

GLENCOE CORRELATION

Pre-Algebra: An Integrated Transition to Algebra & Geometry

NEW MEXICO

Mathematics Performance Standards

Grades 5-8

STANDARDS	LESSON REFERENCES
CONTENT STANDARD 1: UNIFYING CONCEPTS AND PROCESSES STUDENTS WILL UNDERSTAND AND USE MATHEMATICS IN PROBLEM SOLVING	
A. <i>Differentiate among problem-solving approaches to investigate and understand mathematical content.</i>	
1. Use a variety of reasoning processes to investigate and understand the mathematical content of given problems, and explain which strategies are more efficient than others for certain types of problems. This can be demonstrated by: <ul style="list-style-type: none"> • choosing an appropriate method to investigate a problem, 	3-1, 5-8, 7-1
<ul style="list-style-type: none"> • describing the process of mathematical thinking through oral and written presentation, and 	2-6, 3-1, 5-8
<ul style="list-style-type: none"> • determining the reasonableness of the solution. 	3-1, 5-8, 7-1
B. <i>Formulate problems from community mathematical situations.</i>	
1. Find examples of numerical and geometric concepts to interpret the environment and culture of their community or state.	5-9, 6-8
2. Describe each example in a variety of ways (e.g., orally, in writing, in pictures, in graphs and tables, with concrete materials and/or algebraic notation).	1-8
3. Conduct an investigation or project that applies mathematics to assist in solving a community-based situation.	4-9
C. <i>Develop and apply strategies to solve a wide variety of problems with an emphasis on multi-step and non-routine problems.</i>	
1. Classify each of a set of problems as single- or multi-step, and organize the information given in each problem in list, table, or graph form as a strategy for solving the problem.	3-1, 4-4, 5-8, 10-8, 12-4
D. <i>Verify and interpret results with respect to the original problem situation.</i>	
1. Check to see that the solution of a problem is reasonable, and demonstrate why it is reasonable through models and/or manipulatives.	3-1, 4-4, 5-8, 10-8, 12-4

STANDARDS	LESSON REFERENCES
E. Use manipulatives, calculators, computers, and other tools, as appropriate, in order to strengthen mathematical thinking, understanding, and power to build upon foundational concepts.	
1. Use appropriate tools (e.g., manipulatives, calculators, and computers) to observe and explore mathematical properties and relationships from numeric, algebraic, and geometric perspectives.	1-2, 2-4, 2-6, 3-2, 4-8, 4-9, 5-3, 5-9, 6-2, 6-5, 7-1, 7-5
F. Generalize solutions and strategies to new problem situations.	
1. Adapt previously used solutions and strategies to new problem situations by using pictures and physical models.	1-4, 2-8, 3-5, 7-6, 9-7, 11-7
2. Adapt previously used solutions and strategies to new problem situations by making conjectures, gathering evidence, and building an argument to support mathematical concepts.	3-6, 4-4, 5-8, 10-8
CONTENT STANDARD 2: UNIFYING CONCEPTS AND PROCESSES STUDENTS WILL UNDERSTAND AND USE MATHEMATICS IN COMMUNICATION	
A. Interpret and explain personal and mathematical thinking to make conjectures and convincing arguments.	
1. Use language to communicate mathematical ideas.	1-2, 1-3, 1-4, 1-6, 2-5, 3-8, 4-2
2. Reach agreement about word meanings and recognize the importance of commonly shared definitions.	1-1, 1-6, 2-1, 3-1, 4-1, 5-1, 6-1, 7-1, 9-1
3. Write about mathematical ideas in journals.	2-3, 5-9, 8-7, 10-6
B. Use drawings, discussion, reading, writing, and listening to access, learn, and communicate mathematical ideas.	
1. Through discussion and writing, explore deeper understanding of concepts and principles.	1-2, 1-3, 1-4, 1-6, 2-5, 3-8, 4-2
C. Create and use a variety of media and methods to communicate mathematical concepts, thoughts, and problem solutions including charts, slides, graphs, maps, drawings, pictures, sound recordings, video, e-mail, and others.	
1. Use current technology to explore concepts, make conjectures, validate solutions, and convince other people.	1-2, 2-4, 2-6, 3-2, 4-8, 4-9, 5-3, 7-1
D. Represent mathematical ideas through the use of learning tools such as manipulatives, calculators, and computers.	
1. Use calculators and computers to compute rapidly and to graph relationships instantly.	8-3
2. Using calculators, systematically change one variable and observe what happens to a related variable.	4-9, 6-2, 6-5, 7-1, 7-5, 8-8, 9-3, 10-2

STANDARDS	LESSON REFERENCES
E. Describe the value of mathematical notation and its role in the development of mathematical ideas.	
1. Explain the interaction of mathematics with other school subjects.	1-10, 2-5, 4-1, 4-9, 5-1, 9-8, 11-6, 13-2
2. Integrate math into situations which give its symbols and processes practical meaning.	2-2, 3-4, 4-2, 4-8
CONTENT STANDARD 3: UNIFYING CONCEPTS AND PROCESSES STUDENTS WILL UNDERSTAND AND USE MATHEMATICS IN REASONING	
A. Identify and apply deductive and inductive reasoning to mathematical problems.	
1. Describe objects or processes accurately.	5-8
2. Elaborate on their properties, similarities, differences, and relationships.	5-8
B. Use a variety of reasoning processes to explain mathematical thinking and to solve problems.	
1. With a triangle, “tile” a plane using copies of the triangle to determine characteristics of other triangles.	11-5
C. Verify results to justify and validate thinking.	
1. Give counter-examples to show why certain solutions may not work.	3-1, 4-4, 5-8, 10-8
2. Solve problems using proportional reasoning.	9-1, 9-4, 11-6
D. Construct and evaluate mathematical arguments and conjectures.	
1. Given a mathematical solution, determine its reasonableness.	3-1, 5-2, 5-8, 6-2, 9-8
CONTENT STANDARD 4: UNIFYING CONCEPTS AND PROCESSES STUDENTS WILL UNDERSTAND AND USE MATHEMATICAL CONNECTIONS	
A. Use mathematical processes and concepts to summarize complex ideas.	
1. Use statistics to make conclusions about problems of social equity.	8-2, 9-4
2. Use perspective, proportion, and golden ratio in art and design.	9-1, 11-9
B. Describe how mathematics is integrated throughout the school and surrounding environment.	
1. Discuss examples of mathematical connections to other content areas.	1-10, 2-5, 4-1, 4-9, 5-1, 9-8, 13-2
2. Use statistics to explain connections between school and community.	12-4
C. Use mathematical foundations as a basis for more complex mathematics.	
1. Develop a knowledge of surface area in order to understand fractions and proportions.	12-5, 12-6

STANDARDS	LESSON REFERENCES
2. Explore the relationships among counting, multiplication, and exponents.	4-2, 14-1, 14-4
D. Apply mathematical thinking and modeling to solve problems in other curriculum areas such as employability, health education, social studies, visual and performing arts, physical education, language arts, and science.	
1. Study maps to learn about scaling and its relationship to similarity, ratio, and proportion.	12-8
E. Describe the role of mathematics in our culture and society.	
1. Use connected mathematics problems in probability and statistics (e.g., handshake problem) to extend discussion to the world around them.	10-1, 10-2, 10-5, 10-6, 10-7
CONTENT STANDARD 5: NUMBER AND OPERATION CONCEPTS STUDENTS WILL UNDERSTAND AND USE NUMBERS AND NUMBER RELATIONSHIPS	
A. Represent and use numbers in a variety of equivalent forms including integers, fractions, decimals, percents, exponents, and scientific notation.	
1. Translate among equivalent forms of numbers including integers, fractions, decimals, percents, exponents, and scientific notation as appropriate for a given situation.	5-1, 6-1, 6-9, 9-7, 9-9, 9-10
B. Expand number sense to include integers and rational numbers.	
1. Use pictures, physical objects, calculators, and computers to illustrate and explore examples of integers and rational numbers in real-world situations.	2-2, 6-1, 6-3, 6-4, 9-7, 9-8
C. Apply the relationships among fractions, decimals, and percents, to ratio and proportion.	
1. Investigate and describe examples of percents, ratios, and proportions in problem-based situations.	4-6, 9-1, 9-4, 9-5, 11-6
D. Represent numerical relationships in one- and two-dimensional graphs.	
1. Explore one- and two-dimensional graphs of actual situations and describe the numerical relationships they illustrate.	1-10, 5-7, 8-1, 8-3, 8-5, 8-6
CONTENT STANDARD 6: NUMBER AND OPERATION CONCEPTS STUDENTS WILL UNDERSTAND AND USE NUMBER SYSTEMS AND NUMBER THEORY	
A. Explain why other sets of numbers are needed in addition to whole numbers.	
1. Identify and describe examples of fractions, decimals, integers, and rational numbers in problem-based situations.	2-4, 2-5, 5-3, 5-4, 5-5, 6-3
B. Use order relations for whole numbers, fractions, decimals, integers, and rational numbers.	
1. Order and compare whole numbers, fractions, decimals, integers, and rational numbers.	2-3, 5-1, 6-1

STANDARDS	LESSON REFERENCES
2. Describe the effects of operations on the size and order of numbers.	1-2, 4-2
C. <i>Extend basic arithmetic operations to fractions, decimals, integers, and rational numbers and demonstrate the relationships among them.</i>	
1. Apply the computation of fractions, decimals, integers, and rational numbers.	2-4, 2-5, 2-7, 2-8, 5-3, 6-3, 6-4, 6-5
2. Express composite numbers as the product of the prime factors.	4-4
3. Find and describe examples of proportions.	9-4, 9-5, 11-6, 11-7
D. <i>Apply number theory concepts such as primes, factors, and multiples in mathematical problem situations inside and outside the school environment.</i>	
1. Use a number line to illustrate and represent relationships of prime and composite numbers.	4-4
CONTENT STANDARD 7: NUMBER AND OPERATION CONCEPTS STUDENTS WILL UNDERSTAND AND USE COMPUTATION AND ESTIMATION	
A. <i>Solve problems through computation with whole numbers, fractions, decimals, rational and irrational numbers.</i>	
1. Use a variety of computational methods to show proficiency in addition, subtraction, multiplication, and division of fractions, decimals, integers, and rational numbers.	2-4, 2-5, 2-7, 2-8, 5-3, 6-3, 6-4, 6-5
B. <i>Develop, analyze, and explain methods for solving problems.</i>	
1. Use a variety of processes to investigate and understand the mathematical content of given problems, and explain which strategies are more efficient.	1-1, 1-2, 2-6, 3-1, 4-3, 4-4, 5-2, 8-5, 9-2, 9-8
C. <i>Select and use an appropriate method for computing from various processes including mental arithmetic, paper and pencil, calculators, and technology.</i>	
1. Select an appropriate strategy from various computational methods.	1-1, 1-2, 5-2, 5-3, 5-4, 5-5, 6-3, 6-4, 6-5, 9-8
2. Use estimation as a first step in all calculations, especially when using calculators.	1-1, 5-2, 5-3, 6-2
D. <i>Use computation, estimation, and proportions to solve problems.</i>	
1. Compute, estimate, and solve proportional problems.	9-4, 9-5, 11-6
2. Make and read scale drawings.	9-4, 11-7
E. <i>Develop, analyze, and explain procedures for computation and techniques for estimation.</i>	
1. Apply and explain various estimation techniques, such as rounding and comparison, when computing fractions and decimals.	5-2, 6-2, 9-8
2. Use and explain proportional reasoning to solve problems.	9-4, 11-6, 11-7

STANDARDS	LESSON REFERENCES
3. Apply computation in probability and geometry.	10-6, 10-8, 10-9, 10-10, 12-1, 12-2, 13-7, 12-8, 13-4
F. Use estimates to check the reasonableness of results.	
1. Estimate the sum, difference, product, and quotient when computing with fractions, decimals, and integers in order to check the reasonableness of solutions.	5-2, 5-3, 5-4, 5-5, 6-2, 6-3, 6-4, 6-5, 9-8
2. Question accuracy of results when using calculators and when measuring.	5-2, 5-3
CONTENT STANDARD 8: GEOMETRY AND MEASUREMENT CONCEPTS STUDENTS WILL HAVE A FOUNDATION IN GEOMETRIC CONCEPTS	
A. Identify, describe, compare, and classify geometric figures.	
1. Describe relationships among geometric figures in terms of congruence, similarity, or parallel sides.	11-5, 11-6, 11-7
B. Explore transformations of geometric figures.	
1. Demonstrate, using objects or illustrations, the effects of flips, turns, slides, and enlargements.	11-9
C. Visualize and represent geometric figures with special attention to developing spatial sense.	
1. Demonstrate the geometric concepts of symmetry, reflection, congruency, parallelism, and perpendicularity.	11-1, 11-3, 11-5, 11-9
2. Transfer from three-dimensional to two-dimensional representations and vice versa, using model building, paper folding, and other activities.	12-5, 12-6, 12-7, 12-8
3. Measure and construct angles and other geometric figures.	11-1
D. Represent and solve problems using geometric models.	
1. Estimate and then calculate circumference, volume, and surface area.	7-4, 12-5, 12-6, 12-7, 12-8
E. Apply geometric properties and relationships to the world.	
1. Use similar triangles to determine the distance across a street, stream, or canyon.	11-6
F. Use geometry as a means of describing the physical world.	
1. Investigate geometric patterns, including painted stripe patterns, wall paper patterns, and fractals, to describe attributes such as symmetry and proportion.	11-9
CONTENT STANDARD 9: GEOMETRY AND MEASUREMENT CONCEPTS STUDENTS WILL UNDERSTAND AND USE MEASUREMENT	
A. Define the characteristics of perimeter, area, volume, angle measure, capacity, weight, and mass.	
1. Given a shoe box and lid, measure the perimeter, area, and angles of the lid and the volume, weight, and mass of the box.	3-5, 4-2, 7-8, 12-5, 12-7

STANDARDS	LESSON REFERENCES
B. <i>Select the appropriate units and tools to measure to the degree of accuracy required in particular problems.</i>	
1. Given a list of measurements, identify the appropriate units for each defined example.	7-8
C. <i>Estimate, make, and use measurements to describe and compare.</i>	
1. Construct a three-inch cube of paper and estimate how many cubes would be needed to completely fill the classroom.	12-7
2. Predict the results of combining, subdividing, and changing shapes.	11-9
D. <i>Use formulas and procedures for determining measures to solve problems.</i>	
1. Apply formulas to solve the following: in a square garden plot of 100 square feet, how long are the rows?	3-5, 12-3, 13-1
2. Use the Pythagorean relationship to solve problems.	13-4
E. <i>Describe the structure and use of different systems of measurement.</i>	
1. Convert measurement units within the U.S. customary system and the metric system.	7-8
CONTENT STANDARD 10: STATISTICS AND PROBABILITY CONCEPTS STUDENTS WILL UNDERSTAND AND USE STATISTICS	
A. <i>Collect, organize, and describe data systematically.</i>	
1. Survey the class for the total number of shoes in their households, organize the data by shoe type, and display the results in a chart or graph.	1-10, 10-3
B. <i>Construct, read, and interpret tables, charts, and graphs.</i>	
1. Analyze data sets with respect to frequency and distribution.	1-10, 2-3
2. Describe measures of central tendency and dispersion in actual data sets.	1-10, 6-6, 8-2, 10-1
C. <i>Make inferences and convincing arguments based on data analysis.</i>	
1. Using the data collected in Performance Standard 10A, determine whether casual shoes or dress shoes are preferred.	1-10, 10-3
D. <i>Evaluate arguments that are based on data analysis.</i>	
1. Support the inference in Performance Standard 10C using the data collected.	10-3
E. <i>Show how statistical methods are an important and powerful means for making decisions.</i>	
1. Identify valid and invalid uses of statistics.	1-10, 8-2, 10-1, 10-3, 10-4

STANDARDS	LESSON REFERENCES
CONTENT STANDARD 11: STATISTICS AND PROBABILITY CONCEPTS STUDENTS WILL UNDERSTAND AND USE PROBABILITY	
A. <i>Model situations by devising and carrying out experiments or simulations to determine probabilities.</i>	
1. Model the following problem using two groups of colored tiles in a paper bag: There are six blue and six white socks in a drawer. Without looking at the socks, how many would you have to pick to be sure that you had at least one of each color?	10-8, 10-9, 10-10
B. <i>Use probability models to compare experimental results to mathematical expectations.</i>	
1. Use a spinner twenty times and record the results. Compare the results to mathematical probability.	10-8, 10-9, 10-10
C. <i>Interpret probability ratios as percents and decimals.</i>	
1. Express the results from Performance Standard 11B as a percent and as a decimal.	10-8, 10-9, 10-10
D. <i>Make predictions that are based on experimental or theoretical probabilities.</i>	
1. Predict the result of a series of trials once the probability for one trial is known.	10-5, 10-6
2. Use a variety of counting techniques such as trees, permutations, and combinations to determine the number of ways an event can occur.	10-5, 10-6
E. <i>Identify multiple uses for probability inside and outside the school environment.</i>	
1. Determine the probability of a correct answer from a blind guess on a multiple choice test with five possible answers.	9-3, 10-8
CONTENT STANDARD 12: FUNCTIONS AND ALGEBRA CONCEPTS STUDENTS WILL UNDERSTAND AND USE PATTERNS AND FUNCTIONS	
A. <i>Describe, extend, analyze, and create a wide variety of patterns.</i>	
1. Given the first six Fibonacci numbers, describe the pattern, and extend it to the next number.	2-6
2. Create similar patterns.	2-6
B. <i>Describe and represent relationships with tables, graphs, and rules.</i>	
1. Given data, complete a pattern, graph the data on a coordinate plane, and explain the necessary operations on x to get to y	1-7, 2-2, 8-1, 8-3, 8-4, 8-5
C. <i>Analyze functional relationships to explain how a change in one quantity results in a change in another.</i>	
1. Use graphs, data tables, and equations to examine functions.	8-1, 8-2, 10-1
D. <i>Use patterns and functions to represent and solve problems.</i>	
1. Interpret or create situations that fit given graphs.	8-3, 8-4, 8-5

STANDARDS	LESSON REFERENCES
CONTENT STANDARD 13: FUNCTIONS AND ALGEBRA CONCEPTS STUDENTS WILL UNDERSTAND AND APPLY ALGEBRAIC CONCEPTS	
A. <i>Examine relationships among variables, expressions, and equations.</i>	
1. Distinguish the differences between expressions and equations.	1-3, 1-6
2. Use a variable as a place holder for a specific unknown or as a representative of a range of values.	1-8, 4-2
B. <i>Represent situations and number patterns with tables, graphs, rules, and equations.</i>	
1. Generalize number patterns to model observed physical patterns.	2-6, 5-9
C. <i>Analyze tables, graphs, and equations to identify properties and relationships.</i>	
1. Given x and y values in tables, compare the changes in tables and graph the results.	8-1, 8-4
D. <i>Solve linear equations with confidence using concrete, informal, and formal methods.</i>	
1. Evaluate algebraic expressions and formulas for given values of the variable.	1-3, 4-2, 4-9
2. Represent and describe solutions to linear equations.	1-8, 3-2, 3-3, 7-2, 7-3, 7-5
E. <i>Investigate inequalities and nonlinear equations informally.</i>	
1. Draw the following inequality on a number line: $x < 2$.	3-6, 3-7, 5-7, 7-6
2. For the equation, $y = \frac{1}{x}$, explore what happens to y when x changes.	8-1, 8-3, 8-4
3. Solve linear inequalities which represent real-world problems.	1-9
F. <i>Apply algebraic methods to solve a variety of mathematical problems inside and outside the school environment.</i>	
1. Use a proportion to change a recipe to serve additional people.	9-4, 9-5, 11-6
2. Solve problems using algebraic expressions with methods such as substitution, formulas, and equivalent forms.	1-3, 3-4, 3-5, 4-2, 6-5, 12-5, 12-6, 12-7, 12-8