



InspireData™ Standards Match

MONTANA



Mathematics Content Standards GRADES 5-8

Meeting curriculum standards is a major focus in education today. This document highlights the correlation of **InspireData™** with the **Montana Mathematics Content Standards**.

The Inspired Standards Match is designed to demonstrate the many ways InspireData supports the standards and to give educators ideas for using this tool to meet learning goals.

How to read the InspireData Standards Match:

- ▶ **Yellow** highlight indicates a standard or objective that can be supported by the use of InspireData databases, database templates, user generated databases, lesson plans or program features.
- ▶ **Green** notes list details about how InspireData can be used to meet the standards, including examples of specific databases, lesson plans or features that support them.

Thank you for your interest in InspireData!

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MONTANA STANDARDS FOR MATHEMATICS

Mathematics is intended to give students an ability to solve problems, to communicate their ideas and strategies, and to apply their skills in other disciplines. Students are expected to understand and investigate mathematical concepts, to use mathematics in real-world situations, and to select and use appropriate technology to model and study mathematical processes.

Students will use mathematical methods to learn about six strands: Quantity (number), Algebraic Representation, Shape (geometry), Measurement, Chance and the Use of Data, and Mathematical Patterns. In every strand, it is important for all students to have a conceptual framework, a knowledge of procedures, a sense of reasonable results, and a confidence to apply their skills.

Content Standards indicate what all students should know, understand, and be able to do in a specific content area.

Benchmarks define our expectations for students' knowledge, skills, and abilities along a developmental continuum in each content area. That continuum is focused at three points—the end of grade 4, grade 8, and grade 12.

Content Standard 1 - Students engage in the mathematical processes of problem solving and reasoning, estimation, communication, connections and applications, and using appropriate technology.

Content Standard 2 - Students demonstrate understanding of and an ability to use numbers and operations.

Content Standard 3 - Students use algebraic concepts, processes, and language to model and solve a variety of real-world and mathematical problems.

Content Standard 4 - Students demonstrate understanding of shape and an ability to use geometry.

Content Standard 5 - Students demonstrate understanding of measurable attributes and an ability to use measurement processes.

Content Standard 6 - The students demonstrate understanding of an ability to use data analysis, probability, and statistics.

Content Standard 7 - Students demonstrate understanding of and an ability to use patterns, relations and functions.

Mathematics Content Standard 1

Students engage in the mathematical processes of problem solving and reasoning, estimation, communication, connections and applications, and using appropriate technology.

Rationale

These processes are essential to all mathematics and must be incorporated in all other mathematics standards.

Benchmarks

Students will:

End of Grade 4	End of Grade 8	Upon Graduation—End of Grade 12
<ol style="list-style-type: none"> 1. solve problems from many contexts using a variety of strategies (e.g., estimate, make a table, look for a pattern, and simplify the problem). Explain the methods for solving these problems. 2. apply estimation strategies throughout the problem-solving process. 3. communicate mathematical ideas in a variety of ways (e.g., written, verbal, concrete, pictorial, graphical, algebraic). 4. recognize and investigate the relevance and usefulness of mathematics through applications, both in and out of school. 5. select and use appropriate technology to enhance mathematical understanding. Appropriate technology may include, but is not limited to, paper and pencil, calculator, and computer. 	<ol style="list-style-type: none"> 1. formulate and solve multi-step and nonroutine problems using a variety of strategies. Generalize methods to new problem situations. 2. select and apply appropriate estimation strategies throughout the problem-solving process. 3. interpret and communicate mathematical ideas and logical arguments using correct mathematical terms and notations. 4. recognize and investigate the relevance and usefulness of mathematics through applications, both in and out of school. 5. select and use appropriate technology to enhance mathematical understanding. Appropriate technology may include, but is not limited to, paper and pencil, calculator, computer, and data collection devices. 	<ol style="list-style-type: none"> 1. recognize and formulate problems from situations within and outside mathematics and apply solution strategies to those problems. 2. select, apply, and evaluate appropriate estimation strategies throughout the problem-solving process. 3. formulate definitions, make and justify inferences, express generalizations, and communicate mathematical ideas and relationships. 4. apply and translate among different representations of the same problem situation or of the same mathematical concept. Model connections between problem situations that arise in disciplines other than mathematics. 5. select and use appropriate technology to enhance mathematical understanding. Appropriate technology may include, but is not limited to, paper and pencil, calculator, computer, and data collection devices.

Mathematics Content Standard 2

Students demonstrate understanding of and an ability to use numbers and operations.

Rationale

An understanding of numbers and how they are used is necessary in the everyday world. Computational skills and procedures should be developed in context so the learner perceives them as tools for solving problems.

Benchmarks

Students will:

End of Grade 4	End of Grade 8	Upon Graduation—End of Grade 12
<ol style="list-style-type: none">1. exhibit connections between the concrete and symbolic representation of a problem or concept.2. use the number system by counting, grouping and applying place value concepts.3. model, explain, and use basic facts, the operations of addition and subtraction of whole numbers, and mental mathematics.4. model and explain multiplication and division of whole numbers.5. model and explain part/whole relationships in everyday situations.	<ol style="list-style-type: none">1. use the four basic operations with whole numbers, fractions, decimals, and integers.2. use mental mathematics and number sense in using order of operations, and order relations for whole numbers, fractions, decimals, and integers.3. use the relationships and applications of ratio, proportion, percent, and scientific notation.4. develop and apply number theory concepts (e.g., primes, factors and multiples) in real-world and mathematical problem situations.	<ol style="list-style-type: none">1. use and understand the real number system, its operations, notations, and the various subsystems.2. use definitions and basic operations of the complex number system.

Mathematics Content Standard 3

Students use algebraic concepts, processes, and language to model and solve a variety of real-world and mathematical problems.

Rationale

Algebra is the language of mathematics and science. Through the use of variables and operations, algebra allows students to form abstract models from contextual information.

Benchmarks

Students will:

End of Grade 4	End of Grade 8	Upon Graduation—End of Grade 12
<ol style="list-style-type: none">1. use symbols (e.g., boxes or letters) to represent numbers in simple situations.2. explore the use of variables and open sentences to express relationships (e.g., missing addend).3. use inverse operations and other strategies to solve number sentences.	<ol style="list-style-type: none">1. understand the concepts of variable, expression and equation.2. represent situations and number patterns using tables, graphs, verbal rules, equations, and models.3. recognize and use the general properties of operations (e.g., the distributive property).4. solve linear equations using concrete, numerical and algebraic methods.5. investigate inequalities and nonlinear relationships informally.	<ol style="list-style-type: none">1. use algebra to represent patterns of change.2. use basic operations with algebraic expressions.3. solve algebraic equations and inequalities: linear, quadratic, exponential, logarithmic, and power.4. solve systems of algebraic equations and inequalities, including use of matrices.5. use algebraic models to solve mathematical and real-world problems.

Mathematics Content Standard 4

Students demonstrate understanding of shape and an ability to use geometry.

Rationale

The study of geometry helps students represent and make sense of the world by discovering relationships and developing spatial sense.

Benchmarks

Students will:

End of Grade 4	End of Grade 8	Upon Graduation—End of Grade 12
<ol style="list-style-type: none">1. describe, model, and classify two- and three-dimensional shapes.2. investigate and predict results of combining, subdividing, and changing shapes.3. identify lines of symmetry, congruent and similar shapes, and positional relationships.	<ol style="list-style-type: none">1. identify, describe, construct, and compare plane and solid geometric figures.2. understand and apply geometric properties and relationships (e.g., the Pythagorean Theorem).3. represent geometric figures on a coordinate grid.4. explore properties and transformations of geometric figures.5. use geometry as a means of describing the physical world.	<ol style="list-style-type: none">1. construct, interpret, and draw three-dimensional objects.2. classify figures in terms of congruence and similarity and apply these relationships.3. translate between synthetic and coordinate representations.4. deduce properties of figures using transformations, coordinates, and vectors in problem solving.5. apply trigonometric ratios (sine, cosine and tangent) to problem situations involving triangles.

Mathematics Content Standard 5

Students demonstrate understanding of measurable attributes and an ability to use measurement processes.

Rationale

The first step in scientific investigation is understanding the measurable attributes of objects.

Benchmarks

Students will:

End of Grade 4	End of Grade 8	Upon Graduation—End of Grade 12
1. estimate, measure, and investigate length, capacity, weight, mass, area, volume, time, and temperature.	1. estimate, make, and use measurements to describe, compare, and/or contrast objects in real-world situations.	1. apply concepts of indirect measurements (e.g., using similar triangles to calculate a distance).
2. develop the process of measuring and concepts related to units of measurement, including standard units (English and metric) and nonstandard units.	2. select and use appropriate units and tools to measure to a level of accuracy required in a particular setting.	2. use dimensional analysis to check reasonableness of procedures.
3. apply measurement skills to everyday situations.	3. apply the concepts of perimeter, area, volume and capacity, weight and mass, angle measure, time, and temperature.	3. investigate systems of derived measures (e.g., km/sec, g/cm ³).
4. select and use appropriate tools and techniques.	4. demonstrate understanding of the structure and use of systems of measurement, including English and metric.	4. apply the appropriate concepts of estimates in measurement, error in measurement, tolerance, and precision.
	5. use the concepts of rates and other derived and indirect measurements.	
	6. demonstrate relationships between formulas and procedures for determining area and volume.	

Mathematics Content Standard 6

The students demonstrate understanding of and an ability to use data analysis, probability, and statistics.

Rationale

With society's expanding use of data for prediction and decision making, it is important that students develop an understanding of the concepts and processes used in analyzing data.

Benchmarks

Students will:

End of Grade 4	End of Grade 8	Upon Graduation—End of Grade 12
1. collect, organize, and display data.	1. systematically collect, organize, and describe data.	1. use curve fitting to make predictions from data.
2. construct, read, and interpret displays of data, including graphs.	2. construct, read, and interpret tables, charts, and graphs.	2. apply measures of central tendency and demonstrate understanding of the concepts of variability and correlation.
3. formulate and solve problems that involve collecting and analyzing data.	3. draw inferences, construct, and evaluate arguments based on data analysis and measures of central tendency.	3. select an appropriate sampling method for a given statistical analysis.
4. demonstrate basic concepts of chance (e.g., equally likely events, simple probabilities).	4. construct sample spaces and determine the theoretical and experimental probabilities of events.	4. use experimental probability, theoretical probability, and simulation methods to represent and solve problems, including expected values.
	5. make predictions based on experimental results or probabilities.	5. design a statistical experiment to study a problem and communicate the outcomes.
		6. describe, in general terms, the normal curve and use its properties to answer questions about sets of data that are assumed to be normally distributed.

Mathematics Content Standard 7

Students demonstrate understanding of and an ability to use patterns, relations and functions.

Rationale

One of the central themes of mathematics is the study of patterns, relations, and functions. Exploring patterns helps students develop mathematical power and instills in them an appreciation for the beauty of mathematics.

Benchmarks

Students will:

End of Grade 4	End of Grade 8	Upon Graduation—End of Grade 12
<ol style="list-style-type: none"> recognize, describe, extend, and create a variety of patterns. represent and describe mathematical and real-world relationships. 	<ol style="list-style-type: none"> describe, extend, analyze, and create a variety of patterns and functions. describe and represent relationships with tables, graphs, and rules. analyze functional relationships to explain how a change in one quantity results in a change in another. use patterns and functions to represent and solve problems. describe functions using graphical, numerical, physical, algebraic, and verbal models or representations. 	<ol style="list-style-type: none"> describe functions and their inverses using graphical, numerical, physical, algebraic, and verbal mathematical models or representations. analyze the graphs of the families of polynomial, rational, power, exponential, logarithmic, and periodic functions. analyze the effects of parameter changes on the graphs of functions and relations, including translations. model real-world phenomena with a variety of functions. use graphing for parametric equations, three-dimensional equations, and recursive relations.