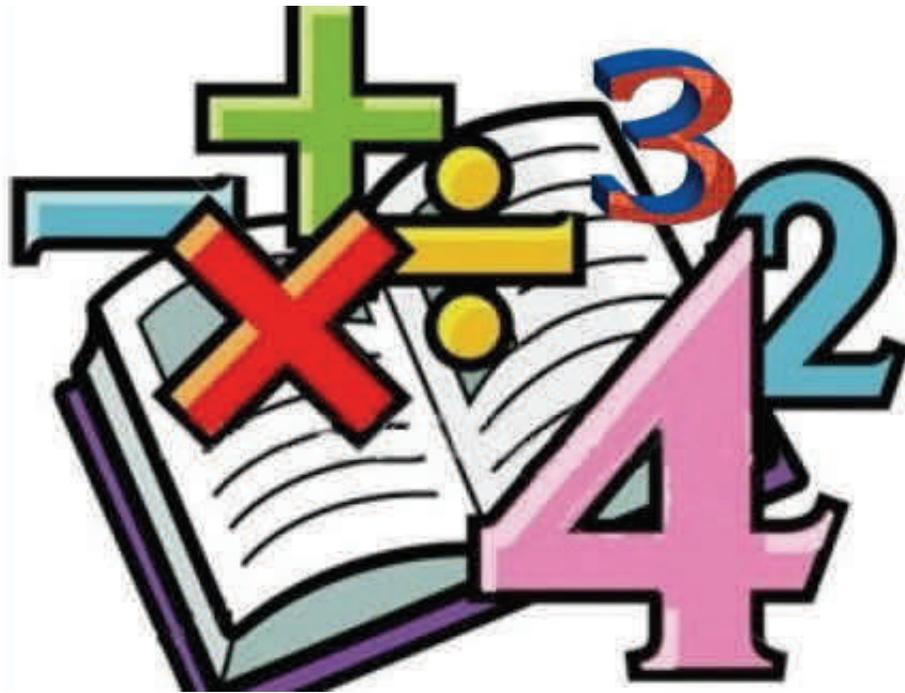


Diocese of Madison

**MATH EDUCATION
STANDARDS & BENCHMARKS**



Grades K—8

Office of Catholic Schools

Math Education Standards	
M.1.	Mathematical Processes: Students will apply a variety of mathematical skills and strategies, including reasoning, oral and written communication.
M.2.	Number Operations & Relationships: Students will use numbers effectively for various purposes.
M.3.	Geometry: Students will be able to use geometric concepts, relationships and procedures to interpret, represent, and solve problems.
M.4.	Measurement: Students will select and use appropriate tools and techniques to measure accurately.
M.5.	Statistics & Probability: Students will use data collection and analysis in problem-solving situations.

	Kindergarten	Grade 1	Grade 2
M.1.	Mathematical Processes: Students will apply a variety of mathematical skills and strategies, including reasoning, oral and written communication.		
A	Communicate mathematical ideas through manipulatives and number sentences.	Communicate mathematical ideas through manipulatives, number sentences, and graphs.	Communicate mathematical ideas through manipulatives, number sentences, and graphs.
B	Use appropriate mathematical vocabulary, symbols, and notation, including +, -, =	Use appropriate mathematical vocabulary, symbols, and notation, including +, -, =, \$, cents, <, >	Use appropriate mathematical vocabulary, symbols, and notation, including +, -, \$, cents, <, >
C	Use reason when determining solutions to grade-level mathematical processes.	Use reason when determining solutions to grade-level mathematical processes.	Use reason when determining solutions to grade-level mathematical processes.
D		Recognize mathematical ideas as they appear in other subject areas.	Recognize mathematical ideas as they appear in other subject areas.
E		Explain concepts clearly and logically and support solutions with evidence.	Explain concepts clearly and logically and support solutions with evidence.

	Grade 3	Grade 4	Grade 5
M.1.	Mathematical Processes: Students will apply a variety of mathematical skills and strategies, including reasoning, oral and written communication.		
A	Communicate mathematical ideas using models and diagrams.	Communicate mathematical ideas using models and diagrams.	Communicate mathematical ideas using models and diagrams.
B	Use appropriate mathematical vocabulary, symbols, and notation with understanding based on prior conceptual work.	Use appropriate mathematical vocabulary, symbols, and notation with understanding based on prior conceptual work.	Use appropriate mathematical vocabulary, symbols, and notation with understanding based on prior conceptual work.
C	Use reason when determining solutions to grade-level mathematical processes.	Use reason when determining solutions to grade-level mathematical processes.	Use reason when determining solutions to grade-level mathematical processes.
D	Use operations to solve everyday real-world problems.	Use operations to solve everyday real-world problems.	Use operations to solve everyday real-world problems.
E	Explain written solutions clearly and logically with supporting evidence.	Explain written solutions clearly and logically with supporting evidence.	Explain written solutions clearly and logically with supporting evidence.

	Grade 6	Grade 7	Grade 8
M.1.	Mathematical Processes: Students will apply a variety of mathematical skills and strategies, including reasoning, oral and written communication.		
A	Using technology, communicate mathematical ideas in various ways.	Using technology, communicate mathematical ideas in various ways.	Using technology, communicate mathematical ideas in various ways.
B	Use appropriate mathematical vocabulary, symbols, and notation with understanding based on prior conceptual work.	Use appropriate mathematical vocabulary, symbols, and notation with understanding based on prior conceptual work.	Use appropriate mathematical vocabulary, symbols, and notation with understanding based on prior conceptual work.
C	Use reason when determining solutions to grade-level mathematical processes.	Use reason when determining solutions to grade-level mathematical processes.	Use reason when determining solutions to grade-level mathematical processes.
D	Use operations to solve everyday real-world problems.	Use operations to solve everyday real-world problems.	Use operations to solve everyday real-world problems.
E	Justify solutions by using step-by-step processes.	Justify solutions by using step-by-step processes.	Justify solutions by using step-by-step processes.

	Kindergarten	Grade 1	Grade 2
M.2.	Number Operations & Relationships: Students will use numbers effectively for various purposes.		
A	Read, represent, order, and interpret whole numbers.	Read, represent, order, and interpret whole numbers.	Read, represent, order, and interpret rational numbers.
B	Perform and explain addition, subtraction, and counting by groupings.	Perform and explain addition, subtraction, and counting by groupings.	Perform and explain addition, subtraction, and counting by groupings.
C	Use appropriate numerical operations and relationships when problem-solving.	Use appropriate numerical operations and relationships when problem-solving.	Use appropriate numerical operations and relationships when problem-solving.

	Grade 3	Grade 4	Grade 5
M.2.	Number Operations & Relationships: Students will use numbers effectively for various purposes.		
A	Read, write, compare, order, and interpret rational numbers.	Read, write, compare, order, and interpret rational numbers.	Read, write, compare, order, and interpret rational numbers.
B	Perform and explain addition and subtraction by re-grouping, as well as multiplication and division of whole numbers.	Perform and explain addition and subtraction of fractions, as well as multiplication and division of whole numbers.	Perform and explain multiplication and division of fractions and decimals, as well as convert fractions and decimals into percentages.
C	Use appropriate operational methods when problem-solving.	Use appropriate operational methods when problem-solving.	Use appropriate operational methods, including divisibility rules, when problem-solving.

	Grade 6	Grade 7	Grade 8
M.2.	Number Operations & Relationships: Students will use numbers effectively for various purposes.		
A	Use mathematical notation appropriately (e.g. expanded, scientific, exponential)	Use and apply mathematical notation appropriately (e.g. expanded, scientific, exponential)	Read, write, compare, order, and interpret irrational and radical numbers; understand rules of exponents.
B	Convert rational numbers. (e.g. fractions to decimals to percents)	Generate and explain equivalencies of rational numbers and percents.	Understand absolute value, extracting roots, and raising numbers to a power.
C	Compare and contrast ratios and proportions; use prime factorization to find greatest common factor and least common multiple.	Apply percents to discounts, simple interest, and sales tax; including percents less than one and greater than one hundred.	Use appropriate operational methods, including percent of change.

	Kindergarten	Grade 1	Grade 2
M.3.	Geometry: Students will be able to use geometric concepts, relationships and procedures to interpret, represent, and solve problems.		
A	Describe objects in the environment using shape words (e.g., circle, square, rectangle, triangle)	Identify, draw, and build shapes	Identify, draw, and build shapes.
B		Compare similarities and differences among shapes (e.g. sides and corners)	Compare similarities and differences among shapes (e.g. faces, angles, sides, and vertices)
C			
D			

	Grade 3	Grade 4	Grade 5
M.3.	Geometry: Students will be able to use geometric concepts, relationships and procedures to interpret, represent, and solve problems.		
A	Identify, classify, and create geometric figures.	Identify, classify, create, and measure geometric figures.	Identify, classify, create, and measure geometric figures.
B	Identify points and plot points within a rectangular coordinate system.	Identify points and plot points within a rectangular coordinate system.	Identify points and plot points within a rectangular coordinate system.
C	Identify and perform slides, flips, and turns.	Distinguish between slides, flips, and turns.	Draw slides, flips, and turns.
D	Identify and use relationships among figures.	Compare and contrast varying figures (e.g. quadrilaterals).	Compare and contrast varying figures using the sum of interior angles.

	Grade 6	Grade 7	Grade 8
M.3.	Geometry: Students will be able to use geometric concepts, relationships and procedures to interpret, represent, and solve problems.		
A	Draw, construct, and describe geometrical figures and describe the relationships between them.	Draw, construct, and describe geometrical figures and describe the relationships between them.	Draw, construct, and describe geometrical figures and describe the relationships between them.
B	Understand the use of a rectangular coordinate system.	Understand the use of a rectangular coordinate system using the rules of transformation.	Understand the use of a rectangular coordinate system using the rules of transformation.
C	Use and identify transformations as reflections, rotations and translations.	Use and identify transformations as reflections, rotations and translations.	Use and identify transformations as reflections, rotations and translations.
D	Construct and represent congruent and similar figures.	Identify and use relationships among the corresponding parts of 2 and 3 dimensional figures.	Construct and label parallel lines with transversal.

	Kindergarten	Grade 1	Grade 2
M.4.	Measurement: Students will select and use appropriate tools and techniques to measure accurately.		
A	Understand and use appropriate vocabulary (e.g. heavier v. lighter) as related to measurement.	Select and use appropriate tools and techniques to measure accurately.	Select and use appropriate tools and techniques to measure accurately.
B		Measure time, money, and distance.	Measure time, money, and distance.
C			

	Grade 3	Grade 4	Grade 5
M.4.	Measurement: Students will select and use appropriate tools and techniques to measure accurately.		
A	Recognize and describe measurable attributes/units of measure.	Understand units of length, capacity, and weight in the customary system.	Understand and calculate units of length, capacity, and weight in the customary and metric systems.
B	Understand and demonstrate appropriateness of tools and units of measurement.	Understand and demonstrate appropriateness of tools and units of measurement.	Understand and calculate perimeter, area, and circumference using geometric formulas.
C			

	Grade 6	Grade 7	Grade 8
M.4.	Measurement: Students will select and use appropriate tools and techniques to measure accurately.		
A	Understand, calculate, and convert metric and customary units.	Understand, calculate, and convert metric and customary units.	Understand, calculate, and convert metric and customary units.
B	Understand and calculate perimeter, area, and circumference using geometric formulas.	Understand and apply Pythagorean Theorem to right triangles.	Understand and apply Pythagorean Theorem to right triangles including real-world and mathematical problems.
C	Determine measurements indirectly.	Determine measurements indirectly.	Determine measurements indirectly.

	Kindergarten	Grade 1	Grade 2
M.5.	Statistics & Probability: Students will use data collection and analysis in problem-solving situations.		
A	Work with data in the context of real-world situations.	Use graphs and tallies to display data.	Use varying graphs to display data.
B	Draw conclusions based on data.	Use graphs to interpret data.	Problem-solve by reading graphs, tables, and charts
C	Determine the likelihood of an occurrence of events.		

	Grade 3	Grade 4	Grade 5
M.5.	Statistics & Probability: Students will use data collection and analysis in problem-solving situations.		
A	Collect, organize, and display data using various methods.	Collect, organize, and display data using various methods.	Collect, organize, and display data using various methods, including stem and leaf plots.
B	Interpret and analyze information from displayed data to draw reasonable conclusions.	Extract, interpret, and analyze information from organized displayed data to draw reasonable conclusions.	Extract, interpret, and analyze information from organized displayed data to draw reasonable conclusions.
C	Determine the likelihood of an occurrence of events.	Use simple models to conduct probability experiments.	Use simple models to conduct probability experiments.

	Grade 6	Grade 7	Grade 8
M.5.	Statistics & Probability: Students will use data collection and analysis in problem-solving situations.		
A	Collect, organize, and display data using various methods, including circle graphs.	Collect, organize, and display data using various methods, including box and whisker.	Collect, organize, and display data using various methods.
B	Extract, interpret, and analyze information from organized displayed data, including measurements of central tendencies, to draw reasonable conclusions.	Extract, interpret, and analyze information from organized displayed data to draw reasonable conclusions and predict outcomes.	Extract, interpret, and analyze information from organized displayed data, including scatter plots, to draw reasonable conclusions and predict outcomes.
C	Determine the likelihood of an occurrence of events using tree diagrams, lists, etc.	Use combinations and permutations to determine the likelihood of an occurrence of events.	Determine the likelihood of an occurrence of events by comparing direct and indirect probabilities.

	Kindergarten	Grade 1	Grade 2
M.6.	Algebraic Relationships: The student will discover, describe, and generalize simple and complex patterns and relationships.		
A			Use letter, box, or symbol to stand for any number-measured quantity or object.
B			Recognize and use appropriate grade-level properties and relations.
C			
D			
E			

	Grade 3	Grade 4	Grade 5
M.6.	Algebraic Relationships: The student will discover, describe, and generalize simple and complex patterns and relationships.		
A	Substitute letters or symbols for unknown numbers.	Substitute numbers for variables to solve an expression or equation.	Substitute numbers for variables to solve an expression or equation.
B	Recognize, describe, and analyze functional relationships using an input / output chart.	Recognize, describe, and analyze functional relationships to identify a rule to describe pattern change.	Recognize, describe, and analyze functional relationships to identify a rule to describe pattern change.
C	Solve multi-step problems.	Solve equations in a logical way.	Solve variable equations and inequalities in a logical way.
D	Recognize and use appropriate grade-level properties and relations.	Recognize and use appropriate grade-level properties and relations.	Recognize and use appropriate grade-level properties and relations.
E			

	Grade 6	Grade 7	Grade 8
M.6.	Algebraic Relationships: The student will discover, describe, and generalize simple and complex patterns and relationships.		
A	Use variables to represent an unknown number, quantity, or object.	Use variables to represent an unknown number, quantity, or object.	Use variables to represent an unknown number, quantity, or object.
B	Work with linear and nonlinear patterns and relationships in a variety of ways (e.g. tables and graphs).	Work with linear and nonlinear patterns and relationships in a variety of ways (e.g. algebraic equations, inequalities, expressions).	Work with linear and nonlinear patterns and relationships in a variety of ways (e.g. slope).
C	Recognize, describe, and analyze functional relationships to identify a rule to describe pattern change.	Recognize, describe, and analyze functional relationships (e.g. exponential growth and decay).	Recognize, describe, and analyze functional relationships (e.g. quadratic functions and polynomials).
D	Solve one-step and two-step one variable equations in a logical way.	Solve multi-step one and two variable equations in a logical way.	Solve and graph equations, inequalities, and systems of equations in a logical way.
E	Apply properties in solving expressions, equations, and inequalities.	Apply properties in solving expressions, equations, and inequalities.	Apply properties in solving expressions, equations, and inequalities.