

Benchmark Achievement Level Descriptors (Benchmark ALDs)

Overview and Purpose

The development of Achievement Level Descriptors (ALDs) is a critical step in communicating student performance in terms of levels or categories of performance on any standardized assessment. For Minnesota Comprehensive Assessments (MCAs), ALDs are developed in collaboration with educators during the first year of full implementation. The ALDs provide a description of grade-level student performance on MCAs for each of the achievement levels of Exceeds the Standards, Meets the Standards, Partially Meets the Standards, and Does Not Meet the Standards. These statements are included on a student's MCA score report to aid families in score interpretation. More detail regarding the development of the [MCA Achievement Level Descriptors](#) is on [Testing 1, 2, 3](#).

Over the years, educators have requested more specific descriptions of the knowledge, skills and abilities of students who typically score in each of the different MCA achievement levels beyond what the traditional ALDs offer. In response to this need, Minnesota Department of Education (MDE) staff collaborated to outline more specific descriptions, the Benchmark ALDs for Mathematics and Reading. The purpose of Benchmark ALDs is to

1. promote equity for all students across the state by clarifying expected learning outcomes for instruction and local assessment of Minnesota Academic Standards in Reading and Mathematics; and
2. support teachers' analysis of the depth of their curriculum, instruction, and classroom assessments.

The Mathematics and Reading Benchmark ALDs were developed by

- reviewing test questions and test data for all operational MCA III questions, in many cases 800–1,000 questions per grade;
- grouping items within each benchmark based on student performance on the items relative to their overall performance on the MCAs; and
- reviewing the achievement level groupings of questions within each benchmark for commonalities in the skills, understanding and context needed to correctly answer the items. Each Benchmark ALD describes some of the skills typically demonstrated by students whose overall performance on the MCAs is at that achievement level. These skills are in addition to the descriptions at the lower achievement levels.

Released Examples

Where possible, released examples that illustrate skills described in the benchmark and achievement level are listed in the document. To view examples, click on “Released Example” in the Benchmark ALD tables or go to the [Minnesota Question Tool](https://public.education.mn.gov/nqt/) (https://public.education.mn.gov/nqt/). Once at the Minnesota Question Tool (MQT) site, you can enter or copy and paste the released example identification number into the “Search by Question ID” field. Note that within the MQT you can find additional questions that are aligned to the academic standards but are not specifically listed in the Benchmark ALD tables.

Example items are not currently available for all benchmarks and achievement levels in the Benchmark ALD tables. MDE will update the document as more released examples become available.

Training Module

Watch the training module to learn how to use the Benchmark ALDs to evaluate the rigor of classroom assessments and instructional materials: <https://testing123.education.mn.gov/test/plan/success/>.

This module will help educators understand how the Benchmark ALDs can be used to facilitate the learning outcomes defined in the Minnesota K–12 Academic Standards in Mathematics and Reading and to evaluate the rigor of classroom assessment and instruction.

Grade 6 Mathematics Benchmark Achievement Level Descriptors

Number & Operation

Read, write, represent and compare positive rational numbers expressed as fractions, decimals, percents and ratios; write positive integers as products of factors; use these representations in real-world and mathematical situations. (6.1.1)

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|--|--|---|---|--|
| 6.1.1.1 Locate positive rational numbers on a number line and plot pairs of positive rational numbers on a coordinate grid. | Plots and identifies whole-number and basic decimal ordered pairs on a coordinate grid <u>Released Examples:</u> 263226, 263229 | Plots and identifies fractions and mixed numbers on a number line Plots and identifies fractions and mixed numbers in an ordered pair on a coordinate grid Identifies a decimal, to the tenths place, or fraction on a number line with the same fractional scale (e.g., plots 0.6, or $\frac{3}{5}$ on a number line marked in fifths) | Identifies the coordinates of points on a coordinate grid Plots decimals and fractions on a number line with a fractional scale twice the size of the increments used (e.g., plots $\frac{1}{6}$ on a number line marked in thirds) <u>Released Examples:</u> 264500, 260111, 262028 | Uses coordinate grid vocabulary to describe and identify the coordinates of an ordered pair Plots and identifies values on a number line with any scale |

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| <p>6.1.1.2</p> <p>Compare positive rational numbers represented in various forms. Use the symbols <, = and >.</p> | <p>Correctly compares whole numbers using the symbols <, =, and ></p> | <p>Orders a short list of fractions with denominators that are multiples of each other or decimals up to the thousandths</p> <p>Compares two fractions with differing denominators</p> <p>Released Examples: 260020, 261021</p> | <p>Orders positive rational numbers given in various forms (e.g., percent, improper fraction, etc.) that differ by more than 0.001</p> <p>Released Example: 264955</p> | <p>Compares decimals, fractions, percents, etc. that differ by less than 0.001</p> <p>Identifies multiple rational numbers, in various forms, that are greater than, less than, or equal to a given number</p> <p>Released Example: 265601</p> |
| <p>6.1.1.3</p> <p>Understand that percent represents parts out of 100 and ratios to 100.</p> | <p>Translates between percents, fractions with denominators of 100, and ratios with groups out of 100</p> <p>Released Examples: 263754, 264680</p> | <p>Translates from ratios to percents</p> <p>Uses percents or ratios to determine number in part of a group with group sizes of 5, 10, 50, or 200</p> <p>Released Examples: 265515, 264918</p> | <p>Identifies more than 1 ratio that describes a percent</p> | <p>Creates ratios using colon notation (e.g., 3:5) for novel real-world situations</p> |

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| 6.1.1.4 Determine equivalences among fractions, decimals and percents; select among these representations to solve problems. | Identifies and writes the decimal representation of a 2-digit percent <u>Released Examples:</u> 44230, 263755 | Identifies and writes the percent or decimal equivalent of a given fraction When given a fractional amount, identifies the complement represented as a percent Adds simple percents and fractions when identifying the total percent of something <u>Released Examples:</u> 44136, 263779 | Identifies multiple representations of common percents Represents numbers as fractions (proper, improper, mixed, simplified and not simplified), decimals (including repeating decimals), and percents (including 1-digit percents) Solves one- and two-step problems involving percents and represents the answer as a fraction or a decimal <u>Released Examples:</u> 264927, 263753 | Solves multi-step problems with fractions and represents the answer in various representations Consistently compares and represents numbers (including values less than 0.1) in various forms <u>Released Example:</u> 265611 |

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| 6.1.1.5 Factor whole numbers; express a whole number as a product of prime factors with exponents. | Identifies the prime factorization of a number less than 200, without the use of exponents, when the prime factors have 3 or fewer repeated uses and are 1 digit <u>Released Examples:</u> 260032, 261004 | Represents prime factorization of a number without the use of exponents | Consistently uses exponents when representing the prime factorization of any 3-digit number <u>Released Examples:</u> 42484, 262301 | Justifies and explains prime factorization Knows that 1 is not used in prime factorization |

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| 6.1.1.6 Determine greatest common factors and least common multiples. Use common factors and common multiples to calculate with fractions and find equivalent fractions. | In groups of numbers with values up to 30, can find GCFs of 5 or less <u>Released Examples:</u> 262336 | Identifies the GCF of a group of numbers with values less than 100 and when there are 3 or fewer common factors | Identifies the LCM or GCF in word problems with numbers less than 30 Consistently identifies the LCM for a group of numbers with values less than 30 and having at most 2 common factors Identifies the GCF of a group of numbers greater than 100 but multiples of 5 <u>Released Examples:</u> 260042, 261039 | Finds the LCM or GCF of two or three numbers that may have 3 or more common factors Identifies a group of numbers with a specific GCF or LCM Uses the GCF or LCM to identify missing values in a situation <u>Released Examples:</u> 265509 |

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| 6.1.1.7 Convert between equivalent representations of positive rational numbers. | Identifies and simplifies repeated multiplication representations of a 1-digit, whole number base with a 1-digit exponent Identifies an improper fraction that is equivalent to a given mixed number with 1-digit numerator, denominator, and whole number <u>Released Examples:</u> 264209, 264814 | Converts between mixed numbers and improper fractions Simplifies monomial, exponential expressions as well as simple, exponential polynomial expressions <u>Released Example:</u> 44263 | Converts from simplified to non-simplified versions of fractions when the common factors are 1 digit | Converts between non-simplified versions of fractions when the common factors are 2 digit |

Understand the concept of ratio and its relationship to fractions and to the multiplication and division of whole numbers. Use ratios to solve real-world and mathematical problems. (6.1.2)

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| 6.1.2.1 Identify and use ratios to compare quantities; understand that comparing quantities using ratios is not the same as comparing quantities using subtraction. | Uses ratios involving 1 to find a quantity in one step | Identifies ratios and simplified ratios that are given in a scenario <u>Released Example:</u> 44123 | Uses two-step problem-solving to determine a ratio of given quantities Represents ratios in fraction form <u>Released Example:</u> 264817 | Uses multi-step problem-solving to determine or compare ratios Uses ratios to compare various unknown quantities <u>Released Example:</u> 264812 |

| Benchmark | Does Not Meet | Partially Meets | Meets | Exceeds |
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| <p>6.1.2.2 Apply the relationship between ratios, equivalent fractions and percents to solve problems in various contexts, including those involving mixtures and concentrations.</p> | <p>Uses scale factors to solve a one-step problem</p> <p>Represents simple data in a circle graph</p> <p>Released Example: 263732</p> | <p>Uses unit ratios to find a quantity</p> <p>Determines a quantity described by a simple given ratio</p> <p>Released Example: 43894</p> | <p>Uses a given ratio to determine the total amount or the complement part of the ratio</p> <p>Released Example: 44197</p> | <p>Represents a part or total amount based on a given ratio in a variety of forms (percent of total, fractional amount, various ratio notations, etc.)</p> <p>Applies scale factors to measurements in different units within the same system (e.g., mL and liters)</p> |
| <p>6.1.2.3 Determine the rate for ratios of quantities with different units.</p> | <p>Finds whole-number unit rate in one-step problems</p> <p>Finds unit prices greater than \$1 in simple one-step problems</p> <p>Released Examples: 263090, 264070, 264932</p> | <p>Uses known of time conversions for units greater than a week to find a unit rate</p> | <p>Uses two rates to identify the unit rate</p> <p>Uses and represents rates in a fractional form</p> <p>Released Examples: 264066, 264945</p> | <p>Finds ratios when the given numbers are fractions and decimals or require multi-step calculations</p> <p>Uses known of time conversion rates for units, including small increments, to find unit rates</p> <p>Released Example: 264175</p> |

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|--|--|--|---|--|
| 6.1.2.4 Use reasoning about multiplication and division to solve ratio and rate problems. | Solves one-step ratio and rate problems involving whole numbers Released Example: 264659 | Solves one-step ratio and rate problems involving decimals and fractions Solves two-step ratio and rate problems with whole numbers less than 100 Released Examples: 264784, 264211, 276327 | Solves multi-step ratio and rate problems with numbers greater than or equal to 100 Solves ratio and rate problems involving one or more unit conversions Released Examples: 262029, 264742 | Uses multiple ratios or rates to solve real-world problems |

Multiply and divide decimals, fractions and mixed numbers; solve real-world and mathematical problems using arithmetic with positive rational numbers. (6.1.3)

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|--|--|--|--|--|
| 6.1.3.1 Multiply and divide decimals and fractions using efficient and generalizable procedures, including standard algorithms. | Divides or multiplies a decimal by a 1-digit whole number Identifies a possible denominator when two fractions are multiplied that each have 1-digit numerators and denominators that are less than or equal to 5 | Multiplies two decimals to the tenths place with a value greater than 1 but less than 10 Multiplies two fractions that each have 1-digit numerators and denominators that are less than or equal to 5 Divides a fraction or decimal by a 1-digit whole number Knows the term “product” means to multiply Released Examples: 264909, 264910 | Divides a fraction or a mixed number by a fraction or a mixed number with denominators that are relatively prime Multiplies two decimals that are both less than 10 and one of them is written to the tenths place and the other is written to the hundredths place Uses various multiplication symbols [·, (), and ×] Released Examples: 44147, 44521 | Divides two decimals with differing place values after the decimal, including values with zeros after the decimal (e.g., 0.002 and 2.01) Consistently uses and understands the term “product” to mean multiplication and the term “quotient” to mean division Solves multi-step mathematical problems involving fractions and decimals Released Example: 263217 |

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| 6.1.3.2 Use the meanings of fractions, multiplication, division and the inverse relationship between multiplication and division to make sense of procedures for multiplying and dividing fractions. | Assessed within 6.1.3.1 | Assessed within 6.1.3.1 | Assessed within 6.1.3.1 | Assessed within 6.1.3.1 |
| 6.1.3.3 Calculate the percent of a number and determine what percent one number is of another number to solve problems in various contexts. | Identifies how to find the percentage of a number | Calculates a percentage of a whole number | Calculates a percentage of a decimal greater than 1 Finds what percent one whole number is of another whole number in context Released Examples: 265516, 264942 | Finds what percent one decimal or fraction is of another in context Calculates percents when solving multi-step, real-world situations Released Examples: 263122, 264129 |

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| 6.1.3.4 Solve real-world and mathematical problems requiring arithmetic with decimals, fractions and mixed numbers. | Solves real-world and mathematical problems requiring arithmetic with decimals, fractions, and mixed numbers Released Examples: 262099, 263741 | Solves real-world problems by adding and subtracting 2 fractions with unlike denominators and/or mixed numbers | Solves real-world problems by adding, subtracting, multiplying, and/or dividing two or more fractions, mixed numbers, or decimals in multi-step problems Translates between decimals, fractions, and mixed numbers when solving problems Released Examples: 260028, 260058, 264689 | Solves real-world problems with fractions, decimals, and/or mixed numbers to find solutions that answer questions about the minimum, maximum, or fraction of a fraction in context Released Examples: 261073, 263709 |

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|---|--|--|--|--|
| 6.1.3.5 Estimate solutions to problems with whole numbers, fractions and decimals and use the estimates to assess the reasonableness of results in the context of the problem. | Assessed within 6.1.3.4 | Assessed within 6.1.3.4 | Assessed within 6.1.3.4 | Assessed within 6.1.3.4 |

Algebra

Recognize and represent relationships between varying quantities; translate from one representation to another; use patterns, tables, graphs and rules to solve real-world and mathematical problems. (6.2.1)

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|---|--|--|--|---|
| 6.2.1.1 Understand that a variable can be used to represent a quantity that can change, often in relation to another changing quantity. Use variables in various contexts. | Uses the given meaning of a variable in context to solve simple one-step problems | Identifies the meaning of a variable given in context Demonstrates how changing one variable affects a second variable in one-operation equations given context Released Example: 266003 | Identifies how a change in one variable affects another variable in equations with up to three operations in real-world context or mathematical situations | Finds the new value of a variable when another variable changes in a complex situation Identifies new representations of relationships between variables given in equation, table, or word formats Released Examples: 265271, 265274 |

| Benchmark | Does Not Meet | Partially Meets | Meets | Exceeds |
|---|---|---|--|---|
| <p>6.2.1.2</p> <p>Represent the relationship between two varying quantities with function rules, graphs and tables; translate between any two of these representations.</p> | <p><i>A typical student at this level of mathematics succeeds at few of the most fundamental mathematics skills of the Minnesota Academic Standards.</i></p> <p>Some of the skills typically demonstrated may include:</p> <p>Graphs up to 4 points listed in an input-output table</p> <p>Describes simple relationships between input and output values listed in table format</p> | <p><i>A typical student at this level of mathematics partially meets the mathematics skills of the Minnesota Academic Standards.</i></p> <p>Some of the skills typically demonstrated may include:</p> <p>Identifies an equation that represents whole numbers in an input-output table where input values increase by 1 and vice versa</p> <p>Identifies the graph that matches values given in an input-output table</p> | <p><i>A typical student at this level of mathematics meets the mathematics skills of the Minnesota Academic Standards.</i></p> <p>Some of the skills typically demonstrated may include:</p> <p>Graphs points from a linear equation (in slope-intercept form) given the starting value (y-intercept)</p> <p>Translates between a linear equation (in slope-intercept form), graph, and table containing rational numbers</p> <p><u>Released Examples:</u> 265280, 264192, 265284</p> | <p><i>A typical student at this level of mathematics exceeds the mathematics skills of the Minnesota Academic Standards.</i></p> <p>Some of the skills typically demonstrated may include:</p> <p>Graphs a linear equation on a coordinate grid</p> <p>Translates between a linear equation, written description, graph, and table containing rational numbers</p> <p><u>Released Examples:</u> 264507, 265283</p> |

Use properties of arithmetic to generate equivalent numerical expressions and evaluate expressions involving positive rational numbers. (6.2.2)

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|--|---|---|--|--|
| <p>6.2.2.1</p> <p>Apply the associative, commutative and distributive properties and order of operations to generate equivalent expressions and to solve problems involving positive rational numbers.</p> | <p>Identifies valid first steps that use the distributive property to simplify an expression</p> <p>Uses order of operations to simplify expressions with up to four operations (+, −, and ×) involving whole numbers and decimals</p> <p>Released Examples: 262076, 261008</p> | <p>Applies the associative and the distributive properties to simplify and solve expressions</p> <p>Identifies valid steps for simplifying specific expressions and solving problems</p> <p>Released Example: 260009</p> | <p>Applies order of operations to create equivalent expressions with multiple operations (+, −, ×, and ÷) involving positive rational numbers</p> <p>Released Examples: 266149, 266161, 264717, 266025, 263096, 263222</p> | <p>Applies the commutative, associative, and distributive properties to simplify and solve multi-step complex expressions and equations involving positive rational numbers</p> <p>Simplifies expressions using order of operations and then identifies multiple equivalent expressions</p> <p>Released Examples: 262044, 262372, 266050</p> |

Understand and interpret equations and inequalities involving variables and positive rational numbers. Use equations and inequalities to represent real-world and mathematical problems; use the idea of maintaining equality to solve equations. Interpret solutions in the original context. (6.2.3)

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|--|--|--|--|--|
| 6.2.3.1 Represent real-world or mathematical situations using equations and inequalities involving variables and positive rational numbers. | Identifies which inequality represents the direct comparison of two variables in context | Identifies single-operation expressions, linear equations, and one-variable inequalities that represent real-world situations | Identifies equations and inequalities that represent real-world situations using whole numbers and decimals Released Example: 264195 | Creates equations and inequalities that represent complex real-world situations involving up to two 2 variables and vice versa Explains the meaning of expressions in real-world contexts Released Examples: 264178, 265014 |

| Benchmark | Does Not Meet | Partially Meets | Meets | Exceeds |
|---|--|---|--|---|
| <p>6.2.3.2</p> <p>Solve equations involving positive rational numbers using number sense, properties of arithmetic and the idea of maintaining equality on both sides of the equation. Interpret a solution in the original context and assess the reasonableness of results.</p> | <p><i>A typical student at this level of mathematics succeeds at few of the most fundamental mathematics skills of the Minnesota Academic Standards.</i></p> <p>Some of the skills typically demonstrated may include:</p> <p>Finds the value of the variable in a simple one- or two-step equation</p> <p>Released Examples: 44635, 264855</p> | <p><i>A typical student at this level of mathematics partially meets the mathematics skills of the Minnesota Academic Standards.</i></p> <p>Some of the skills typically demonstrated may include:</p> <p>Finds the value of the variable in a two- or three-step equation</p> <p>Finds the value of a variable in a two-step equation (containing whole numbers) with two variables when the value of the other variable is given</p> <p>Released Example: 264220</p> | <p><i>A typical student at this level of mathematics meets the mathematics skills of the Minnesota Academic Standards.</i></p> <p>Some of the skills typically demonstrated may include:</p> <p>Solves for one or two variables in equations that are set in context</p> <p>Solves multi-step equations (containing whole numbers, fractions, and decimals) with up to two variables when the value of one variable is given</p> <p>Released Examples: 265025, 265019</p> | <p><i>A typical student at this level of mathematics exceeds the mathematics skills of the Minnesota Academic Standards.</i></p> <p>Some of the skills typically demonstrated may include:</p> <p>Understands the meaning of the word solution and determines if a solution is reasonable in context</p> <p>Identifies the steps needed to solve multi-step equations when given unsimplified equations</p> <p>Solves for one or two variables in unsimplified multi-step equations</p> <p>Released Examples: 265028, 265297</p> |

Geometry & Measurement

Calculate perimeter, area, surface area and volume of two- and three-dimensional figures to solve real-world and mathematical problems. (6.3.1)

| Benchmark | <p>Does Not Meet</p> <p><i>A typical student at this level of mathematics succeeds at few of the most fundamental mathematics skills of the Minnesota Academic Standards.</i></p> <p>Some of the skills typically demonstrated may include:</p> | <p>Partially Meets</p> <p><i>A typical student at this level of mathematics partially meets the mathematics skills of the Minnesota Academic Standards.</i></p> <p>Some of the skills typically demonstrated may include:</p> | <p>Meets</p> <p><i>A typical student at this level of mathematics meets the mathematics skills of the Minnesota Academic Standards.</i></p> <p>Some of the skills typically demonstrated may include:</p> | <p>Exceeds</p> <p><i>A typical student at this level of mathematics exceeds the mathematics skills of the Minnesota Academic Standards.</i></p> <p>Some of the skills typically demonstrated may include:</p> |
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| <p>6.3.1.1</p> <p>Calculate the surface area and volume of prisms and use appropriate units, such as cm^2 and cm^3. Justify the formulas used. Justification may involve decomposition, nets or other models.</p> | <p>Computes volume of a rectangular prism given base area, height, and an image</p> | <p>Computes volume of a rectangular prism given all 3 dimensions</p> <p>Released Examples: 265615, 266082</p> | <p>Uses formulas to compute volumes and surface areas of cubes, triangular prisms, and rectangular prisms</p> <p>Understands how to find unknown dimensions of a rectangular prism when given the volume</p> <p>Released Example: 44083</p> | <p>Solves for unknown dimensions, volume, or surface area in prisms when given surface area or volume</p> <p>Justifies how to find the surface area of a prism</p> <p>Released Examples: 264953, 265252</p> |

| Benchmark | Does Not Meet | Partially Meets | Meets | Exceeds |
|---|--|--|--|--|
| <p>6.3.1.2</p> <p>Calculate the area of quadrilaterals. Quadrilaterals include squares, rectangles, rhombuses, parallelograms, trapezoids and kites. When formulas are used, be able to explain why they are valid.</p> | <p><i>A typical student at this level of mathematics succeeds at few of the most fundamental mathematics skills of the Minnesota Academic Standards.</i></p> <p>Some of the skills typically demonstrated may include:</p> <p>Finds areas of simple figures on a grid by counting whole squares</p> <p>Computes the area of a rectangle when the dimensions of both the length and width are provided</p> <p>Released Example: 263017</p> | <p><i>A typical student at this level of mathematics partially meets the mathematics skills of the Minnesota Academic Standards.</i></p> <p>Some of the skills typically demonstrated may include:</p> <p>Finds missing side length or possible dimensions of a rectangle when given area</p> <p>Finds the area of a square given a side length</p> | <p><i>A typical student at this level of mathematics meets the mathematics skills of the Minnesota Academic Standards.</i></p> <p>Some of the skills typically demonstrated may include:</p> <p>Uses formulas to compute area of parallelograms, trapezoids, and kites</p> <p>Uses the perimeter of a rectangle or square to find a missing side length or the area</p> <p>Released Example: 264512</p> | <p><i>A typical student at this level of mathematics exceeds the mathematics skills of the Minnesota Academic Standards.</i></p> <p>Some of the skills typically demonstrated may include:</p> <p>Uses the perimeter or diagonals of a quadrilateral and its properties to find the area of the quadrilateral</p> <p>Decomposes figures into quadrilaterals to find the area of the figure</p> <p>Released Examples: 264514, 264726</p> |
| <p>6.3.1.3</p> <p>Estimate the perimeter and area of irregular figures on a grid when they cannot be decomposed into common figures and use correct units, such as cm and cm².</p> | <p>Estimates areas of simple irregular figures by counting whole square units</p> <p>Identifies square units as a measurement of area</p> | <p>Understands that square units correspond to area and units correspond to lengths</p> <p>Estimates perimeter or area of simple irregular figures using a scale of 1 unit or 1 square unit</p> <p>Released Example: 44648</p> | <p>Estimates area or perimeter of irregular objects using scale other than 1</p> <p>Uses strategies to estimate parts of areas of irregular figures and then sums the parts</p> | <p>Combines units/partial units or square units/partial square units to estimate areas and perimeters of irregular and curved figures with precision</p> <p>Released Examples: 265040, 265042</p> |

Understand and use relationships between angles in geometric figures. (6.3.2)

| <p>Benchmark</p> | <p>Does Not Meet</p> <p><i>A typical student at this level of mathematics succeeds at few of the most fundamental mathematics skills of the Minnesota Academic Standards.</i></p> <p>Some of the skills typically demonstrated may include:</p> | <p>Partially Meets</p> <p><i>A typical student at this level of mathematics partially meets the mathematics skills of the Minnesota Academic Standards.</i></p> <p>Some of the skills typically demonstrated may include:</p> | <p>Meets</p> <p><i>A typical student at this level of mathematics meets the mathematics skills of the Minnesota Academic Standards.</i></p> <p>Some of the skills typically demonstrated may include:</p> | <p>Exceeds</p> <p><i>A typical student at this level of mathematics exceeds the mathematics skills of the Minnesota Academic Standards.</i></p> <p>Some of the skills typically demonstrated may include:</p> |
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| <p>6.3.2.1</p> <p>Solve problems using the relationships between the angles formed by intersecting lines.</p> | <p>Identifies the measure of the supplementary angle given the other angle with which it forms a straight angle</p> <p>Released Example: 262364</p> | <p>Identifies the measure of the complementary angle given the other angle with which it forms a right angle</p> <p>Calculates the measure of a supplementary angle to a given angle</p> <p>Released Examples: 260202, 262367</p> | <p>Solves problems involving angle measures by applying understanding of angle relationships, properties, and the terms: intersecting lines and supplementary, complementary, and vertical angles</p> <p>Solves multi-step problems to find missing angle measures in complex diagrams</p> <p>Released Example: 266030</p> | <p>Describes relationships between angles using appropriate vocabulary such as congruent, supplement, complement, vertical, or adjacent</p> <p>Released Examples: 265205, 265207</p> |

| Benchmark | Does Not Meet | Partially Meets | Meets | Exceeds |
|---|--|--|---|---|
| <p>6.3.2.2</p> <p>Determine missing angle measures in a triangle using the fact that the sum of the interior angles of a triangle is 180°. Use models of triangles to illustrate this fact.</p> | <p><i>A typical student at this level of mathematics succeeds at few of the most fundamental mathematics skills of the Minnesota Academic Standards.</i></p> <p>Some of the skills typically demonstrated may include:</p> <p>Identifies the measure of the third angle of a triangle using a drawing of the triangle and the fact that the sum of the interior angles of a triangle is 180 degrees</p> <p>Understands angle/vertex notation and meaning of right-angle symbol</p> <p>Released Examples: 263106, 266058</p> | <p><i>A typical student at this level of mathematics partially meets the mathematics skills of the Minnesota Academic Standards.</i></p> <p>Some of the skills typically demonstrated may include:</p> <p>Understands isosceles triangles have two equal base angles</p> <p>Determines a missing angle measure or two missing angle measures in an isosceles triangle</p> <p>Released Example: 263771</p> | <p><i>A typical student at this level of mathematics meets the mathematics skills of the Minnesota Academic Standards.</i></p> <p>Some of the skills typically demonstrated may include:</p> <p>Determines more than one possible combination of missing angle measures in a triangle using properties of angles</p> | <p><i>A typical student at this level of mathematics exceeds the mathematics skills of the Minnesota Academic Standards.</i></p> <p>Some of the skills typically demonstrated may include:</p> <p>Solves multi-step missing angle problems (angle measures both inside and outside a triangle) using triangle properties and angle relationships for intersecting lines</p> <p>Released Example: 44213</p> |

| Benchmark | Does Not Meet | Partially Meets | Meets | Exceeds |
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| <p>6.3.2.3</p> <p>Develop and use formulas for the sums of the interior angles of polygons by decomposing them into triangles.</p> | <p><i>A typical student at this level of mathematics succeeds at few of the most fundamental mathematics skills of the Minnesota Academic Standards.</i></p> <p>Some of the skills typically demonstrated may include:</p> <p>Knows that angle measures in a triangle sum to 180 degrees</p> <p>Knows that opposite angles are congruent in parallelograms</p> | <p><i>A typical student at this level of mathematics partially meets the mathematics skills of the Minnesota Academic Standards.</i></p> <p>Some of the skills typically demonstrated may include:</p> <p>Finds the missing angle in a quadrilateral given the 3 other angles</p> <p>Determines the measure of two missing angles in a quadrilateral given they are congruent</p> <p>Released Example: 44258</p> | <p><i>A typical student at this level of mathematics meets the mathematics skills of the Minnesota Academic Standards.</i></p> <p>Some of the skills typically demonstrated may include:</p> <p>Interprets “$m\angle A$” to mean “measure of angle A”</p> <p>Determines the measure of a missing angle in a polygon with up to 7 sides</p> <p>Decomposes a polygon with up to 7 sides into triangles to determine the sum of interior angles</p> <p>Released Example: 266021</p> | <p><i>A typical student at this level of mathematics exceeds the mathematics skills of the Minnesota Academic Standards.</i></p> <p>Some of the skills typically demonstrated may include:</p> <p>Knows or can calculate the sum of the measures of the interior angles of any polygon</p> <p>Explains how to calculate the sum of the measures of the interior angles by decomposing any polygon into triangles</p> <p>Released Example: 265256</p> |

Choose appropriate units of measurement and use ratios to convert within measurement systems to solve real-world and mathematical problems. (6.3.3)

| <p>Benchmark</p> | <p>Does Not Meet</p> <p><i>A typical student at this level of mathematics succeeds at few of the most fundamental mathematics skills of the Minnesota Academic Standards.</i></p> <p>Some of the skills typically demonstrated may include:</p> | <p>Partially Meets</p> <p><i>A typical student at this level of mathematics partially meets the mathematics skills of the Minnesota Academic Standards.</i></p> <p>Some of the skills typically demonstrated may include:</p> | <p>Meets</p> <p><i>A typical student at this level of mathematics meets the mathematics skills of the Minnesota Academic Standards.</i></p> <p>Some of the skills typically demonstrated may include:</p> | <p>Exceeds</p> <p><i>A typical student at this level of mathematics exceeds the mathematics skills of the Minnesota Academic Standards.</i></p> <p>Some of the skills typically demonstrated may include:</p> |
|--|---|--|---|---|
| <p>6.3.3.1</p> <p>Solve problems in various contexts involving conversion of weights, capacities, geometric measurements and times within measurement systems using appropriate units.</p> | <p>Uses multiplication or division (not addition or subtraction) to convert units when given conversion information</p> <p><u>Released Example:</u> 262105</p> | <p>Converts measurements in a smaller unit to a larger unit with some smaller units left over (e.g., 70 minutes to 1 hour, 10 minutes) and vice versa with either known time conversions or given conversions</p> <p>Multiplies or divides to solve one-step conversion problems</p> <p><u>Released Examples:</u> 262119, 265618</p> | <p>Solves one- and two- step conversions by calculating with whole numbers and converting between more common units within the customary system, the time system, and the metric system (e.g., hours to days is one step; meters to millimeters is two steps)</p> <p><u>Released Examples:</u> 262353, 264117</p> | <p>Solves real-world, multi-step problems involving conversions and calculating with decimals and fractions</p> <p>Consistently applies conversion factors for all metric conversions</p> <p><u>Released Examples:</u> 760112, 264740, 265617</p> |

| Benchmark | <p>Does Not Meet</p> <p><i>A typical student at this level of mathematics succeeds at few of the most fundamental mathematics skills of the Minnesota Academic Standards.</i></p> <p>Some of the skills typically demonstrated may include:</p> | <p>Partially Meets</p> <p><i>A typical student at this level of mathematics partially meets the mathematics skills of the Minnesota Academic Standards.</i></p> <p>Some of the skills typically demonstrated may include:</p> | <p>Meets</p> <p><i>A typical student at this level of mathematics meets the mathematics skills of the Minnesota Academic Standards.</i></p> <p>Some of the skills typically demonstrated may include:</p> | <p>Exceeds</p> <p><i>A typical student at this level of mathematics exceeds the mathematics skills of the Minnesota Academic Standards.</i></p> <p>Some of the skills typically demonstrated may include:</p> |
|---|---|---|---|---|
| <p>6.3.3.2</p> <p>Estimate weights, capacities and geometric measurements using benchmarks in measurement systems with appropriate units.</p> | <p>Identifies which common unit is most appropriate to use when estimating length or weight of an object or distance traveled</p> <p>Identifies an appropriate 1-digit value for a given unit measuring a characteristic of an object</p> <p>Released Example: 264962</p> | <p>Identifies appropriate metric or customary unit for capacity or weight when given a value and an object or situation</p> | <p>Recognizes appropriate estimates for area and other characteristics, including when the best unit is less common</p> <p>Released Example: 264186</p> | <p>Distinguishes between appropriate estimates for volume and area that may require some calculations</p> <p>Recognizes appropriate estimates including when measures are fractional</p> <p>Released Examples: 264184, 264198</p> |

Data Analysis & Probability

Use probabilities to solve real-world and mathematical problems; represent probabilities using fractions, decimals and percents. (6.4.1)

| Benchmark | Does Not Meet <i>A typical student at this level of mathematics succeeds at few of the most fundamental mathematics skills of the Minnesota Academic Standards.</i> Some of the skills typically demonstrated may include: | Partially Meets <i>A typical student at this level of mathematics partially meets the mathematics skills of the Minnesota Academic Standards.</i> Some of the skills typically demonstrated may include: | Meets <i>A typical student at this level of mathematics meets the mathematics skills of the Minnesota Academic Standards.</i> Some of the skills typically demonstrated may include: | Exceeds <i>A typical student at this level of mathematics exceeds the mathematics skills of the Minnesota Academic Standards.</i> Some of the skills typically demonstrated may include: |
|---|--|--|--|--|
| 6.4.1.1 Determine the sample space (set of possible outcomes) for a given experiment and determine which members of the sample space are related to certain events. Sample space may be determined by the use of tree diagrams, tables or pictorial representations. | Identifies which sample space describes or does not describe an experiment Determines number of possible outcomes in sample spaces for two events using multiplication facts up to 5 <u>Released Examples:</u> 263076, 260633 | Determines number of possible outcomes in sample spaces for more than two events using multiplication facts up to 5 Consistently interprets tree diagrams <u>Released Examples:</u> 264519, 265266 | Determines one possible outcome from the total sample space when given in table, tree diagram, or written description <u>Released Examples:</u> 263078, 265051 | Determines possible outcomes and number of occurrences of each outcome in a probability experiment Identifies scenarios to match given experiments <u>Released Examples:</u> 265045, 265049 |

| Benchmark | Does Not Meet <i>A typical student at this level of mathematics succeeds at few of the most fundamental mathematics skills of the Minnesota Academic Standards.</i> Some of the skills typically demonstrated may include: | Partially Meets <i>A typical student at this level of mathematics partially meets the mathematics skills of the Minnesota Academic Standards.</i> Some of the skills typically demonstrated may include: | Meets <i>A typical student at this level of mathematics meets the mathematics skills of the Minnesota Academic Standards.</i> Some of the skills typically demonstrated may include: | Exceeds <i>A typical student at this level of mathematics exceeds the mathematics skills of the Minnesota Academic Standards.</i> Some of the skills typically demonstrated may include: |
|---|---|---|---|--|
| 6.4.1.2 Determine the probability of an event using the ratio between the size of the event and the size of the sample space; represent probabilities as percents, fractions and decimals between 0 and 1 inclusive. Understand that probabilities measure likelihood. | Identifies how probability is written as a fraction as a ratio of success over total, and as a percent Identifies probabilities (%) between 70% and 95% as being “likely” and percents between 5% and 30% as “unlikely” Released Examples: 264654, 264867 | Determines probabilities of events as the ratio of the size of an event to the size of the sample space written as a fraction or percent in real-world situations Understands the meaning of probability or likelihood (certain, impossible, likely, and unlikely) of an event | Determines probabilities of compound events written as a fraction, percent, or decimal in real-world situations Understands the concept of random selection Released Examples: 264172, 264917, 265522 | Creates sample spaces for stated probabilities Determines probabilities of complements of events Released Example: 265619 |

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|--|--|--|--|--|
| 6.4.1.3 Perform experiments for situations in which the probabilities are known, and compare the resulting relative frequencies with the known probabilities; know that there may be differences. | Determines which relative frequencies are more than or less than expected results when no more than 5 items are listed in table format <u>Released Example:</u> 263721 | Understands the meaning of relative frequency and applies it to simple experiments (mostly coin toss) Compares experimental probabilities with expected probabilities for two or three events, where the number of trials is a multiple of 10 <u>Released Examples:</u> 261158, 266078 | Determines if relative frequencies match theoretical probabilities Determines if expected results match experimental results <u>Released Example:</u> 264730 | Explains why there could be a difference between expected and experimental results Compares and explains differences in relative frequency data with theoretical probabilities <u>Released Examples:</u> 42498, 266056 |

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|---|--|--|--|---|
| 6.4.1.4 Calculate experimental probabilities from experiments; represent them as percents, fractions and decimals between 0 and 1 inclusive. Use experimental probabilities to make predictions when actual probabilities are unknown. | Calculates experimental probabilities from 2 or 3 items listed in a table with a sum of 10 objects total Released Example: 263101 | Finds an experimental probability (as a fraction or percent) from a group of up to 5 items from real-world experiments and no extra information Released Examples: 44165, 44259 | Identifies important information to use with experimental data and makes predictions based on context and given data Determines the probability of event A or event B occurring Determines the probability of an event occurring when data is presented verbally and without tables Released Examples: 265312, 265313 | Uses experimental probabilities stated for events to predict future events in real-world situations Uses experimental data to make predictions when theoretical probabilities are not known, including group sizes other than 10, 20, 50, or 100 Released Example: 262337 |