

Diocese of Lansing

# Curriculum Guidelines for Mathematics

Kindergarten through Grade Eight



**Grade 2**

**2008**

# Mathematics K-8

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*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

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“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.*

Curriculum Institute Team

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## Purpose of this Document

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- 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

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To Michael Goetz,

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

for sharing his expertise, knowledge and materials with us.

# GRADE TWO

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Second graders continue with more sophisticated work in addition and subtraction of whole numbers. They begin conceptual development of multiplication and division, grounded in contexts and modeled using concrete objects.

Teachers can emphasize the inverse relationships between addition and subtraction, and multiplication and division.

Students will be using strategies and algorithms to compute using whole numbers.

Simple ideas about fractions are introduced.

In geometry, students continue to learn about geometric shapes and their characteristics.

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

## Understanding the Organizational Structure

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

<b>Strand 1 Number &amp; Operations</b>	<b>Strand 2 Algebra</b>	<b>Strand 3 Measurement</b>	<b>Strand 4 Geometry</b>	<b>Strand 5 Data &amp; Probability</b>
<b>Domains</b>				
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

## 2nd Grade GLCEs

SOM-GLECS CODE	OBJECTIVES	COMPLETED	DATE	CHAPTERS
<b>STRAND 1</b>	<b>NUMBERS AND OPERATIONS</b>			
	<b>Count, Write, and Order Whole Numbers</b>			
<b>N.ME.02.01</b>	<b>[Ext – NC]</b> Count to 1000 by 1’s, 10’s and 100’s starting from any number in the sequence.			
<b>N.ME.02.02</b>	<b>[CORE – NC]</b> Read and write numbers to 1000 in numerals and words, and relate them to the quantities they represent.			
<b>N.ME.02.03</b>	<b>[CORE – NC]</b> Compare and order numbers to 1000; use the symbols > and <.			
<b>N.ME.02.04</b>	<b>[NASL]</b> Count orally by 3’s and 4’s starting with 0, and by 2’s, 5’s, and 10’s starting from any whole number.			
	<b>Understand Place Value</b>			
<b>N.ME.02.05</b>	<b>[NASL]</b> Express numbers through 999 using place value, e.g., 137 is 1 hundred, 3 tens, and 7 ones; use concrete materials.			
	<b>Add and Subtract Whole Numbers</b>			
<b>N.FL.02.06</b>	<b>[Ext – NC]</b> Decompose 100 into addition pairs, e.g., 99 + 1, 98 + 2...			
<b>N.MR.02.07</b>	<b>[CORE – NC]</b> Find the distance between numbers on the number line, e.g., how far is 79 from 26?			
<b>N.MR.02.08</b>	<b>[Ext – NC]</b> Find missing values in open sentences, e.g., $\square + 42 = 57$ ; use relationship between addition and subtraction.			
<b>N.MR.02.09</b>	<b>[CORE]</b> Given a contextual situation that involves addition and subtraction using numbers through 99: model using objects or pictures; explain in words; record using numbers and symbols; solve.			
<b>N.FL.02.10</b>	<b>[CORE – NC]</b> Add fluently two numbers through 99, using strategies including formal algorithms; subtract fluently two numbers through 99.			
<b>N.FL.02.11</b>	<b>[CORE – NC]</b> Estimate the sum of two numbers with three digits.			
<b>N.FL.02.12</b>	<b>[NASL]</b> Calculate mentally sums and differences involving: three-digit numbers and ones; three-digit numbers and tens; three-digit numbers and hundreds.			

SOM-GLECS CODE	OBJECTIVES	COMPLETED	DATE	CHAPTERS
	<b>Understand Meaning of Multiplication and Division</b>			
<b>N.MR.02.13</b>	<b>[CORE]</b> Understand multiplication as the result of counting the total number of objects in a set of equal groups, e.g., $3 \times 5$ gives the number of objects in 3 groups of 5 objects, or $3 \times 5 = 5 + 5 + 5 = 15$ .			
<b>N.MR.02.14</b>	<b>[CORE]</b> Represent multiplication using area and array models.			
<b>N.MR.02.15</b>	<b>[FUT]</b> Understand division ( $\div$ ) as another way of expressing multiplication, using fact families within the 5 x 5 multiplication table; emphasize that division “undoes” multiplication, e.g., $2 \times 3 = 6$ can be rewritten as $6 \div 2 = 3$ or $6 \div 3 = 2$ .			
<b>N.MR.02.16</b>	<b>[Ext]</b> Given a situation involving groups of equal size or of sharing equally, represent with objects, words, and symbols; solve.			
<b>N.MR.02.17</b>	<b>[NASL]</b> Develop strategies for fluently multiplying numbers up to $5 \times 5$ .			
	<b>Work With Unit Fractions</b>			
<b>N.ME.02.18</b>	<b>[CORE]</b> Recognize, name, and represent commonly used unit fractions with denominators 12 or less; model $\frac{1}{2}$ , $\frac{1}{3}$ , and $\frac{1}{4}$ by folding strips.			
<b>N.ME.02.19</b>	<b>[CORE – NC]</b> Recognize, name, and write commonly used fractions: $\frac{1}{2}$ , $\frac{1}{3}$ , $\frac{2}{3}$ , $\frac{1}{4}$ , $\frac{2}{4}$ , $\frac{3}{4}$ .			
<b>N.ME.02.20</b>	<b>[CORE]</b> Place 0 and halves, e.g. $\frac{1}{2}$ , $1\frac{1}{2}$ , $2\frac{1}{2}$ , on the number line; relate to a ruler.			
<b>N.ME.02.21</b>	<b>[FUT]</b> For unit fractions from $\frac{1}{12}$ to $\frac{1}{2}$ understand the inverse relationship between the size of a unit fraction and the size of the denominator; compare unit fractions from $\frac{1}{12}$ to $\frac{1}{2}$ .			
<b>N.ME.02.22</b>	<b>[FUT]</b> Recognize that fractions such as $\frac{2}{2}$ , $\frac{3}{3}$ , and $\frac{4}{4}$ are equal to the whole (one).			

SOM-GLECS CODE	OBJECTIVES	COMPLETED	DATE	CHAPTERS
<b>Strand 3</b>	<b>MEASUREMENT</b>			
	<b>Measure, Add, and Subtract Length</b>			
<b>M.UN.02.01</b>	<b>[CORE]</b> Measure lengths in meters, centimeters, inches, feet, and yards approximating to the nearest whole unit and using abbreviations: cm, m, in, ft, yd.			
<b>M.PS.02.02</b>	<b>[CORE – NC]</b> Compare lengths; add and subtract lengths (no conversion of units).			
	<b>Understand the Concept of Area</b>			
<b>M.UN.02.03</b>	<b>[Ext]</b> Measure area using non-standard units to the nearest whole unit.			
<b>M.TE.02.04</b>	<b>[FUT]</b> Find the area of a rectangle with whole number side lengths by covering with unit squares and counting, or by using a grid of unit squares; write the area as a product.			
	<b>Tell Time and Solve Time Problems</b>			
<b>M.UN.02.05</b>	<b>[CORE]</b> Using both A.M. and P.M., tell and write time from the clock face in 5 minute intervals and from digital clocks to the minute; include reading time: 9:15 as nine-fifteen and 9:50 as nine-fifty. Interpret time both as minutes after the hour and minutes before the next hour, e.g., 8:50 as eight-fifty and ten to nine. Show times by drawing hands on clock face.			
<b>M.UN.02.06</b>	<b>[CORE]</b> Use the concept of duration of time, e.g., determine what time it will be half an hour from 10:15.			
	<b>Record, Add and Subtract Money</b>			
<b>M.UN.02.07</b>	<b>[CORE]</b> Read and write amounts of money using decimal notations, e.g., \$1.15.			
<b>M.PS.02.08</b>	<b>[FUT]</b> Add and subtract money in mixed units, e.g., \$2.50 + 60 cents and \$5.75 - \$3, but not \$2.50 + \$3.10.			
	<b>Read Thermometers</b>			
<b>M.UN.02.09</b>	<b>[Ext]</b> Read temperature using the scale on a thermometer in degrees Fahrenheit.			

SOM-GLECS CODE	OBJECTIVES	COMPLETED	DATE	CHAPTERS
	<b>Solve Measurement Problems</b>			
M.PS.02.10	[CORE – NC] Solve simple word problems involving length and money.			
M.TE.02.11	[CORE] Determine perimeters of rectangles and triangles by adding lengths of sides, recognizing the meaning of perimeter.			
<b>Strand 4</b>	<b>GEOMETRY</b>			
	<b>Identify and Describe Shapes</b>			
G.GS.02.01	[CORE] Identify, describe, and compare familiar two-dimensional and three-dimensional shapes, such as triangles, rectangles, squares, circles, semi-circles, spheres, and rectangular prisms.			
G.GS.02.02	[FUT] Explore and predict the results of putting together and taking apart two-dimensional and three-dimensional shapes.			
G.GS.02.03	[Ext] Distinguish between curves and straight lines and between curved surfaces and flat surfaces.			
G.SR.02.04	[CORE] Classify familiar plane and solid objects, e.g., square, rectangle, rhombus, cube, pyramid, prism, cone, cylinder, and sphere, by common attributes such as shape, size, color, roundness, or number of corners and explain which attributes are being used for classification.			
G.TR.02.05	[FUT] Recognize that shapes that have been slid, turned, or flipped are the same shape, e.g., a square rotated 45° is still a square.			
	<b>Use Coordinate Systems</b>			
G.LO.02.06	[FUT] Find and name locations using simple coordinate systems such as maps and first quadrant grids.			
<b>Strand 5</b>	<b>DATA AND PROBABILITY</b>			
	<b>Create, Interpret, and Solve Problems Involving Pictographs</b>			
D.RE.02.01	[FUT] Make pictographs using a scale representation, using scales where symbols equal more than one.			
D.RE.02.02	[FUT] Read and interpret pictographs with scales, using scale factors of 2 and 3.			
RE.02.03	[FUT] Solve problems using information in pictographs; include scales such as “each ■ represents 2 apples”; avoid partial cases.			

