Montana Instructional Alignment
HPS Critical Competencies
Mathematics
Fifth Grade

Content Standards

Content Standard 1 - Number Sense and Operations:

A student, applying reasoning and problem solving, will use number sense and operations to represent numbers in multiple ways, understand relationships among numbers and number systems, make reasonable estimates and compute fluently within a variety of relevant cultural contexts.

Content Standard 2 - Data Analysis:

A student, applying reasoning and problem solving, will use data representation and analysis, probability, statistics and statistical methods to evaluate information and make informed decisions within a variety of relevant cultural contexts.

Content Standard 3 - Geometric Reasoning:

A student, applying reasoning and problem solving, will understand geometric properties and spatial relationships, transformation of shapes, representational systems, spatial reasoning and geometric models to analyze mathematical situations within a variety of relevant cultural contexts.

Content Standard 4 - Algebraic and Functional Reasoning:

A student, applying reasoning and problem solving, will use algebraic and functional concepts and procedures to understand patterns, quantitative and functional relationships, algebraic representations, models and change within a variety of relevant cultural contexts.

Montana Instructional Alignment
HPS Critical Competencies
Mathematics
Fifth Grade

Content Standard 1 - **Number Sense and operations:**
A student, applying reasoning and problem solving, will use number sense and operations to represent numbers in multiple ways, understand relationships among numbers and number systems, make reasonable estimates and compute fluently within a variety of relevant cultural contexts.

Essential Learning Expectations (ELE's / Critical Competencies) should be addressed in contexts that promote problem solving, reasoning, communication, making connections, and designing and analyzing representations. – *Curriculum Focal Points for Prekindergarten through Grade 8 Mathematics – NCTM – National Council for Teachers of Mathematics*

State Established Benchmark At the end of 8th grade, a proficient student will:	**Essential Learning Expectation** (ELE) (HPS Critical Competencies)	**NCTM**	**Assessment Statements** (Specific Examples)	**Vocabulary** (for instructional purposes)
1.1 **Number Theory**: Apply number theory concepts (e.g. primes, factors, and multiples) in mathematical problem situations.	• Recognize prime and composite numbers	**Number and Operations** • Developing an understanding of and fluency with division of whole numbers • Develop an understanding of and fluency with addition and subtraction of fractions and decimals.	• 1, 2, 3, 5, 7 – Prime • 4, 6, 8, 9, 10 - Composite	prime, composite
1.2 **Estimation**: Select and apply appropriate estimation strategies to measure, compute, and judge results in terms of reasonableness and accuracy. (e.g., estimate an irrational number using the square roots of perfect square numbers).	• Apply estimation skills to all operations	**Numbers and Operations**	• 364 x25 rounds to 400 x30 12,000 or 360 x30 10,800	front-end, about, compatible
1.3 **Rational Numbers**: Recognize relationships among different representations of rational numbers and identify, compare and order rational numbers as well as common irrational numbers.	• Understand place value of whole numbers – thousands through millions and decimals tenths through thousandths		• Find place value of the underlined digit and the value of whole numbers and decimals. 1.69 – Place value tenths value 0.60	place value, value, thousandths, rational numbers, irrational numbers
1.4 **Rational Number Operations**: Compute fluently and solve multi-step problems using integers, fractions, decimals, percents, and numbers in exponential form.	• Add, subtract and simply fractions with uncommon denominators • Multiply facts fluently thru 12 • Add and subtract decimals to the thousandths place		• $\frac{1}{3}=\frac{4}{12}$ + $\frac{4}{12}=\frac{4}{12}$ = $\frac{8}{12}=\frac{2}{3}$ 4.694 - 2.782 = 1.912 4^3 = 4x4x4 = 64	value, percents, powers of, ten, least common factor, numerator, denominator, factors, simplify, product, lowest term

Montana Instructional Alignment
HPS Critical Competencies
Mathematics
Fifth Grade

Content Standard 1 Continued - **Number Sense and operations:**
A student, applying reasoning and problem solving, will use number sense and operations to represent numbers in multiple ways, understand relationships among numbers and number systems, make reasonable estimates and compute fluently within a variety of relevant cultural contexts.

Essential Learning Expectations (ELE's / Critical Competencies) should be addressed in contexts that promote problem solving, reasoning, communication, making connections, and designing and analyzing representations. – *Curriculum Focal Points for Prekindergarten through Grade 8 Mathematics – NCTM – National Council for Teachers of Mathematics*

State Established Benchmark **At the end of 8th grade, a proficient student will:**	**Essential Learning Expectation** (ELE) **(HPS Critical Competencies)**	**NCTM**	**Assessment Statements** **(Specific Examples)**	**Vocabulary (for instructional purposes)**
1.5 **Proportional Reasoning:** Understand and apply proportional relationships and solve problems involving rates, ratios, proportions, and percents.	• Apply and compare equivalent in various forms (fractions, decimals, percent, ratio, and proportion)		• $\frac{3}{10} = 0.3 = 30\%$ • $\frac{40}{100} = 0.40 = 40\%$	ratio, percent, proportion
1.6 **Measurement:** Demonstrate an understanding of measurable attributes of objects, and the units, systems, and processes of measurement within relevant cultural contexts.				

Montana Instructional Alignment
HPS Critical Competencies
Mathematics
Fifth Grade

Content Standard 2 - **Data Analysis:**
A student, applying reasoning and problem solving, will use data representation and analysis, probability, statistics and statistical methods to evaluate information and make informed decisions within a variety of relevant cultural contexts.

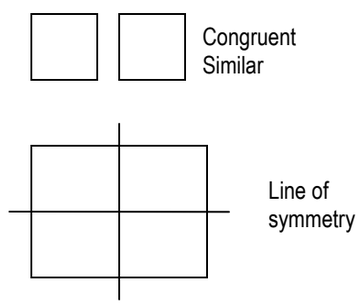
Essential Learning Expectations (ELE's / Critical Competencies) should be addressed in contexts that promote problem solving, reasoning, communication, making connections, and designing and analyzing representations. – *Curriculum Focal Points for Prekindergarten through Grade 8 Mathematics – NCTM – National Council for Teachers of Mathematics*

State Established Benchmark **At the end of 8th grade, a proficient student will:**	**Essential Learning Expectation** (ELE) **(HPS Critical Competencies)**	**NCTM**	**Assessment Statements** **(Specific Examples)**	**Vocabulary** **(for instructional purposes)**
2.1 **Represent Data**: Collect, organize and represent data (e.g. box plots, histograms, scatter plots, circle graphs) in culturally relevant contexts.				
2.2 **Evaluate Data:** Interpret, analyze, and evaluate data to make decisions and predictions (e.g. trends in data).				
2.3 **Descriptive Statistics:** Compute and apply mean, median, mode, and range to compare and describe data.	• Find mean, median, mode, range and make predications	**Data Analysis** • Students apply their understanding of whole numbers, fractions, and decimals	• 4,6,6,6,7,8,9 Find mean, median, mode, range of this set of numbers	mean, median, mode, range, average
2.4 **Probability:** Using real-life contexts or simulation create sample spaces, determine experimental and theoretical probabilities (e.g. using tree diagrams), and make predictions.	• Make simple predictions using probability		• Strips of paper in a bag 6 green, 1 blue, 3 red What is the probability of picking a red strip?	probability, fair/unfair game, random, prediction, possible, least likely, certain, equally likely, unlikely, likely, outcome

Montana Instructional Alignment
HPS Critical Competencies
Mathematics
Fifth Grade

Content Standard 3 - **Geometric Reasoning:**
A student, applying reasoning and problem solving, will understand geometric properties and spatial relationships, transformation of shapes, representational systems, spatial reasoning and geometric models to analyze mathematical situations within a variety of relevant cultural contexts.

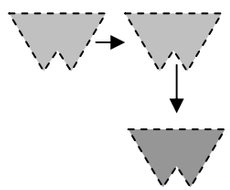
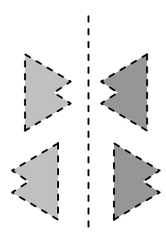
Essential Learning Expectations (ELE's / Critical Competencies) should be addressed in contexts that promote problem solving, reasoning, communication, making connections, and designing and analyzing representations. – *Curriculum Focal Points for Prekindergarten through Grade 8 Mathematics – NCTM – National Council for Teachers of Mathematics*

State Established Benchmark **At the end of 8th grade, a proficient student will:**	**Essential Learning Expectation** (ELE) **(HPS Critical Competencies)**	**NCTM**	**Assessment Statements** **(Specific Examples)**	**Vocabulary (for instructional purposes)**
3.1 **Properties**: Define, classify, and compare properties of solids and plane figures, including angles.	• Describe, model, identify, classify attributes of 2-dimensional, 3-dimensional by indentifying angles		• 3-dimensional shapes – sphere, triangular pyramid, rectangular prism, rectangular pyramid, cone, cylinder, cube	acute, obtuse, right angle, straight angle, vertex, protractor, compass
3.2 **Relationships**: Determine congruence, similarity, and symmetry of objects in mathematics and in the contexts of art, science, and culture.			• 	line, line segment, ray, quadrilateral point, parallel, perpendicular, intersect

Montana Instructional Alignment
HPS Critical Competencies
Mathematics
Fifth Grade

Content Standard 3 - **Geometric Reasoning:**
A student, applying reasoning and problem solving, will understand geometric properties and spatial relationships, transformation of shapes, representational systems, spatial reasoning and geometric models to analyze mathematical situations within a variety of relevant cultural contexts.

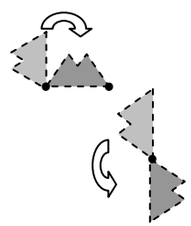
Essential Learning Expectations (ELE's / Critical Competencies) should be addressed in contexts that promote problem solving, reasoning, communication, making connections, and designing and analyzing representations. – *Curriculum Focal Points for Prekindergarten through Grade 8 Mathematics – NCTM – National Council for Teachers of Mathematics*

State Established Benchmark **At the end of 8th grade, a proficient student will:**	**Essential Learning Expectation** (ELE) **(HPS Critical Competencies)**	**NCTM**	**Assessment Statements** **(Specific Examples)**	**Vocabulary (for instructional purposes)**
3.3 **Transformations**: Define, identify, and apply transformations (e.g. translations, rotations, reflections, dilations) on the coordinate plane.	• Define, identify, and model slide (translation), flip (reflection) and turn (rotation)		•  • 	slide, translation, flip, reflection, turn, rotation

Montana Instructional Alignment
HPS Critical Competencies
Mathematics
Fifth Grade

Content Standard 3 - **Geometric Reasoning:**
A student, applying reasoning and problem solving, will understand geometric properties and spatial relationships, transformation of shapes, representational systems, spatial reasoning and geometric models to analyze mathematical situations within a variety of relevant cultural contexts.

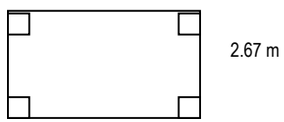
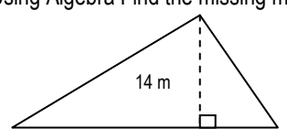
Essential Learning Expectations (ELE's / Critical Competencies) should be addressed in contexts that promote problem solving, reasoning, communication, making connections, and designing and analyzing representations. – *Curriculum Focal Points for Prekindergarten through Grade 8 Mathematics – NCTM – National Council for Teachers of Mathematics*

State Established Benchmark At the end of 8th grade, a proficient student will:	Essential Learning Expectation (ELE) (HPS Critical Competencies)	NCTM	Assessment Statements (Specific Examples)	Vocabulary (for instructional purposes)
			• 	
3.4 **Measurement**: Select appropriate metric or standard units and formulas to measure and compute angles, perimeter, area, surface area, and volume.	• Select and apply appropriate units of measurement perimeter, area, volume, measure angles	**Measurement** • Volume • Area • Perimeter	• Use a protractor to measure this angle 	

Montana Instructional Alignment
HPS Critical Competencies
Mathematics
Fifth Grade

Content Standard 3 - **Geometric Reasoning:**
A student, applying reasoning and problem solving, will understand geometric properties and spatial relationships, transformation of shapes, representational systems, spatial reasoning and geometric models to analyze mathematical situations within a variety of relevant cultural contexts.

Essential Learning Expectations (ELE's / Critical Competencies) should be addressed in contexts that promote problem solving, reasoning, communication, making connections, and designing and analyzing representations. – *Curriculum Focal Points for Prekindergarten through Grade 8 Mathematics – NCTM – National Council for Teachers of Mathematics*

State Established Benchmark At the end of 8th grade, a proficient student will:	Essential Learning Expectation (ELE) (HPS Critical Competencies)	NCTM	Assessment Statements (Specific Examples)	Vocabulary (for instructional purposes)
			• Using Algebra Find the missing measurement for this figure.  2.67 m 5.67 m *P* = • Using Algebra Find the missing measurement for this triangle.  14 m 24 m *A* =	equilateral, obtuse, polygon (regular), congruent, rhombus, similar, trapezoid, degree, parallelogram, scalene, isosceles, perimeter, area, volume

Montana Instructional Alignment
HPS Critical Competencies
Mathematics
Fifth Grade

Content Standard 3 - **Geometric Reasoning:**
A student, applying reasoning and problem solving, will understand geometric properties and spatial relationships, transformation of shapes, representational systems, spatial reasoning and geometric models to analyze mathematical situations within a variety of relevant cultural contexts.

Essential Learning Expectations (ELE's / Critical Competencies) should be addressed in contexts that promote problem solving, reasoning, communication, making connections, and designing and analyzing representations. – *Curriculum Focal Points for Prekindergarten through Grade 8 Mathematics – NCTM – National Council for Teachers of Mathematics*

State Established Benchmark **At the end of 8th grade, a proficient student will:**	**Essential Learning Expectation** (ELE) **(HPS Critical Competencies)**	**NCTM**	**Assessment Statements** **(Specific Examples)**	**Vocabulary (for instructional purposes)**
3.4 **Measurement**: Select appropriate metric or standard units and formulas to measure and compute angles, perimeter, area, surface area, and volume**.**	• Select and apply appropriate units of measurement perimeter, area, volume, measure angles	**Measurement** • Volume • Area • Perimeter	• Using Algebra Find the missing measurement for each prism. $l = 4.5\ m$ $w = 5\ m$ $h = 2\ m$ v	equilateral, obtuse, polygon (regular), congruent, rhombus, similar, trapezoid, degree, parallelogram, scalene, isosceles, perimeter, area, volume
3.5 **Justification:** Develop informal arguments to verify geometric relationships (e.g. Pythagorean Theorem) and solve problems.			•	circle, chord, radius, diameter, center, open/closed figures, prisms, pyramids, cylinder, cone, sphere, cubes, edges, vertices, sides

Montana Instructional Alignment
HPS Critical Competencies
Mathematics
Fifth Grade

Content Standard 4 - **Algebraic and Functional Reasoning:**
A student, applying reasoning and problem solving, will use algebraic and functional concepts and procedures to understand patterns, quantitative and functional relationships, algebraic representations, models and change within a variety of relevant cultural contexts.

Essential Learning Expectations (ELE's / Critical Competencies) should be addressed in contexts that promote problem solving, reasoning, communication, making connections, and designing and analyzing representations. – *Curriculum Focal Points for Prekindergarten through Grade 8 Mathematics – NCTM – National Council for Teachers of Mathematics*

State Established Benchmark At the end of 8th grade, a proficient student will:	**Essential Learning Expectation** (ELE) (HPS Critical Competencies)	**NCTM**	**Assessment Statements** (Specific Examples)	**Vocabulary** (for instructional purposes)
4.1 **Patterns**: Create and use tables, graphs, words, and symbols/variables to represent, analyze, and generalize a variety of patterns.	• Survey, make and interpret data and graphs (double bar, double line, circle and pictographs, stem-and-leaf plot) • Recognize and explore patterns	**Data Analysis** • Students apply their understanding of whole numbers, fractions, and decimals as they construct and analyze **Algebra** •	• X Y Axis 	scale, interval, key, X and Y axis, horizontal/vertical axis, coordinate, grid, stem-and-leaf plot, survey, tally chart, pictograph, pattern
4.2 **Equivalence**: Recognize, simplify, and generate equivalent forms for algebraic expressions.				
4.3 **Solving**: Use number properties and inverse operations to solve single-variable equations and inequalities.	• Read, write, and evaluate expressions and equations using inverse operations to solve single variable equations • Apply appropriate properties	**Algebra** • Students use patterns, models, and relationships as contexts for writing and solving simple equation and inequalities **Numbers and Operations** **Algebra**	• x + 5 = 8 • Commutative - 6 x 5 = 5 x 6 • Associative - (7 + 6) + 5 = 7 + (6 + 5) • Property of One – 7 x 1 = 7 (identity) • Zero Property – 0 x 6 = 0 • Distributive – 3 x (6 + 10)	commutative, associative, identity, property of one, zero property, inverse operation, distributive
4.4 **Function**: Identify linear and non-linear functional relationships and contrast their properties from tables, graphs, or equations.	• Graph and table (input/output) functional relationships (ordered pairs) in Quadrant 1	**Algebra**	• Rule: Add 5 Input | Output 6 | n n | 15 12 | n	input, output, ordered pairs, X and Y axis, coordinate grid
4.5 **Modeling:** Identify and compute rate of change/slope and intercepts from equations, graphs, and tables; model and solve contextual problems involving linear proportions.				