



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

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.ⁱ
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.ⁱⁱ
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.ⁱⁱⁱ
5. Encourages a synthesis of faith, life, and culture.^{iv}

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 one, students understand and use the concept of ones and tens in the place value number system. Students add and subtract small numbers with ease. They measure with simple units and locate objects in space. They describe data and analyze and solve simple problems.

Number Sense

- 1.MT.NS-1.0** Students understand and use numbers up to 100:
- 1.MT.NS-1.1** Count, read, and write whole numbers to 100, starting at 1 or elsewhere.
- 1.MT.NS-1.2** Compare and order whole numbers to 100 by using the symbols for less than, equal to, or greater than ($<$, $=$, $>$).
- 1.MT.NS-1.3** Represent equivalent forms of the same number through the use of physical models, diagrams, and number expressions (to 20) (e.g., 8 may be represented as $4 + 4$, $5 + 3$, $2 + 2 + 2 + 2$, $10 - 2$, $11 - 3$).
- 1.MT.NS-1.4** Count and group object in ones and tens (e.g., three groups of 10 and 4 equals 34, or $30 + 4$).
- 1.MT.NS-1.5** Identify and know the value of coins and show different combinations of coins that equal the same value.
- 1.MT.NS-2.0** Students demonstrate the meaning of addition and subtraction and use these operations to solve problems:
- 1.MT.NS-2.1** Know the addition facts (sums to 20) and the corresponding subtraction facts and commit them to memory.
- 1.MT.NS-2.2** Use the inverse relationship between addition and subtraction to solve problems.
- 1.MT.NS-2.3** Identify 1 more than, 1 less than, 10 more than, and 10 less than a given number.
- 1.MT.NS-2.4** Count by 2s, 5s, and 10s to 100.
- 1.MT.NS-2.5** Show the meaning of addition (putting together, increasing) and subtraction (taking away, comparing, finding the difference).
- 1.MT.NS-2.6** Solve addition and subtraction problems with one- and two-digit numbers (e.g., $5+3=8$, $12+11=23$).
- 1.MT.NS-2.7** Find the sum of three one-digit numbers (e.g., $1+3+4=8$).
- 1.MT.NS-3.0** Students use estimation strategies in computation and problem solving that involve numbers that use the ones, tens, and hundreds places:
- 1.MT.NS-3.1** Make reasonable estimates when comparing larger or smaller numbers.

Algebra and Functions

- 1.MT.AF-1.0** Students use number sentences with operational symbols and expressions to solve problems:
- 1.MT.AF-1.1** Write and solve number sentences from problem situations that express relationships involving addition and subtraction.
- 1.MT.AF-1.2** Understand the meaning of the symbols $+$, $-$, $=$.
- 1.MT.AF-1.3** Create problem situations that might lead to given number sentences involving addition and subtraction.

Measurement and Geometry

- 1.MT.MG-1.0** Students use direct comparison and nonstandard units measure objects:
1.MT.MG-1.1 Compare the length, weight, and volume of two or more objects by using direct comparison or a nonstandard unit.
- 1.MT.MG-1.2** Introduce telling time to the nearest half hour and relate time to events (e.g., before/after, shorter/longer).
- 1.MT.MG-2.0** Students identify common geometric figures, classify them by common attributes, and describe their relative position or their location in space:
- 1.MT.MG-2.1** Identify, describe, and compare triangles, rectangles, squares, and circles, including the faces of three-dimensional objects.
- 1.MT.MG-2.2** Classify familiar plane and solid objects by common attributes, such as color, position, shape, size, roundness, or number of corners, and explain which attributes are being used for classification.
- 1.MT.MG-2.3** Give and follow directions about location.
- 1.MT.MG-2.4** Arrange and describe objects in space by proximity, position, and direction (e.g., near, far, below, above, up, down, behind, in front of, next to, left or right of).

Statistics, Data Analysis, and Probability

- 1.MT.SD-1.0** Students organize, represent, and compare data by category on simple graphs and charts:
- 1.MT.SD-1.1** Sort objects and data by common attributes and describe the categories.
1.MT.SD-1.2 Represent and compare data (e.g., largest, smallest, most often, least often) by using pictures, bar graphs, tally charts, and picture graphs.
- 1.MT.SD-2.0** Students sort objects and create and describe patterns by numbers, shapes, sizes, rhythms, or colors:
- 1.MT.SD-2.1** Describe, extend, and explain ways to get to a next element in simple repeating patterns (e.g., rhythmic, numeric, color, and shape).

Mathematical Reasoning

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