

## Nevada Grade 6 Mathematics Item Specifications

<b>Grade 6 CRT Item Specifications – Number and Operations</b>		
<b>Content Standard 1.0</b> 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.		
<b>“Enduring and Important Knowledge” identified in previous grade-levels may be included within the context of some problems.</b>		
Assessed Indicators	Depth of Knowledge Essence (*)	Item Specifications and Assessment Development Notes
<b>1.6.1 Place Value</b> Identify and use place value positions to thousandths.	DOK 1	Items may ask students to identify place value positions and to identify the value of a given digit.
<b>1.6.2 Fractions</b> Add and subtract fractions with unlike denominators.  Multiply and divide with fractions using models, drawings, and numbers.  Use models to translate among fractions, decimals, and percents.	DOK 2	Limit denominators up to 16.  Items may use models of equivalent decimals, fractions, and percents.  Equivalent percents limited to 1%, 5%, 10%, 20%, 25%, 50%, 75%, and 100%.  For computations with fractions, improper fractions and mixed numbers may be used.  Answers may be in simplified form.
<b>1.6.3 Comparing and Ordering</b> Read, write, compare, and order groups of fractions, groups of decimals, and groups of percents.	DOK 1	Do not mix number formats within a group of numbers.  Percents must be 1% or greater.  No improper fractions or mixed numbers.  When ordering a list of numbers, a maximum of five numbers may be used.  Comparison items may ask students to identify the greatest or least number in a set of numbers, or to identify a number greater than or less than a given number.
<b>1.6.5 Facts</b> Identify equivalent expressions between and among fractions, decimals, and percents.	DOK 1	Identify fractions, decimals and percents equivalent facts limited to $\frac{1}{2}$ , $\frac{1}{4}$ , $\frac{1}{5}$ , and $\frac{1}{10}$ .

**(\*) = 50% of the assessed items must be at or above the Depth of Knowledge Essence**

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Assessed Indicators	Depth of Knowledge Essence (*)	Item Specifications and Assessment Development Notes
<p><b>1.6.6 Estimation</b> Estimate using fractions, decimals, and percents.</p> <p>Use estimation strategies in mathematical and practical situations</p>	DOK 2	<p>Answer choices may be single numbers, ranges of numbers, or descriptions.</p> <p>Do not mix number formats within an item.</p> <p>No percents less than 1%.</p> <p>No decimal percents.</p> <p>Items may be written in context and may be multi-step.</p> <p>Item may ask students to estimate the percent or estimate with a percent.</p> <p>Items may ask students to round with decimals.</p>
<p><b>1.6.7 Computation</b> Calculate using fractions, decimals, and percents in mathematical and practical situations.</p> <p>Use order of operations to evaluate expressions with integers</p>	DOK 2	<p>Improper fractions and mixed numbers may be used.</p> <p>Percents are limited to 1%, 5%, 25%, 75%, and multiples of 5%, up to and including 100%.</p> <p>Remainders may be expressed as terminating decimals, fractions, or whole numbers.</p> <p>For division with decimals, the divisor must be a whole number.</p> <p>Non-contextual items involving fractions will be coded to 1.6.2 instead of 1.6.7.</p> <p>Expressions used to assess order of operations may contain parentheses, but not exponents. Integers must be positive.</p>
<p><b>1.6.8 Number Theory</b> Use the concepts of number theory, including prime and composite numbers, factors, multiples, and the rules of divisibility to solve problems.</p>	DOK 1	<p>Limit multiples and their factors to 144.</p> <p>Identify divisibility rules for 2, 3, 4, 5, 6, 9 and 10.</p> <p>Items may ask students to determine the LCM and GCF of two or three numbers.</p>

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## Nevada Grade 6 Mathematics Item Specifications

<b>Grade 6 CRT Item Specifications - Algebra</b>		
<b>Content Standard 2.0</b> 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.		
<b>“Enduring and Important Knowledge” identified in previous grade-levels may be included within the context of some problems.</b>		
<b>Assessed Indicators</b>	<b>Depth of Knowledge Essence (*)</b>	<b>Item Specifications and Assessment Development Notes</b>
<b>2.6.1 Patterns</b> Use and create tables and charts to extend a pattern in order to describe a rule for input/output tables and to find missing terms in a sequence.	DOK 2	Patterns must be repeated 3 times.  Number patterns must use whole numbers only.  Use the term “pattern” instead of “sequence”.  Items may ask students to describe a rule for a pattern using words or symbols, or to create a pattern using a given rule.  Rules limited to 1 or 2 steps. Items using tables should have both columns relate to each other like an input/output table. Items may ask students to identify a missing term in a pattern or the expression that could be used to determine a missing term in a pattern.
<b>2.6.2 Variables and Unknowns</b> Evaluate formulas and algebraic expressions using whole number values.  Solve and graphically represent equations and simple inequalities in one variable	DOK 1	Items may ask students to substitute whole number values for variables in formulas and expressions.  Expressions are limited to 3 or fewer terms.  Avoid using geometric formulas for perimeter, circumference, and area.  Equations and inequalities must be one-step and use whole numbers only.  Greater/less than or equal to symbols ( $\geq$ , $\leq$ ) may be used in inequalities.  When graphically representing inequalities, inequalities should isolate the variable (e.g., $x > 3$ ) and represented on a number line.
<b>2.6.4 Relations and Functions</b> When given a rule relating two variables, create a table and represent the ordered pairs on a coordinate plane.	DOK 2	Limit to linear relationships using whole numbers only.  Given a rule identify the corresponding, table or graphed points.  Tables and graphs must show a minimum of 3 points.

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## Nevada Grade 6 Mathematics Item Specifications

<b>Grade 6 CRT Item Specifications - Measurement</b>		
<b>Content Standard 3.0</b> 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.		
<b>“Enduring and Important Knowledge” identified in previous grade-levels may be included within the context of some problems.</b>		
Assessed Indicators	Depth of Knowledge Essence (*)	Item Specifications and Assessment Development Notes
<b>3.6.1 Comparison and Estimation</b> Estimate and compare corresponding units of measure for temperature, length, and weight/mass between customary and metric systems.	DOK 2	Items must focus on using comparison and estimation to get at the general size of a unit measure (e.g., Which unit is closest in size to a meter? Answer choices: inch, foot, yard, and mile.). Customary units for length include: inch, foot, yard, and mile. Metric units for length include: millimeter, centimeter, meter, and kilometer. Customary units for weight include: grain, ounce, pound and ton. Metric units for weight/mass include: milligram, centigram, gram, and kilogram.
<b>3.6.2 Precision in Measurements</b> Given two measurements of the same object, select the one that is more precise.  Explain how the size of the unit of measure used effects precision.	DOK 1	Items may give four measurements of an object and ask which measurement is most precise. Use metric units for this type of item.  Measurement must use units within the same system.  Items may ask students to select the unit that will provide the most precise measurement. Customary units may be used for this type of item.
<b>3.6.3 Formulas</b> Select, model, and apply formulas to find the perimeter, circumference, and area of plane figures.	DOK 1	Items may use squares, triangles, rectangles, and circles only.  Items may ask students to select the correct formula, or to apply the formula.
<b>3.6.4 Money</b> Compare and use unit cost in practical situations.	DOK 1	
<b>3.6.5 Ratios and Proportions</b> Write and apply ratios in mathematical and practical problems involving measurement and monetary conversions.	DOK 1	Item should provide a ratio in a common format.  Ratios may use whole numbers only.  Student may be given the ratio in lowest terms or asked to find the ratio in lowest terms.
<b>3.6.6 Time</b> Use equivalent periods of time to solve practical problems.	DOK 2	Items may ask students to solve problems involving time relationships.

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## Nevada Grade 6 Mathematics Item Specifications

<b>Grade 6 CRT Item Specifications - Geometry</b>		
<b>Content Standard 4.0</b> 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.		
<b>“Enduring and Important Knowledge” identified in previous grade-levels may be included within the context of some problems.</b>		
Assessed Indicators	Depth of Knowledge Essence (*)	Item Specifications and Assessment Development Notes
<p><b>4.6.1 Two-Dimensional Shapes</b> Measure angles using a protractor.</p> <p>Identify, classify, compare and draw regular and irregular quadrilaterals.</p> <p>Identify, draw, and use central angles to represent fractions of a circle.</p>	DOK 1	<p>For measuring angles, a protractor will be embedded in the graphic. Items may not ask students to measure angles within a figure; angles must stand alone. Angle measures may be up to 180°.</p> <p>The number of degrees represented by a central angle is limited to whole numbers. Figures may include angle measures, lengths of sides, or side tic marks as necessary. Trapezoid may be defined as a quadrilateral with <b>at least</b> one pair of parallel sides.</p> <p>Items may ask students to identify quadrilaterals visually or from descriptions. Items may ask students to determine a simple fraction represented by a central angle. Items may ask students to identify a classification rule or give a rule and ask students to classify shapes according to the rule.</p>
<p><b>4.6.2 Congruence and Similarity</b> Determine actual measurements represented on scale drawings.</p> <p>Convert actual measurements to scale.</p>	DOK 2	<p>All conversions should result in whole number measurements.</p> <p>Scale factors do not need to be whole numbers.</p> <p>All items should include a graphic representation. Conversions should be used to solve practical problems.</p>
<p><b>4.6.3 Coordinate Geometry</b> Using a coordinate plane, identify and locate points.</p> <p>Graph coordinates representing geometric shapes in all four quadrants on a coordinate plane.</p>	DOK 2	<p>Axes may be scaled by 1s or 2s. The same scale should be used on both axes.</p> <p>Items must include a graphic of a coordinate plane with labeled points representing vertices of a polygon.</p> <p>Items may ask students to determine the location of the missing vertex of a geometric shape on a coordinate plane.</p>
<p><b>4.6.6 Line, Angles, and their Properties</b> Draw, identify, and find measures of complementary and supplementary angles using arithmetic and geometric methods.</p>	DOK 1	<p>Items may ask students to identify complementary and supplementary angles.</p> <p>Items may ask students to calculate the measure of an unknown angle. Items must include a graphic.</p>

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# Nevada Grade 6 Mathematics Item Specifications

<b>Grade 6 CRT Item Specifications – Data Analysis</b>		
<b>Content Standard 5.0</b> 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.		
<b>“Enduring and Important Knowledge” identified in previous grade-levels may be included within the context of some problems.</b>		
Assessed Indicators	Depth of Knowledge Essence (*)	Item Specifications and Assessment Development Notes
<p><b>5.6.1 Data Collection and Organization</b> Pose questions that guide the collection of data.</p> <p>Organize and represent data using a variety of graphical representations including circle graphs and scatter plots.</p>	DOK 2	<p>Data displays may include all previously assessed types of data displays, plus Venn diagrams, circle graphs and scatter plots. Displays must not include axis breaks. Items may ask students to construct a data display that represents a given set of data on <b>constructed response</b> items only.</p> <p>Items may ask students to compare data in a data display or to perform calculations to answer questions about a data display.</p> <p>Items may ask students to select the correct data display given a set of data.</p>
<p><b>5.6.2 Central Tendency and Data Distribution</b> Select and apply the measures of central tendency to describe data.</p>	DOK 1	<p>Items assessing mean may include up to 5 data points.</p> <p>Data may not have more than one mode.</p> <p>Data can be shown in list format or in a display.</p> <p>Data values are limited to whole numbers.</p> <p>The mean of a data set may be a whole number or decimal (terminating to the hundredths place).</p> <p>Items that ask students to select the appropriate measure of central tendency for use in a practical situation are assessed in <b>8<sup>th</sup> grade</b>.</p>
<p><b>5.6.3 Interpretation of Data</b> Analyze the effect a change of graph type has on the interpretation of a set of data.</p> <p>Interpret data and make predictions using circle graphs and scatter plots.</p>	DOK 2	<p>Items that ask students to interpret data and make predictions are limited to circle graphs and scatter plots.</p> <p>Analyzing the effect of a change in graph type (Data displays may include all previously assessed types of data displays, plus Venn diagrams, circle graphs and scatter plots) is for <b>constructed response</b> items only.</p>

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Assessed Indicators	Depth of Knowledge Essence (*)	Item Specifications and Assessment Development Notes
<p><b>5.6.4 Permutations and Combinations</b> Find the number of outcomes for a specific event by constructing sample spaces and tree diagrams.</p>	DOK 2	<p>Items may ask students to identify a tree diagram, chart, or organized list that displays all possible combinations or outcomes of an activity.</p> <p>Items limited to 16 outcomes.</p>
<p><b>5.6.5 Experimental and Theoretical Probability</b> <i>Find experimental probability using concrete materials. (Not on state CRT).</i></p> <p>Represent the results of simple probability experiments as fractions, decimals, percents, and ratios to make predictions about future events.</p>	DOK 2	<p>Items may use simple probability experiments with up to 2 events and limited to 16 outcomes.</p> <p>Make an inference or prediction based on the results of a simple probability experiment.</p>
<p><b>5.6.6 Statistical Inferences</b> Analyze various representations of a set of data to draw conclusions and make predictions.</p> <p>Describe the limitations of various graphical representations.</p>	DOK 2	

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