree of accuracy required in a particular problem-solving situation.
- 5.M.1.3** Solve problems involving linear measurement, weight, and capacity (e.g., measuring to the nearest sixteenth of an inch or nearest millimeter; using ounces, milliliters, or pounds and kilograms) to the appropriate degree of accuracy.
- 5.M.1.4** Perform one-step conversions within a system of measurement (e.g., inches to feet, centimeters to meters).

**5-8 Benchmark M.2:** Apply appropriate techniques, tools, and formulas to determine measurements.

**Performance Standards**

- 5.M.2.1** Solve measurement problems using appropriate tools involving length, perimeter, weight, capacity, time, and temperature.
- 5.M.2.2** Select and use strategies to estimate measurements including length, distance, capacity, and time.
- 5.M.2.3** Apply strategies and use tools for estimating and measuring the perimeter of regular and irregular shapes.

# NEW MEXICO Grade 5 MATHEMATICS STANDARDS

**Strand: DATA ANALYSIS AND PROBABILITY**

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

**5-8 Benchmark D.1:** Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them.

**Performance Standards**

**5.D.1.1** Construct, read, analyze, and interpret tables, charts, graphs, and data plots.

**5.D.1.2** Construct, interpret, and analyze data from graphical representations and draw simple conclusions using bar graphs, line graphs, circle graphs, frequency tables, and Venn diagrams.

**5.D.1.3** Display, analyze, compare, and interpret different data sets, including data sets of different sizes.

**5.D.1.4** Organize and display single-variable data in appropriate graphs and representations.

**5.D.1.5** Organize, read, and display numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including correct titles, labels, and intervals or categories including:

- a. frequency tables
- b. stem and leaf plots
- c. bar, line, and circle graphs
- d. Venn diagrams
- e. pictorial displays
- f. charts and tables

**5.D.1.6** Formulate questions and identify data to be collected to correctly answer a question.

**5-8 Benchmark D.2:** Select and use appropriate statistical methods to analyze data.

**Performance Standards**

**5.D.2.1** Organize and display single-variable data in appropriate graphs and representations and determine which types of graphs are appropriate for various data sets.

**5.D.2.2** Use fractions and percentages to compare data sets of different sizes.

**5.D.2.3** Correctly rank the values of a numerical data set containing simple fractions and decimals, identify maximum and minimum data values, and calculate the range for a data set.

# NEW MEXICO Grade 5 MATHEMATICS STANDARDS

**5-8 Benchmark D.3:** Develop and evaluate inferences and predictions that are based on data.

**Performance Standards**

- 5.D.3.1 Make and justify valid inferences, predictions, and arguments based on statistical analysis.
- 5.D.3.2 Compare a given prediction with the results of an investigation.
- 5.D.3.3 Use counting strategies to determine all the possible outcomes of a particular familiar event.
- 5.D.3.4 Find all possible outcome sets involving four or more sets of objects.
- 5.D.3.5 Evaluate the reasonableness of inferences that are based on data in the context of the original solution.
- 5.D.3.6 Identify the method used to make an inference and/or a prediction on a given data set and solve similar problems.
- 5.D.3.7 Determine the accuracy of a prediction or an inference based on the accuracy of the data in a given data set.
- 5.D.3.8 List all possible outcomes of simple events.

**5-8 Benchmark D.4:** Understand and apply basic concepts of probability.

**Performance Standards**

- 5.D.4.1 Determine probabilities through experiments and/or simulations and compare the results with mathematical expressions.
- 5.D.4.2 Make predictions from the results of student-generated experiments of single events.
- 5.D.4.3 Identify simple experiments where the probabilities of all outcomes are equal.
- 5.D.4.4 Describe and predict the results of a probability experiment.
- 5.D.4.5 Use fractions to describe the results of an experiment.
- 5.D.4.6 Use probability to generalize from a simple pattern or set of examples and justify why the generalization is reasonable.