

Diocese of Lansing

Curriculum Guidelines for Mathematics

Kindergarten through Grade Eight



**Grade 7
2008**

Mathematics K-8

JUNE, 2008

VISION STATEMENT

Mathematics plays an integral role in the Catholic School, home, community and world, reflecting the beauty, order and unity in God's universe. Basic knowledge and skills in mathematics are important to every individual. Mathematics contributes to the development of the whole person by providing a practical tool for daily living.

Society demands mathematical knowledge which helps students develop their ability to reason and to think logically, as well as to discover creative ways of solving problems.

Our goal is to provide the mathematics teachers with an overview of the broad spectrum of mathematical concepts. These specific standards are provided so that students can learn to apply mathematical concepts through the use of higher level thinking skills, critical analysis, application of technology and problem solving.

Integrating Catholic Social Teaching into Mathematics Instruction

“The Church’s social teaching is a rich treasure of wisdom about building a just society and living lives of holiness amidst the challenges of modern society”.

(United States Council of Catholic Bishops)

Diocese of Lansing mathematics teachers should integrate Catholic social teachings whenever applicable. Examples of this could include faith-based data collection, economics and statistics respectful of the life and dignity of the human person, proportions and graphical representations that are illustrative of solidarity with our brothers and sisters, problem solving that will ensure the right to life and dignity, as well as math-based community service projects to encourage stewardship of creation.

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PURPOSE OF THIS DOCUMENT

- This document is designed to be used as a tool to guide instruction.
 - To provide Grade Level Content Expectations (GLECs) as developed by the State of Michigan (SOM) Department of Education
 - To assist schools with grade level and school-wide curriculum mapping.
 - To provide a means of measuring progress at grade level
 - To provide a means of communicating progress between grade levels
 - To provide continuity between schools within the Diocese of Lansing
- This document also offers main focus areas for each grade level.
- This document offers scope and sequence of objectives across grade levels.
- This document contains suggestions for incorporating Catholic faith and values into mathematics instruction.
- This document contains an analysis of current mathematical textbooks from a wide range of publishers.

With appreciation

To Michael Goetz,

Math Department Chair for grades K-8 at Grand Blanc Community Schools

for sharing his expertise, knowledge and materials with us.

Seventh Grade

In seventh grade, the main focus concerns linear and geometric relationships. Students will explore the relationship of equations to their graphs, as well as to tables and contextual situations for linear functions.

In addition, work in algebra extends into simplifying and solving expressions and equations.

The concepts from geometry in grade seven include: measurement, similarity, construction, congruency, and basic transformations.

To allow for ease in referencing expectations, each expectation has been coded with a strand, domain, grade-level, and expectation number.

For example, **M.UN.00.01** indicates:

M-Measurement strand

UN-Units & systems of measurement domain of the Measurement strand

01-First Expectation in the Grade-Level view of the Measurement strand

Strand 1 Number & Operations	Strand 2 Algebra	Strand 3 Measurement	Strand 4 Geometry	Strand 5 Data & Probability
Domains				
Meaning, notation, place value, and comparisons (ME)	Patterns, relations, functions, and change (PA)	Units and systems of measurement (UN)	Geometric shape, properties, and mathematical arguments (GS)	Data representation (RE)
Number relationships and meaning of operations (MR)	Representation (RP)	Techniques and formulas for measurement (TE)	Location and spatial relationships (LO)	Data interpretation and analysis (AN)
Fluency with operations and estimation (FL)	Formulas, expressions, equations, and inequalities (RP)	Problem solving involving measurement (PS)	Spatial reasoning and geometric modeling (SR)	Probability (PR)
			Transformation and symmetry (TR)	

MEAP Correlations: [Core]-core item [Core-NC] No calculator [Ext-NC]- extension no calculator [Ext] - extension of core [Fut] – future core item [NASL] – Not assessed at State level

7th Grade GLCEs

SOM-GLECs Code	Objectives	COMPLETED	DATE	CHAPTER
Strand 1	NUMBER AND OPERATIONS			
	Understand derived quantities			
N. MR.07.01	Solve problems involving derived quantities such as density, velocity, and weighted averages			
	Understand and solve problems involving rates, ratios, and proportions			
N.FL.07.02	Calculate rates of change including speed.			
N.MR.07.03	Convert ratio quantities between different systems of units, such as feet per second to miles per hour.			
N.FL.07.04	Solve proportion problems using such methods as unit rate, scaling, finding equivalent fractions, and solving the proportion equation $a/b = c/d$; know how to see patterns about proportional situations in tables.			
	Recognize irrational numbers			
N.MR.07.05	Understand the concept of square root and cube root, and estimate using calculators			
	Compute with rational numbers			
N.FL.07.06	Solve problems involving operations with integers.			
N.FL.07.07	Add, subtract, multiply, and divide positive and negative rational numbers fluently.			

SOM-GLECs Code	Objectives	COMPLETED	DATE	CHAPTER
N.FL.07.08	Estimate results of computations with rational numbers			
Strand 2	ALGEBRA			
	Understand and apply directly proportional relationships and relate to linear relationships			
A.PA.07.01	[Fut] Recognize when information given in a table, graph, or formula suggests a directly proportional or linear relationship.			
A.RP.07.02	[Core] Represent directly proportional and linear relationships using verbal descriptions, tables, graphs, and formulas, and translate among these representations.			
A.PA.07.03	[Fut] Given a directly proportional or other linear situation, graph and interpret the slope and intercept(s) in terms of the original situation; evaluate $y = mx + b$ for specific x values, e.g., weight vs. volume of water, base cost plus cost per unit			
A.PA.07.04	[Core] For directly proportional or linear situations, solve applied problems using graphs and equations, e.g., the heights and volume of a container with uniform cross-section; height of water in a tank being filled at a constant rate; degrees Celsius and degrees Fahrenheit; distance and time under constant speed			
A.PA.07.05	[Fut] Recognize and use directly proportional relationships of the form $y = mx$, and distinguish from linear relationships of the form $y = mx + b$, b non-zero; understand that in a directly proportional relationship between two quantities one quantity is a constant multiple of the other quantity			

SOM-GLECs Code	Objectives	COMPLETED	DATE	CHAPTER
	Understand and represent linear functions			
A.PA.07.06	[Fut] Calculate the slope from the graph of a linear function as the ratio of "rise/run" for a pair of points on the graph, and express the answer as a fraction and a decimal; understand that linear functions have slope that is a constant rate of change.			
A.PA.07.07	[Fut] Represent linear functions in the form $y = x + b$, $y = mx$, and $y = mx + b$, and graph, interpreting slope and y-intercept.			
A.FO.07.08	[Fut] Find and interpret the x- and/or y-intercepts of a linear equation or function. Know that the solution to a linear equation of the form $ax + b = 0$ corresponds to the point at which the graph of $y = ax + b$ crosses the x-axis.			
	Understand and solve problems about inversely proportional relationships			
A.PA.07.09	[Fut] Recognize inversely proportional relationships in contextual situations; know that quantities are inversely proportional if their product is constant, e.g., the length and width of a rectangle with fixed area, and that an inversely proportional relationship is of the form $y = k/x$ where k is some non-zero number.			
A.RP.07.10	[Fut] Know that the graph of $y = k/x$ is not a line, know its shape, and know that it crosses neither the x- nor the y-axis.			

SOM-GLECs Code	Objectives	COMPLETED	DATE	CHAPTER
	Apply basic properties of real numbers in algebraic contexts			
A.PA.07.11	[Core] Understand and use basic properties of real numbers: additive and multiplicative identities, additive and multiplicative inverses, commutativity, associativity, and the distributive property of multiplication over addition.			
	Combine algebraic expressions and solve equations			
A.FO.07.12	[Core] Add, subtract, and multiply simple algebraic expressions of the first degree, e.g., $(92x + 8y) - 5x + y$, or $x(x+2)$ and justify using properties of real numbers.			
A.FO.07.13	[Fut] From applied situations, generate and solve linear equations of the form $ax + b = c$ and $ax + b = cx + d$, and interpret solutions.			
Strand 4	GEOMETRY			
	Draw and construct geometric objects			
G.SR.07.01	[Core] Use a ruler and other tools to draw squares, rectangles, triangles, and parallelograms with specified dimensions.			
G.SR.07.02	[NASL] Use compass and straightedge to perform basic geometric constructions: the perpendicular bisector of a segment, an equilateral triangle, and the bisector of an angle; understand informal justifications			
	Understand the concept of similar polygons, and solve related problems			
G.TR.07.03	[Core] Understand that in similar polygons, corresponding angles are congruent and the ratios of corresponding sides are equal; understand the concepts of similar figures and scale factor.			

G.TR.07.04	[Core] Solve problems about similar figures and scale drawings.			
SOM-GLECs Code	Objectives	COMPLETED	DATE	CHAPTER
G.TR.07.05	[Core] Show that two triangles are similar using the criteria: corresponding angles are congruent (AAA similarity); the ratios of two pairs of corresponding sides are equal and the included angles are congruent (SAS similarity); ratios of all pairs of corresponding sides are equal (SSS similarity); use these criteria to solve problems and to justify arguments.			
G.TR.07.06	[Core] Understand and use the fact that when two triangles are similar with scale factor of r , their areas are related by a factor of r^2 .			
Strand 5	DATA AND PROBABILITY			
	Represent and interpret data			
D.RE.07.01	[Core] Represent and interpret data using circle graphs, stem and leaf plots, histograms, and box-and-whisker plots, and select appropriate representation to address specific questions.			
D.AN.07.02	[Fut] Create and interpret scatter plots and find line of best fit; use an estimated line of best fit to answer questions about the data.			
	Compute statistics about data sets			
D.AN.07.03	[Core] Calculate and interpret relative frequencies and cumulative frequencies for given data sets			
D.AN.07.04	[Core] Find and interpret the median, quartiles, and interquartile range of a given set of data.			

