

MATHEMATICS

GRADE FIVE

STANDARDS

Nevada Grades K-12 Content Standards

- 1.0 Students will accurately calculate and use estimation techniques, number relationships, operation rules, and algorithms; they will determine the reasonableness of answers and the accuracy of solutions to solve problems, communicate, reason, and make connections within and beyond the field of mathematics.
- 2.0 Students will use various algebraic methods to analyze, illustrate, extend, and create numerous representations (words, numbers, tables, and graphs) of patterns, functions, and algebraic relations as modeled in practical situations to solve problems, communicate, reason, and make connections within and beyond the field of mathematics.
- 3.0 Students will use appropriate tools and techniques of measurement to determine, estimate, record, and verify direct and indirect measurements to solve problems, communicate, reason, and make connections within and beyond the field of mathematics.
- 4.0 Students will identify, represent, verify, and apply spatial relationships and geometric properties to solve problems, communicate, and make connections within and beyond the field of mathematics.
- 5.0 Students will collect, organize, display, interpret, and analyze data to determine statistical relationships and probability projections to solve problems, communicate, reason, and make connections within and beyond the field of mathematics.

Nevada Grades K-12 Process Standards

- A Students will develop their ability to **solve problems** by engaging in developmentally appropriate opportunities where there is a need to use various approaches to investigate and understand mathematical concepts.
- B Students will develop their ability to **communicate mathematically** by solving problems where there is a need to obtain information from the real world through reading, listening, and observing.
- C Students will develop their ability to **reason mathematically** by solving problems where there is a need to investigate mathematical ideas and construct their own learning in all content areas.
- D Students will develop the ability to make **mathematical connections** by solving problems where there is a need to view mathematics as an integrated whole.

ESSENTIAL CONCEPTS, SKILLS, AND EXPERIENCES

NUMBERS, NUMBER SENSE, AND COMPUTATION

It is expected that students will:

- (5)1.1 identify and use place value positions of whole numbers and decimals to hundredths [NS 1.5.1]
- (5)1.2 round numbers to an appropriate place value
- (5)1.3 compare and order negative numbers, fractions, and decimals in mathematical and practical situations and plot those numbers on a number line
- (5)1.4 identify and/or generate equivalent fractions
- (5)1.5 rename and identify fractions in simplest form
- (5)1.6 compare fractions with like and unlike denominators using models and drawings, and by finding common denominators [NS 1.5.2]
- (5)1.7 add and subtract fractions with like denominators using models, drawings, and numbers [NS 1.5.2]
- (5)1.8 identify, model, and compare improper fractions and mixed numbers [NS 1.5.2]
- (5)1.9 explain the relationships among fractions, decimals, percents, and ratios, using objects and symbols
- (5)1.10 use models and drawings to identify, compare, add, and subtract decimals and to solve problems
- (5)1.11 read and write numbers, number words, and ordinals
- (5)1.12 read, write, compare, and order integers in mathematical and practical situations [NS 1.5.3]
- (5)1.13 use multiples of 10 to expand knowledge of basic multiplication and division facts [NS 1.5.5]
- (5)1.14 immediately recall, apply, and use basic facts of multiplication and corresponding division facts (products to 144)
- (5)1.15 estimate to determine the reasonableness of an answer in mathematical and practical situations involving decimals [NS 1.5.6]
- (5)1.16 add and subtract decimals [NS/PS 1.5.7]
- (5)1.17 use order of operations to evaluate expressions with whole numbers [NS 1.5.7]
- (5)1.18 multiply and divide decimals by whole numbers in problems representing practical situations [NS/PS 1.5.7]
- (5)1.19 generate and solve addition, subtraction, multiplication, and division problems using whole numbers and decimals in practical situations [NS/PS 1.5.8]
- (5)1.20 describe and use properties and relationships of the operations addition, subtraction, multiplication, and division
- (5)1.21 identify and use least common multiples and greatest common factors
- (5)1.22 use basic facts of addition, subtraction, multiplication, and division with speed and accuracy in computation and problem solving
- (5)1.23 describe and use algorithms for addition, subtraction, multiplication, and division
- (5)1.24 use estimation and mental computation in appropriate situations to solve problems

MATHEMATICS GRADE FIVE (continued)

- (5)1.25 use a variety of appropriate strategies to estimate, compute, and solve mathematical and real-world problems

PATTERNS, FUNCTIONS, AND ALGEBRA

It is expected that students will:

- (5)2.1 identify, describe, and represent patterns and relationships in the number system, including triangular numbers and perfect squares [NS/PS 2.5.1]
- (5)2.2 find possible solutions to an inequality involving a variable using whole numbers as a replacement set [NS 2.5.2]
- (5)2.3 use variables to describe simple functions and relationships
- (5)2.4 solve equations with whole numbers using a variety of methods, including inverse operations, mental math, and guess and check [NS/PS 2.5.2]
- (5)2.5 complete number sentences with the appropriate words and symbols, including \geq , \leq , and \neq [NS 2.5.3]

MEASUREMENT

It is expected that students will:

- (5)3.1 estimate and convert units of measure for weight and volume/capacity within the same measurement system (customary and metric) [NS 3.5.1]
- (5)3.2 measure, compare, and convert length to the closest fractional part ($\frac{1}{4}$ and $\frac{1}{2}$) of inches, feet, yards, and miles
- (5)3.3 measure, compare, and convert length to the closest decimal unit of millimeter, centimeter, meter, and kilometer
- (5)3.4 measure volume and weight to a required degree of accuracy in the customary and metric system [NS 3.5.2]
- (5)3.5 describe and determine the perimeter and area of polygons
- (5)3.6 describe the difference between perimeter and area, including the difference in units of measure [NS 3.5.3]
- (5)3.7 determine totals, differences, and change due for monetary amounts in practical situations [NS/PS 3.5.4]
- (5)3.8 determine equivalent periods of time, including relationships between and among seconds, minutes, hours, days, months, and years [NS/PS 3.5.6]

SPATIAL RELATIONSHIPS, GEOMETRY, AND LOGIC

It is expected that students will:

- (5)4.1 identify, classify, compare, and draw triangles and quadrilaterals based on their properties [NS/PS 4.5.1]
- (5)4.2 identify and draw circles and parts of circles describing the relationships between the various parts [NS/PS 4.5.1]
- (5)4.3 represent concepts of congruency, similarity, and/or symmetry using a variety of methods including dilation (enlargement/reduction) and transformational motions [NS 4.5.2]
- (5)4.4 graph coordinates representing geometric shapes in the first quadrant [NS 4.5.3]

MATHEMATICS GRADE FIVE (continued)

- (5)4.5 predict and describe the results of combining, dividing, and changing shapes into other shapes [NS/PS 4.5.4]
- (5)4.6 identify, define, draw, and describe points, line segments, rays, and angles
- (5)4.7 identify, define, draw, label, and describe planes, parallel lines, intersecting lines, and perpendicular lines [NS/PS 4.5.6]
- (5)4.8 measure, compare, draw, and classify triangles according to their properties such as acute, right, obtuse, scalene, and equilateral angles
- (5)4.9 describe characteristics of right, acute, obtuse, scalene, equilateral, and isosceles triangles [NS 4.5.7]
- (5)4.10 represent relationships using Venn diagrams [NS 4.5.9]

DATA ANALYSIS

It is expected that students will:

- (5)5.1 organize and represent data using a variety of graphical representations including stem and leaf plots and histograms [NS 5.5.1]
- (5)5.2 pose questions that can be used to guide the collection of categorical and numerical data [NS 5.5.1]
- (5)5.3 interpret data and make predictions using stem and leaf plots and histograms [NS 5.5.3]
- (5)5.4 model and compute measures of central tendency for mean, median, and mode [NS/PS 5.5.2]
- (5)5.5 compute range [NS 5.5.2]
- (5)5.6 use data from graphs, tables, and charts to draw and explain conclusions and make predictions
- (5)5.7 represent and solve problems involving combinations using a variety of methods [NS 5.5.4]
- (5)5.8 conduct simple probability experiments using concrete materials [NS 5.5.5]
- (5)5.9 represent the results of simple probability experiments as decimals to make predictions about future events [NS 5.5.5]
- (5)5.10 select an appropriate type of graph to accurately represent the data and justify the selection [NS 5.5.6]

PROBLEM SOLVING

It is expected that students will:

- (5)A.1 select, modify, develop, apply, and justify strategies to solve a variety of mathematical and practical problems and to investigate and understand mathematical concepts [NS/PS A.3-5]
- (5)A.2 apply previous experience and knowledge to new problem solving situations [NS/PS A.3-5]
- (5)A.3 determine an efficient strategy, verify, interpret, and evaluate results with respect to the original problem [NS/PS A.3-5]
- (5)A.4 try more than one strategy when the first strategy proves to be unproductive [NS A.3-5]
- (5)A.5 apply multi-step, integrated, mathematical problem-solving strategies, persisting until a solution is found or until it is clear that no solution exists [NS/PS A.3-5]

MATHEMATICS GRADE FIVE (continued)

- (5)A.6 generalize solutions and strategies to new problem situations [A.3-5]
- (5)A.7 interpret and solve a variety of mathematical problems by paraphrasing, identifying necessary and extraneous information, and ensuring the answer is reasonable [NS/PS A.3-5]
- (5)A.8 use technology, including calculators, to investigate and describe relationships such as patterns and functions, to develop mathematical concepts and solve problems [NS A.3-5]

MATHEMATICAL COMMUNICATION

It is expected that students will:

- (5)B.1 discuss and exchange ideas about mathematics as a part of learning [NS B.3-5]
- (5)B.2 use inquiry techniques (discussion, questioning, research, and data gathering) to solve mathematical problems [NS B.3-5]
- (5)B.3 identify and translate key words and phrases that imply mathematical operations [NS/PS B.3-5]
- (5)B.4 use a variety of methods (physical materials, diagrams, and tables) to represent and then communicate mathematical ideas through oral, verbal, and written formats [NS/PS B.3-5]
- (5)B.5 use everyday language to make conjectures, explain, and justify thinking about strategies and solutions to mathematical problems [NS B.3-5]
- (5)B.6 express mathematical ideas and use them to define, compare, and solve problems orally and in writing [NS B.3-5]
- (5)B.7 use mathematical words, phrases, and symbols to communicate and explain mathematical situations [NS B.3-5]
- (5)B.8 read a variety of fiction and nonfiction texts to learn about mathematics [NS B.3-5]

MATHEMATICAL REASONING

It is expected that students will:

- (5)C.1 justify and explain the solutions to problems using manipulatives and physical models [NS C.3-5]
- (5)C.2 use patterns and relationships to analyze mathematical situations and draw logical conclusions about mathematical problems [NS/PS C.3-5]
- (5)C.3 follow a logical argument and judge its validity [NS C.3-5]
- (5)C.4 ask questions to reflect on, clarify, and extend thinking [NS C.3-5]
- (5)C.5 review and refine the assumptions and steps used to derive conclusions in mathematical arguments [NS C.3-5]
- (5)C.6 determine relevant, irrelevant, and/or sufficient information to solve mathematical problems [NS/PS C.3-5]

MATHEMATICAL CONNECTIONS

It is expected that students will:

- (5)D.1 link new concepts to prior knowledge [NS D.3-5]

MATHEMATICS GRADE FIVE (continued)

- (5)D.2 use mathematical ideas from one area of mathematics to explain an idea from another area of mathematics [NS D.3-5]
- (5)D.3 use physical models to explain the relationship of concepts to procedures [NS/PS D.3-5]
- (5)D.4 apply mathematical thinking and modeling to solve problems that arise in other disciplines such as rhythm in music and motion in science [NS D.3-5]
- (5)D.5 approach problems with flexibility in a variety of ways within and beyond the field of mathematics [NS D.3-5]
- (5)D.6 identify, explain, and use mathematics in everyday life [NS D.3-5]