



# Integrated Faith Standards for Academic Curriculum

Mathematics Curriculum

Kindergarten – Grade 12

\*Revised 2022

*“Education is an important mission, which draws young people to what is good, beautiful, and true.”*

**Pope Francis**

## *Diocese of Manchester Catholic School Standards for Mathematics*

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Mathematics is the study of quantity, structure, space, and change. Attention should be paid to the needs of today's society in teaching mathematics by fostering real world application, enabling students to undertake responsibilities in society both locally and globally while witnessing to the faith.

Individual subjects must be taught according to their own particular methods. It would be wrong to consider subjects as mere adjuncts to faith or as a useful means of teaching apologetics. They enable the pupil to assimilate skills, knowledge, intellectual methods and moral and social attitudes, all of which help to develop his personality and lead him to take his place as an active member of the community of man. Their aim is not merely the attainment of knowledge but the acquisition of values and the discovery of truth. *The Catholic School*, 39

After extensive research and review, the Diocesan Academic Committee determined that the *Mathematics Content Standards for California Public Schools* adopted by the California State Board of Education in 1997 and revised in 2000 (pre-Common Core and No Child Left Behind Act), contained the necessary competencies vital to a high-quality mathematics program. "Mathematics is critical for all students, not only those who will have careers that demand advanced mathematical preparation but all citizens who will be living in the twenty-first century. These standards are based on the premise that all students are capable of learning rigorous mathematics and learning it well, and all are capable of learning far more than is currently expected." (Eastin, 2000).

In studying mathematics, we desire that our students in Catholic Schools will be able to:

- Demonstrate the mental practices of precise, determined, meticulous and accurate questioning, inquiry and reasoning
- Respond to the beauty, harmony, proportion, and wholeness existing in mathematics
- Appreciate how mathematical arguments and procedures can be inferred and practiced in other areas of study, including theology and philosophy
- Propose how mathematical objects or proofs (including the Fibonacci numbers, the musical scale, and geometric proofs) support Divine origin.

We believe that the proposed Diocesan Curriculum Standards for Mathematics adapted and reprinted *Mathematic Content Standards for California Public Schools – Kindergarten Through Grade Twelve* (2000) with permission from the California Department of Education, will help us begin building an educational paradigm that will enable our students to grow in logic and reason with the ability to discern and grow in academic acumen. "Yet the human mind invented mathematics in order to understand creation; but if nature is really structured with a mathematical language and mathematics invented by man can manage to understand it, this demonstrates something extraordinary" Pope Benedict XVI (2006).

### *Basic Principles Underlying All Standards to be Used for the Planning of Curriculum for the Diocese of Manchester*

- A passion for mission should inform every curriculum decision.
- All knowledge reflects God's Truth, Beauty, and Goodness.
- Curriculum and instruction enable deeper incorporation of the children into the Church, the formation of community within the school, and respect for the uniqueness and dignity of each person as created in the image and likeness of God.
- Education fosters growth in Christian virtue and contributes to development and formation of the whole person for the good of the society of which he/she is a member, and in recognition of their destiny, an eternal life in Christ.

- Each subject is to be examined in the context of the Catholic faith through Scripture and Tradition and is to be illuminated by Gospel values.
- Learning and formation are interconnected, as are the natural and spiritual development of each student.
- Curriculum and instruction seek to promote a synthesis of faith, life, and culture, forming students as disciples of Jesus.
- All curricula must support a commitment to strong and consistent Catholic identity.
- Curriculum will assist the student’s ability to think critically, problem solve, innovate, and lead towards a supernatural vision.

### *In a Catholic School, Curricular Formation...*

1. Involves the integral formation of the whole person, body, mind, and spirit, in light of his or her ultimate end and the good of society.<sup>i</sup>
2. Promotes human virtues and the dignity of the human person as created in the image and likeness of God and modeled on the person of Jesus Christ.<sup>ii</sup>
3. Seeks to know and understand objective reality, which includes transcendent Truth, is knowable by reason and faith, and finds its origin, unity, and end in God.
4. Develops a Catholic worldview and enables a deeper incorporation of the student into the heart of the Catholic Church.<sup>iii</sup>
5. Encourages a synthesis of faith, life, and culture.<sup>iv</sup>

## **Kindergarten - Grade 8 Mathematics      Catholic Integrated Faith Standards**

### **Kindergarten through Grade 5 Mathematics Integration of Faith**

- K-5.MA.IF.1**      Recognize the power of the human mind as both a gift from God and a reflection of Him in whose image and likeness we are made.
- K-5.MA.IF.2**      Display a sense of wonder about mathematical relationships as well as confidence in mathematical certitude.
- K-5.MA.IF.3**      Respond to the beauty, harmony, proportion, radiance, and wholeness present in mathematics.
- K-5.MA.IF.4**      Show interest in the pursuit of understanding for its own sake.
- K-5.MA.IF.5**      Exhibit joy at solving difficult mathematical problems and operations.
- K-5.MA.IF.6**      Show interest in how the mental processes evident within the discipline of mathematics (such as order, perseverance, and logical reasoning) help us to develop natural virtues (such as self-discipline and fortitude).
- K-5.MA.IF.7**      Understand why things are true and why they are false.

### **Grade 6 through Grade 8 Mathematics Integration of Faith**

- 6-8.MA.IF.1**      Recognize the power of the human mind as both a gift from God and a reflection of Him in whose image and likeness we are made.
- 6-8.MA.IF.2**      Display a sense of wonder about mathematical relationships as well as confidence in mathematical certitude.
- 6-8.MA.IF.3**      Respond to the beauty, harmony, proportion, radiance, and wholeness present in mathematics.
- 6-8.MA.IF.4**      Show interest in the pursuit of understanding for its own sake.
- 6-8.MA.IF.5**      Exhibit joy at solving difficult mathematical problems and operations.
- 6-8.MA.IF.6**      Show interest in how the mental processes evident within the discipline of mathematics (e.g., order, perseverance, and logical reasoning) help us with the development of natural virtues (such as self-discipline and fortitude).
- 6-8.MA.IF.7**      Further connecting the discipline within mathematics to the development of natural virtues.
- 6-8.MA.IF.8**      Survey the truths about mathematical objects that are interesting in their own right and independent of human opinions.
- 6-8.MA.IF.9**      Demonstrate the mental habits of precise, determined, careful, and accurate questioning, inquiry, and reasoning.
- 6-8.MA.IF.10**      Continue to develop lines of inquiry (as developmentally appropriate) to understand why things are true and why they are false.

By the end of grade two, students understand place value and number relationships in addition and subtraction, and they use simple concepts of multiplication. They measure quantities with appropriate units. They classify shapes and see relationships among them by paying attention to their geometric attributes. They collect and analyze data and verify the answers.

### Number Sense

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- 2.MT.NS-1.0** Students understand the relationship between numbers, quantities, and place value in whole numbers up to 1,000:
- 2.MT.NS-1.1** Count, read, and write whole numbers to 1,000 and identify the place value for each digit.
- 2.MT.NS-1.2** Use words, models, and expanded forms (e.g.,  $45 = 4 \text{ tens} + 5$ ) to represent numbers (to 1,000).
- 2.MT.NS-1.3** Order and compare whole numbers to 1,000 by using the symbols  $<$ ,  $=$ ,  $>$ .
- 2.MT.NS-2.0** Students estimate, calculate, and solve problems involving addition and subtraction of two- and three-digit numbers:
- 2.MT.NS-2.1** Understand and use the inverse relationship between addition and subtraction (e.g., an opposite number sentence for  $8 + 6 = 14$  is  $14 - 6 = 8$ ) to solve problems and check solutions.
- 2.MT.NS-2.2** Find the sum or difference of two whole numbers up to three digits long.
- 2.MT.NS-2.3** Use mental arithmetic to find the sum or difference of two two-digit numbers.
- 2.MT.NS-3.0** Students model and solve simple problems involving multiplication and division:
- 2.MT.NS-3.1** Use repeated addition, arrays, and counting by multiples to do multiplication.
- 2.MT.NS-3.2** Introduce the concept of repeated subtraction, equal sharing, and forming equal groups with remainders to do division.
- 2.MT.NS-3.3** Know how to skip count by 2s, 5s, and 10s.
- 2.MT.NS-3.4** Know the multiplication tables of 2s, 5s, and 10s (to “times 10”) and commit them to memory.
- 2.MT.NS-4.0** Students understand that fractions and decimals may refer to parts of a set and parts of a whole:
- 2.MT.NS-4.1** Recognize, name, and compare unit fractions from  $\frac{1}{12}$  to  $\frac{1}{2}$ .
- 2.MT.NS-4.2** Recognize fractions of a whole and parts of a group (e.g., one-fourth of a pie, two-thirds of 15 balls).
- 2.MT.NS-4.3** Know that when all fractional parts are included, such as four-fourths, the result is equal to the whole and to 1.
- 2.MT.NS-5.0** Students model and solve problems by representing, adding, and subtracting amounts of money:
- 2.MT.NS-5.1** Solve problems using combinations of coins and bills.
- 2.MT.NS-5.2** Know and use the decimal notation and the dollar and cent symbols for money.
- 2.MT.NS-6.0** Students use estimation strategies in computation and problem solving that involve numbers that use the ones, tens, hundreds, and thousands places:
- 2.MT.NS-6.1** Recognize when an estimate is reasonable in measurements (e.g., closest inch).

## Algebra and Functions

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- 2.MT.AF-1.0** Students model, represent, and interpret number relationships to create and solve problems involving addition and subtraction:
- 2.MT.AF-1.1** Use the commutative and associative rules to simplify mental calculations and to check results.
- 2.MT.AF-1.2** Relate problem situations to number sentences involving addition and subtraction.
- 2.MT.AF-1.3** Solve addition and subtraction problems by using data from simple charts, picture graphs, and number sentences.

## Measurement and Geometry

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- 2.MT.MG-1.0** Students understand that measurement is accomplished by identifying a unit of measure, iterating (repeating) that unit, and comparing it to the item to be measured:
- 2.MT.MG-1.1** Measure the length of objects by iterating (repeating) a nonstandard or standard unit.
- 2.MT.MG-1.2** Use different units to measure the same object and predict whether the measure will be greater or smaller when a different unit is used.
- 2.MT.MG-1.3** Measure the length of an object to the nearest inch and/or centimeter.
- 2.MT.MG-1.4** Tell time to the nearest quarter hour and know relationships of time (e.g., minutes in an hour, days in a month, weeks in a year).
- 2.MT.MG-1.5** Determine the duration of intervals of time in hours (e.g., 11:00 a.m. to 4:00 p.m.).
- 2.MT.MG-2.0** Students identify and describe the attributes of common figures in the plane and of common objects in space:
- 2.MT.MG-2.1** Describe and classify plane and solid geometric shapes (e.g., circle, triangle, square, rectangle, sphere, pyramid, cube, rectangular prism) according to the number and shape of faces, edges, and vertices.
- 2.MT.MG-2.2** Put shapes together and take them apart to form other shapes (e.g., two congruent right triangles can be arranged to form a rectangle).

## Statistics, Data Analysis, and Probability

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- 2.MT.SD-1.0** Students collect numerical data and record, organize, display, and interpret the data on bar graphs and other representations:
- 2.MT.SD-1.1** Record numerical data in systematic ways, keeping track of what has been counted.
- 2.MT.SD-1.2** Represent the same data set in more than one way (e.g., bar graphs and charts with tallies).
- 2.MT.SD-1.3** Identify features of data sets (range and mode).
- 2.MT.SD-1.4** Ask and answer simple questions related to data representations.
- 2.MT.SD-2.0** Students demonstrate an understanding of patterns and how patterns grow and describe them in general ways:

- 2.MT.SD-2.1** Recognize, describe, and extend patterns and determine a next term in linear patterns (e.g., 4, 8, 12, 16 ; the number of ears on one horse, two horses, three horses, four horses).
- 2.MT.SD-2.2** Solve problems involving simple number patterns.

### **Mathematical Reasoning**

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- 2.MT.MR-1.0** Students make decisions about how to set up a problem:
- 2.MT.MR-1.1** Determine the approach, materials, and strategies to be used.
- 2.MT.MR-1.2** Use tools, such as manipulatives or sketches, to model problems.
- 2.MT.MR-2.0** Students solve problems and justify their reasoning:
- 2.MT.MR-2.1** Defend the reasoning used and justify the procedures selected.
- 2.MT.MR-2.2** Make precise calculations and check the validity of the results in the context of the problem.
- 2.MT.MR-3.0** Students note connections between one problem and another.