

NEW MEXICO Grade 6 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:

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

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

6.N.1.1 Compare and order rational numbers.

6.N.1.2 Use equivalent representations for rational numbers (e.g., integers, decimals, fractions, percents, ratios, numbers with whole-number exponents).

6.N.1.3 Use appropriate representations of positive rational numbers in the context of real-life applications.

NEW MEXICO Grade 6 MATHEMATICS STANDARDS

6.N.1.4 Identify greatest common factor and least common multiples for a set of whole numbers.

6.N.1.5 Identify and represent on a number line decimals, fractions, mixed numbers, and positive and negative integers.

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

Performance Standards

6.N.2.1 Calculate multiplication and division problems using contextual situations.

6.N.2.2 Factor a whole number into a product of its primes.

6.N.2.3 Demonstrate the relationship and equivalency among ratios and percents.

6.N.2.4 Use proportions to solve problems.

6.N.2.5 Explain and perform:

- a. whole number division and express remainders as decimals or appropriately in the context of the problem
- b. addition, subtraction, multiplication, and division with decimals
- c. addition and subtraction with integers
- d. addition, subtraction, and multiplication with fractions and mixed numerals

6.N.2.6 Determine the least common multiple and the greatest common divisor of whole numbers and use them to solve problems with fractions.

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

Performance Standards

6.N.3.1 Estimate quantities involving rational numbers using various estimations.

6.N.3.2 Use estimates to check reasonableness of results and make predictions in situations involving rational numbers.

6.N.3.3 Determine if a problem situation calls for an exact or approximate answer and perform the appropriate computation.

6.N.3.4 Compare and order positive and negative fractions, decimals, and mixed numbers and place them on a number line.

6.N.3.5 Convert fractions to decimals and percents and use these representations in estimations, computations, and applications.

6.N.3.6 Interpret and use ratios in different contexts.

6.N.3.7 Compute and perform multiplication and division of fractions and decimals and apply these procedures to solving problems.

NEW MEXICO Grade 6 MATHEMATICS STANDARDS

Strand: ALGEBRA

Standard: Students will understand algebraic concepts and applications.

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

- 6.A.1.1 Solve problems involving proportional relationships.
- 6.A.1.2 Graph ordered pairs in the coordinate plane.
- 6.A.1.3 Explain and use symbols to represent unknown quantities and variable relationships.
- 6.A.1.4 Explain and use the relationships among ratios, proportions, and percents.
- 6.A.1.5 Make generalizations based on observed patterns and relationships.

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

- 6.A.2.1 Solve problems involving proportional relationships.
- 6.A.2.2 Use letters to represent an unknown in an equation.
- 6.A.2.3 Solve one-step linear equations and inequalities in one variable with positive whole-number solutions.
- 6.A.2.4 Demonstrate that a variable can represent a single quantity that changes.
- 6.A.2.5 Demonstrate how changes in one variable affect other variables.

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

- 6.A.3.1 Develop and use mathematical models to represent and justify mathematical relationships found in a variety of situations.
- 6.A.3.2 Create, explain, and use mathematical models such as:
 - a. Venn diagrams to show the relationships between the characteristics of two or more sets
 - b. equations and inequalities to model numerical relationships
 - c. three-dimensional geometric models
 - d. graphs, tables, and charts to interpret and analyze data

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

- 6.A.4.1 Represent and explain changes using one-step equations with one variable.
- 6.A.4.2 Solve problems that involve change using proportional relationships.
- 6.A.4.3 Use ratios to predict changes in proportional situations.
- 6.A.4.4 Use tables and symbols to represent and describe proportional and other relationships involving conversions, sequences, and perimeter.
- 6.A.4.5 Generate formulas to represent relationships involving changes in perimeter.

NEW MEXICO Grade 6 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

- 6.G.1.1** Identify, describe, and classify the properties of, and the relationships between, plane and solid geometric figures:
- measure, identify, and draw angles, perpendicular and parallel lines, rectangles, and triangles by using appropriate tools (e.g., straightedge, ruler, compass, protractor, drawing software)
 - understand that the sum of angles of any triangle is 180 degrees and the sum of the angles of any quadrilateral is 360 degrees and use this information to solve problems
 - visualize and draw two-dimensional views of three-dimensional objects made from rectangular solids
- 6.G.1.2** Classify angles as right, obtuse, or straight.
- 6.G.1.3** Describe the properties of geometric figures that include regular polygons, circles, ellipses, cylinders, cones, spheres, and cubes.
- 6.G.1.4** Classify polygons as regular or irregular.
- 6.G.1.5** Classify triangles as scalene, isosceles, or equilateral and by angles (i.e., right, acute, and obtuse).
- 6.G.1.6** Identify angle, line, segment, and ray and use the symbols for each.
- 6.G.1.7** Describe the relationship between radius, diameter, and circumference of a circle.

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

Performance Standards

- 6.G.2.1** Use coordinate geometry to describe location on a plane.
- 6.G.2.2** Recognize skewed lines in space.

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

Performance Standards

- 6.G.3.1** Identify line of symmetry with rotation and scaling.

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

Performance Standards

- 6.G.4.1** Use appropriate technology, manipulatives, constructions, or drawings to recognize or compare geometric figures.

NEW MEXICO Grade 6 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**

- 6.M.1.1** Perform multi-step conversions of measurement units to equivalent units within a given system (e.g., 36 inches equals 3 feet or 1 yard).
- 6.M.1.2** Estimate measurement in both U.S. customary and metric units.
- 6.M.1.3** Select and use units of appropriate size and type to measure angles (e.g., degrees, radians), perimeter, area, and capacity in both U.S. customary and metric systems.
- 6.M.1.4** Use standard units of linear measurement to the nearest sixteenth of an inch; metric measurements to the nearest millimeter.

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

- 6.M.2.1** Apply various measurement techniques and tools, units of measure, and degrees of accuracy to find accurate rational number representations for length, liquid, weight, perimeter, temperature, and time.
- 6.M.2.2** Select and use formulas for perimeters of squares and rectangles.
- 6.M.2.3** Select and use strategies to estimate measurements including angle measure and capacity.
- 6.M.2.4** Select and justify the selection of measurement tools, units of measure, and degrees of accuracy appropriate to the given situation.

NEW MEXICO Grade 6 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

- 6.D.1.1 Use statistical representations to analyze data.
- 6.D.1.2 Draw and compare different graphical representations of the same data.
- 6.D.1.3 Use mean, median, mode, and range to describe data.
- 6.D.1.4 Sketch circle graphs to display data.
- 6.D.1.5 Solve problems by collecting, organizing, displaying and interpreting data.
- 6.D.1.6 Compare different samples of a population with the entire population and determine the appropriateness of using a sample.
- 6.D.1.7 Conduct and explain sampling techniques such as observations, surveys, and random sampling for gathering data.
- 6.D.1.8 Determine the median for a rational number data set containing an odd number of data points.
- 6.D.1.9 Calculate and explain the median for a whole number data set containing an even number of data points.
- 6.D.1.10 Explain advantages and disadvantages of using various display formats for a specific data set.
- 6.D.1.11 Formulate and solve problems by collecting, organizing, displaying, and interpreting data.

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

Performance Standards

- 6.D.2.1 Choose an appropriate graphical format to organize and represent data.
- 6.D.2.2 Describe the effects of missing or incorrect data.
- 6.D.2.3 Compute and analyze statistical measurements for data sets:
 - a. understand how additional data added to data sets may affect the computations of central tendency
 - b. understand how the inclusion or exclusion of outliers affects measures of central tendency
 - c. know why a specific measure of central tendency provides the most useful information in a given context
- 6.D.2.4 Use data samples of a population and describe the characteristics and limitations of the sample.
- 6.D.2.5 Identify different ways of selecting a sample (e.g., convenience sampling, responses to a survey, random sampling) and which method makes a sample more representative for a population.
- 6.D.2.6 Explain how the way a question is asked in a survey might influence the results obtained.
- 6.D.2.7 Identify data that represent sampling errors and explain why the sample and the display might be biased.
- 6.D.2.8 Identify claims based on statistical data and, in sample cases, evaluate the validity and usefulness of the claims.

NEW MEXICO Grade 6 MATHEMATICS STANDARDS

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

Performance Standards

- 6.D.3.1** Identify claims based on statistical data and evaluate the validity of the claim
- 6.D.3.2** Conduct observations, surveys, experiments and/or simulations, record the results in charts, tables, or graphs, and use the results to draw conclusions and make predictions.
- 6.D.3.3** Find all possible combinations in a given set (e.g., the number of ways a set of books can be arranged on a shelf).
- 6.D.3.4** Compare expected results with actual results in a simple experiment.

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

Performance Standards

- 6.D.4.1** List all possible outcomes for a compound event composed of two independent events and recognize whether an outcome is certain, impossible, likely, or unlikely.
- 6.D.4.2** Determine and compare experimental (empirical) and mathematical (theoretical) probabilities (e.g., flipping two color counters).
- 6.D.4.3** Determine theoretical and experimental probabilities and use them to make predictions about events.
- 6.D.4.4** Represent all possible outcomes for compound events in an organized way (e.g., tables, grids, tree diagrams) and express the theoretical probability of each outcome.
- 6.D.4.5** Use data to estimate the probability of future events (e.g., batting averages).
- 6.D.4.6** Represent probabilities as ratios, proportions, decimals between 0 and 1, and percentages between 0 and 100 and verify that the probabilities computed are reasonable; know that if P is the probability of an event, $1 - P$ is the probability of the event not occurring.
- 6.D.4.7** Describe the difference between independent and dependent events and identify situations involving independent or dependent events.