

Diocese of Lansing

Curriculum Guidelines for Mathematics

Kindergarten through Grade Eight



Grade 4

2008

Fourth Grade

In fourth grade, students should master addition and subtraction of whole numbers, and develop skills in the multiplication and division of whole numbers.

Work in numbers also extends to fractions and decimal fractions. Students will use limited sets of fractions as the basis for building meaning for equivalent fractions, addition and subtraction of fractions, and fractions as part of a set of objects.

Work in measurement becomes more sophisticated, with emphasis on units and conversion within systems of units.

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

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.

4th Grade GLCEs

SOM-GLCEs Code	Objectives	Completed	Date	Chapters
Strand 1	NUMBER AND OPERATIONS			
	Understand and use number notation and place value			
N.ME.04.01	[Ext – NC] Read and write numbers to 1,000,000; relate them to the quantities they represent; compare and order.			
N.ME.04.02	[Ext – NC] Compose and decompose numbers using place value to 1,000,000's, e.g., 25,068 is 2 ten thousands, 5 thousands, 0 hundreds, 6 tens, and 8 ones.			
N.ME.04.03	[Ext – NC] Understand the magnitude of numbers up to 1,000,000; recognize the place values of numbers and the relationship of each place value to the place to its right, e.g., 1,000 is 10 hundreds.			
	Use factors and multiples			
N.ME.04.04	[Ext – NC] Find all factors of any whole number through 50, list factor pairs, and determine if a one-digit number is a factor of a given whole number.			
N.ME.04.05	[Core – NC] List the first ten multiples of a given one-digit whole number; determine if a whole number is a multiple of a given one-digit whole number.			
N.MR.04.06	[Ext – NC] Know that some numbers including 2, 3, 5, 7, and 11 have exactly two factors (1 and the number itself) and are called prime numbers.			
N.MR.04.07	[Core – NC] Use factors and multiples to compose and decompose whole numbers.			
	Add and subtract whole numbers			
N.FL.04.08	[Ext – NC] Add and subtract whole numbers fluently.			
	Multiply and divide whole numbers			
N.ME.04.09	[Core – NC] Multiply two-digit numbers by 2, 3, 4, and 5 using the distributive property, e.g., $21 \times 3 = (1 + 20) \times 3 = (1 \times 3) + (20 \times 3) = 3 + 60 = 63$.			
N.FL.04.10	[Ext – NC] Multiply fluently any whole number by a one-digit number and a three-digit number by a two-digit number; for a two-digit by one-digit multiplication use			

SOM-GLCEs Code	Objectives	Completed	Date	Chapters
	distributive property to develop meaning for the algorithm.			
N.FL.04.11	[Core – NC] Divide numbers up to four-digits by one-digit numbers and by 10.			
N.FL.04.12	[Core – NC] Find the value of the unknowns in equations such as $a \div 10 = 25$; $125 \div b = 25$.			
N.MR.04.13	[Fut] Use the relationship between multiplication and division to simplify computations and check results.			
N.MR.04.14	[Ext] Solve contextual problems involving whole number multiplication and division.			
	Read, interpret and compare decimal fractions			
N.ME.04.15	[Core] Read and interpret decimals up to two decimal places; relate to money and place value decomposition.			
N.ME.04.16	[Fut] Know that terminating decimals represents fractions whose denominators are 10, 10 x 10, 10 x 10 x 10, etc., e.g., powers of 10.			
N.ME.04.17	[Ext] Locate tenths and hundredths on a number line.			
N.ME.04.18	[Ext] Read, write, interpret, and compare decimals up to two decimal places.			
N.MR.04.19	[Core - NC] Write tenths and hundredths in decimal and fraction forms, and know the decimal equivalents for halves and fourths.			
	Understand fractions			
N.ME.04.20	[Ext] Understand fractions as parts of a set of objects.			
N.MR.04.21	[Ext] Explain why equivalent fractions are equal, using models such as fraction strips or the number line for fractions with denominators of 12 or less, or equal to 100.			
N.MR.04.22	[Core] Locate fractions with denominators of 12 or less on the number line; include mixed numbers.			
N.MR.04.23	[Ext] Understand the relationships among halves, fourths, and eighths and among thirds, sixths, and twelfths.			

N.ME.04.24	[Fut] Know that fractions of the form m/n where m is greater than n , are greater than 1 and are called improper fractions; locate improper fractions on the number line.			
N.MR.04.25	[Ext] Write improper fractions as mixed numbers, and understand that a mixed number represents the number of “wholes” and the part of a whole remaining, e.g., $5/4 = 1 + 1/4 = 1 \frac{1}{4}$.			
N.MR.04.26	[Ext] Compare and order up to three fractions with denominators 2, 4, and 8, and 3, 6, and 12, including improper fractions and mixed numbers.			
Add and subtract fractions				
N.MR.04.27	[Fut] Add and subtract fractions less than 1 with denominators through 12 and/or 100, in cases where the denominators are equal or when one denominator is a multiple of the other, e.g., $1/12 + 5/12 = 6/12$; $1/6 + 5/12 = 7/12$; $3/10 - 23/100 = 7/100$.			
N.MR.04.28	[Fut] Solve contextual problems involving sums and differences for fractions where one denominator is a multiple of the other (denominators 2 through 12, and 100).			
N.MR.04.29	[Fut – NC] Find the value of an unknown in equations such as $1/8 + x = 5/8$ or $3/4 - y = 1/2$.			
Multiply fractions by whole numbers				
N.MR.04.30	[Fut] Multiply fractions by whole numbers, using repeated addition and area or array models.			
Add and subtract decimal fractions				
N.MR.04.31	[Fut] For problems that use addition and subtraction of decimals through hundredths, represent with mathematical statements and solve.			
N.FL.04.32	[Fut] Add and subtract decimals through hundredths.			

	Multiply and divide decimal fractions			
N.FL.04.33	[Fut] Multiply and divide decimals up to two decimal places by a one-digit whole number where the result is a terminating decimal, e.g., $0.42 \div 3 = 0.14$, but not $5 \div 3 = 1.6$.			
	Estimate			
N.FL.04.34	[Ext] Estimate the answers to calculations involving addition, subtraction, or multiplication.			
N.FL.04.35	[Core] Know when approximation is appropriate and use it to check the reasonableness of answers; be familiar with common place-value errors in calculations.			
N.FL.04.36	[NASL] Make appropriate estimations and calculations fluently with whole numbers using mental math strategies.			
Strand 3	MEASUREMENT			
	Measure using common tools and appropriate units			
M.UN.04.01	[Core] Measure using common tools and select appropriate units of measure.			
M.PS.04.02	[Core] Give answers to a reasonable degree of precision in the context of a given problem.			
M.UN.04.03	[Core] Measure and compare integer temperatures in degrees.			
M.TE.04.04	[NASL] Measure surface area of cubes and rectangular prisms by covering and counting area of the faces.			
	Convert measurement units			
M.TE.04.05	[Ext] Carry out the following conversions from one unit of measure to a larger or smaller unit of measure: meters to centimeters, kilograms to grams, liters to milliliters, hours to minutes, minutes to seconds, years to months, weeks to days, feet to inches, ounces to pounds (using numbers that involve only simple calculations).			
	Use perimeter and area formulas			

M.TE.04.06	[Core] Know and understand the formulas for perimeter and area of a square and a rectangle; calculate the perimeters and areas of these shapes and combinations of these shapes using the formulas.			
M.TE.04.07	[Core] Find one dimension of a rectangle given the other dimension and its perimeter or area.			
M.TE.04.08	[Ext] Find the side of a square given its perimeter or area.			
M.PS.04.09	[Fut] Solve contextual problems about perimeter and area of squares and rectangles in compound shapes.			
	Understand right angles			
M.TE.04.10	[Ext] Identify right angles and compare angles to right angles.			
	Problem-solving			
M.PS.04.11	[Fut] Solve contextual problems about surface area.			
Strand 4	GEOMETRY			
	Understand perpendicular, parallel, and intersecting lines			
G.GS.04.01	[Ext] Identify and draw perpendicular, parallel, and intersecting lines using a ruler and a tool or object with a square (90°) corner.			
	Identify basic geometric shapes and their components, and solve problems			
G.GS.04.02	[Core] Identify basic geometric shapes including isosceles, equilateral, and right triangles, and use their properties to solve problems.			
G.SR.04.03	[Core] Identify and count the faces, edges, and vertices of basic three-dimensional geometric solids including cubes, rectangular prisms, and pyramids; describe the shape of their faces.			

	Recognize symmetry and transformations			
G.TR.04.04	[Ext] Recognize plane figures that have line symmetry.			
G.TR.04.05	[Core] Recognize rigid motion transformations (flips, slides, turns) of a two- dimensional object.			
Strand 5	DATA AND PROBABILITY			
	Represent and solve problems for given data			
D.RE.04.01	[Ext] Construct tables and bar graphs from given data.			
D.RE.04.02	[Core] Order a given set of data, find the median, and specify the range of values.			
D.RE.04.03	[Core] Solve problems using data presented in tables and bar graphs, e.g., compare data represented in two bar graphs and read bar graphs showing two data sets.			