

# MATHEMATICS

## GRADE FOUR

### STANDARDS

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#### ***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

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### NUMBERS, NUMBER SENSE, AND COMPUTATION

*It is expected that students will:*

- (4)1.1 identify and use place value positions of whole numbers up to one million [NS/PS 1.4.1]
- (4)1.2 read and write decimals, extending to the thousandths place
- (4)1.3 read and write proper and improper fractions and mixed numbers
- (4)1.4 compare and describe fractions and/or decimals, as nearer one whole number than another
- (4)1.5 describe the need for fractions and their relationship to whole numbers and decimals
- (4)1.6 identify and compare fractions with like denominators using models, numbers, and drawings [NS/PS 1.4.2]
- (4)1.7 identify fractions in their simplest form
- (4)1.8 rename benchmark fractions as decimals and vice versa (e.g.,  $1/4 = .25$ ,  $1/2 = .50$ )
- (4)1.9 add and subtract fractions and mixed numbers with like denominators
- (4)1.10 read, write, compare, and order whole numbers [NS/PS 1.4.3]
- (4)1.11 read and write number words [NS 1.4.3]
- (4)1.12 explain relative size (magnitude) of numbers using powers of ten (hundreds and thousands) as benchmarks
- (4)1.13 count by multiples of a given number [NS 1.4.4]
- (4)1.14 explain relationships between skip counting, repeated addition, and multiples [NS 1.4.4]
- (4)1.15 immediately recall and use multiplication and corresponding division facts (products to 144) [NS/PS 1.4.5]
- (4)1.16 estimate to determine reasonableness of an answer in mathematical and practical situations [NS 1.4.6]
- (4)1.17 use estimation and mental computation in appropriate situations to solve problems
- (4)1.18 add and subtract multi-digit numbers [NS 1.4.7]
- (4)1.19 multiply and divide multi-digit numbers by a one-digit number with regrouping, including monetary amounts as decimals [NS 1.4.7]
- (4)1.20 add and subtract decimals
- (4)1.21 use subtraction to model and explain division
- (4)1.22 describe the relationships of the operations of addition, subtraction, multiplication, and division
- (4)1.23 describe and use algorithms for addition, subtraction, multiplication, and division
- (4)1.24 generate and solve addition, subtraction, multiplication, and division problems using whole numbers in practical situations [NS/PS 1.4.8]

### PATTERNS, FUNCTIONS, AND ALGEBRA

*It is expected that students will:*

- (4)2.1 analyze, describe, create, and extend patterns using numbers, appropriate tables, and calculators

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- (4)2.2 identify, describe, represent, and explain patterns and relationships in the number system including arithmetic and geometric sequences [NS/PS 2.4.1]
- (4)2.3 select the solution to an equation from a given set of numbers [NS 2.4.2]
- (4)2.4 model, explain, and solve open number sentences involving addition, subtraction, multiplication, and division [NS 2.4.2]
- (4)2.5 complete number sentences with the appropriate words and symbols (+, −, ×, ÷, >, <, =) [NS/PS 2.4.3]

### MEASUREMENT

*It is expected that students will:*

- (4)3.1 estimate and convert units of measure for length, area, and weight within the same measurement system (customary and metric) [NS 3.4.1]
- (4)3.2 estimate temperature in practical situations [NS 3.4.1]
- (4)3.3 measure, compare, and convert length in inches, feet, yards, and miles to the nearest fractional part ( $\frac{1}{4}$ ,  $\frac{1}{2}$ )
- (4)3.4 measure, compare, and convert length in metric units (millimeter, centimeter, meter, kilometer)
- (4)3.5 measure length, area, temperature, and weight to a required degree of accuracy in customary and metric systems [NS 3.4.2]
- (4)3.6 define and determine the perimeter of polygons and the area of rectangles, including squares [NS/PS 3.4.3]
- (4)3.7 determine totals for monetary amounts in practical situations [NS/PS 3.4.4]
- (4)3.8 use money notation to add and subtract given monetary amounts [NS 3.4.4]
- (4)3.9 use elapsed time in quarter-hour increments, beginning on the quarter-hour, to determine start, end, and elapsed time [NS 3.4.6]
- (4)3.10 recognize the number of weeks in a year, days in a year, and days in a month [NS 3.4.6]
- (4)3.11 use A.M. and P.M. appropriately in describing time [NS 3.4.6]

### SPATIAL RELATIONSHIPS, GEOMETRY, AND LOGIC

*It is expected that students will:*

- (4)4.1 identify, draw, and classify angles, including straight, right, obtuse, and acute [NS/PS 4.4.1]
- (4)4.2 describe geometric patterns and relationships
- (4)4.3 identify shapes that are congruent, similar, and/or symmetrical using a variety of methods including transformational motions (flips, turns, slides) [NS 4.4.2]
- (4)4.4 determine lines of symmetry and recognize rotational symmetry
- (4)4.5 identify coordinates for a given point in the first quadrant [NS 4.4.3]
- (4)4.6 locate points of given coordinates on a grid in the first quadrant [NS 4.4.3]
- (4)4.7 identify, describe, and classify two- and three-dimensional figures by relevant properties including the number of vertices, edges, and faces using models [NS/PS 4.4.4]
- (4)4.8 identify, describe, compare, and draw intersecting and parallel lines
- (4)4.9 identify, draw, label, and describe points, line segments, rays, and angles [NS/PS 4.4.6]

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(4)4.10 use the connectors and, or, and not to describe the members of a set [NS 4.4.9]

### DATA ANALYSIS

*It is expected that students will:*

- (4)5.1 pose questions that can be used to guide the collection of categorical and numerical data. [NS 5.4.1]
- (4)5.2 organize and represent data using a variety of graphical representations including frequency tables and line plots. [NS 5.4.1]
- (4)5.3 model the measures of central tendency for mode and median [NS 5.4.2]
- (4)5.4 model and compute range [NS 5.4.2]
- (4)5.5 read, interpret, and discuss charts, tables, and graphs from books, newspapers, and magazines
- (4)5.6 interpret data and make predictions using frequency tables and line plots. [NS 5.4.3]
- (4)5.7 collect, organize, display, describe, and interpret simple data to solve problems
- (4)5.8 conduct simple probability experiments using concrete materials [NS/PS 5.4.5]
- (4)5.9 represent the results of simple probability experiments as fractions to make predictions about future events [NS 5.4.5.]

### PROBLEM SOLVING

*It is expected that students will:*

- (4)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]
- (4)A.2 apply previous experience and knowledge to new problem solving situations [NS/PS A.3-5]
- (4)A.3 determine an efficient strategy, verify, interpret, and evaluate results with respect to the original problem [NS/PS A.3-5]
- (4)A.4 try more than one strategy when the first strategy proves to be unproductive [NS A.3-5]
- (4)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]
- (4)A.6 generalize solutions and strategies to new problem situations [A.3-5]
- (4)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]
- (4)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:*

- (4)B.1 discuss and exchange ideas about mathematics as a part of learning [NS B.3-5]

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- (4)B.2 use inquiry techniques (discussion, questioning, research, and data gathering) to solve mathematical problems [NS B.3-5]
- (4)B.3 identify and translate key words and phrases that imply mathematical operations [NS/PS B.3-5]
- (4)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]
- (4)B.5 use everyday language to make conjectures, explain, and justify thinking about strategies and solutions to mathematical problems [NS B.3-5]
- (4)B.6 express mathematical ideas and use them to define, compare, and solve problems orally and in writing [NS B.3-5]
- (4)B.7 use mathematical words, phrases, and symbols to communicate and explain mathematical situations [NS B.3-5]
- (4)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:*

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

- (4)D.1 link new concepts to prior knowledge [NS D.3-5]
- (4)D.2 use mathematical ideas from one area of mathematics to explain an idea from another area of mathematics [NS D.3-5]
- (4)D.3 use physical models to explain the relationship of concepts to procedures [NS/PS D.3-5]
- (4)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]
- (4)D.5 approach problems with flexibility in a variety of ways within and beyond the field of mathematics [NS D.3-5]
- (4)D.6 identify, explain, and use mathematics in everyday life [NS D.3-5]