Diocese of Pittsburgh

Mathematics Curriculum Overview

CATHOLIC DIOCESE OF
PITTSBURGH

Acknowledgments

The Mathematics Curriculum Guidelines are a result of generous and professionally competent efforts of members of the Diocese of PIttsburgh Math Curriculum Team. This committee includes many teachers, administrators and regional superintendents who responded from their background of expertise with comments and suggestions which have been incorporated into this document. We are grateful for your knowledge, passion and service.

Many resources have been used in compiling these guidelines including scope and sequence charts from major publishers and previously developed curriculum materials from diocesan and state departments of education. A special thank you to the Diocese of Cincinnati and the Diocese of Harrisburg for their expertise and guidance as well.

Diocese of Pittsburgh Curriculum Team

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Introduction

As the landscape of education evolves, the Department for Catholic Schools of the Diocese of Pittsburgh, Pennsylvania, remains committed to enhancing mathematics instruction for all students. A dedicated committee of educators and administrators has crafted a revised curriculum structure to pursue this goal. The committee drew from the National Council of Teachers Mathematics documents, Achieve the Core, and many state documents on mathematics standards.

The revised format exposes students to various teaching strategies and core content that will enable them to succeed in their educational and professional endeavors.The curriculum is built around Pennsylvania's Standards for Mathematics and focuses on five content areas: Numbers and Operations, Algebraic Concepts, Geometry, Measurement and Data, and Probability. The standards are stated for each grade level with anchors, objectives, and student expectations. Many of the skills are interrelated and are not intended to be taught in the specific order they are presented for each quarter. The standard areas give continuity to the teaching of mathematics K-12 and provide the necessary foundation for successful completion at each grade level.

These standard areas stress the importance of teaching through problem-solving, active student involvement in applying mathematics to real-world problem-solving situations, using manipulative materials, being able to model and discuss various concepts, both orally and in writing, working in cooperative learning situations, and using technology to enhance the learning of mathematics.

Mathematics should be scheduled daily for sixty (60) minutes at each grade level (K-8).

The curriculum is structured to provide a coherent progression of learning experiences from kindergarten through twelfth grade. It emphasizes conceptual understanding alongside procedural fluency, encouraging students to explore mathematical concepts through real-world applications, problem-solving tasks and hands-on activities.

Assessment techniques include a variety of evaluations, depending on the desired outcome: formative assessments, summative assessments, performance tasks, and problem-solving tasks. Educators must select assessment strategies that align with their instructional goals, accommodate diverse learners, and provide meaningful feedback to support students' mathematical growth. Additionally, ongoing professional development and collaboration among educators can enhance the effectiveness of assessment practices in mathematics instruction.

The Math Committee hopes that this curriculum will equip students with the mathematical knowledge, skills, and dispositions necessary for success in school, work and life. Providing a rigorous and coherent mathematical education empowers students to become critical thinkers, effective problem solvers and lifelong learners.

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Program Philosophy

The Diocese of Pittsburgh K-12 Catholic schools emphasizes the holistic development of students' mathematical proficiency, critical thinking skills, and moral character within the framework of Catholic values. Rooted in the belief that each student is a unique creation of God, the program seeks to cultivate a deep understanding and appreciation of mathematics while nurturing students' spiritual, intellectual and ethical growth.

The mathematics curriculum is designed to provide students with a rigorous and comprehensive mathematical education that aligns with state standards while reflecting Catholic values and teachings. Emphasizing the development of mathematical fluency, problem-solving skills, and critical thinking abilities, the curriculum prepares students to excel academically and contribute positively to society.

Collaboration, inquiry, and active engagement are integral components of the mathematics learning experience. They foster a supportive and inclusive learning environment where all students feel valued and empowered to succeed. Teachers serve as facilitators of learning, guiding students on their mathematical journey and inspiring them to reach their full potential.

Furthermore, the mathematics program recognizes the importance of family and community involvement in students' education, fostering partnerships between parents, educators, and the broader Catholic community to support students' growth and development.

Ultimately, the mathematics program philosophy seeks to empower students to become compassionate and competent individuals who use their mathematical skills and knowledge to make positive contributions to the world, guided by the

principles of faith, reason and service. The impact of technology on society delivers the message that teaching information and “covering the book” is no longer sufficient as a focus for instructional systems. Instead, instruction must go beyond the content taught and actively engage learners.

It is our mission to enable all students to learn the skills, acquire the knowledge and develop the attitudes in mathematics and technology necessary for them to reach their full potential as morally and socially responsible persons who can meet the challenges of a changing global society. This holistic approach prepares them to be thoughtful, ethical and compassionate individuals, ready to contribute positively to society and reflect God's love in all they do.

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Diocese of Pittsburgh General Mathematics Goals

The Diocese of Pittsburgh's mathematics curriculum is crafted to meet the rigorous standards established by the Pennsylvania Department of Education while reflecting our Catholic values. We aim to ensure that students not only acquire procedural skills and conceptual understanding but also integrate a Catholic worldview and faith-based virtues into their learning. This dual approach enables students to apply critical mathematical knowledge effectively at higher educational levels and in their daily lives, guided by a Catholic lens that emphasizes the beauty and order of God's creation, the complementarity of faith and reason and the full formation of the human person in all domains: intellectual, moral and spiritual.

Mathematics education in Pennsylvania emphasizes a small number of critical areas at each grade level. Students build a solid foundation that supports their progression through increasingly complex mathematical topics by focusing on these key concepts. The general goals of our curriculum include:

- Make sense of and persevere in solving complex mathematical problems by instilling the virtues of understanding and fortitude.
- Use practical mathematical reasoning to construct viable arguments and critique the reasoning of others rooted in the virtues of integrity and respect.
- Communicate with precision when making mathematical statements and express answers with precision appropriate for the context of the problem/situation, guided by prudence and truthfulness.
- Apply mathematical knowledge to analyze and model situations/relationships using multiple representations and appropriate tools to make decisions, solve problems, and draw conclusions, guided by the virtues of stewardship and service.
- Foster a love for learning and an enduring curiosity about mathematics by instilling the virtues of wisdom and wonder.

When taught through the lens of Catholic virtues, mathematics becomes more than an academic discipline; it becomes a means of nurturing a well-rounded individual who recognizes the hand of God in creation and values both knowledge and virtue. By integrating faith into our mathematics goals, we aim to develop students who excel in their studies and embody our Catholic faith's values in their daily lives.

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Standards Overview

**Adapted from the Diocese of Harrisburg and Greensburg*

Standards cannot be viewed or addressed in isolation, as each standard depends upon or may lead to multiple standards across grades; thus, educators must be familiar with both the standards that come before and those that follow a particular grade level. These revised standards reflect instructional shifts that can only occur with an integrated emphasis on content and practice. Standards are overarching statements of what a proficient math student should know and be able to do. Although the standards are not a curriculum or a prescribed series of activities, school entities will use them to develop a local school curriculum that will meet local students' needs.

Diocese of Pittsburgh Math Standards

Grade-Level-Focus Documents(Achieve the Core & PDE Roadmap for Instruction)

Proposed Pennsylvania Personal Finance Standards K-12

Diocese of Pittsburgh Middle School Math Pathways

To ensure students' success in mathematics, it's crucial to establish an efficient system for guiding them onto the right mathematical path throughout middle school. Alongside this placement process, all students must grasp fundamental concepts and skills to cultivate their mathematical abilities. This approach lays the groundwork for the confidence and academic excellence essential for their future.

These pathways are critical to the success of our K-12 math program and our students. First and foremost these pathways provide clear and transparent communications to teachers, students and parents. In addition, they offer differentiated learning opportunities, accommodating diverse student needs. For example, accelerated pathways can challenge advanced learners, while support pathways can help those who need additional time and resources. Our goal is to ensure that students have the flexibility to move between courses to meet their academic needs.

The Diocese of Pittsburgh Math Curriculum Team K-12 team met to evaluate our math curriculum and define our math pathways. Each school uses data and specific criteria to determine placement. The intent is that each child is capable of the work and taught with rigor and challenge. Teachers structure their curriculum and classroom environment to ensure that all students are given the opportunity and support they need to go above and beyond the mastery of the grade-level standards no matter their placement.

An analysis and evaluation of the current secondary mathematics program determines the Diocese of Pittsburgh math course pathways and placement decision criteria. Our ultimate goal is for our students to succeed in mathematics and have a strong foundation for the future. We use multiple data sources to make placement decisions through a data-informed process. We are excited by the opportunity to accelerate the expectations, content standards, and challenge levels for all students. Administrators and teachers monitor student progress closely to ensure each student is being challenged to his/her full potential while support and interventions will also be provided to students needing additional help.

Diocese of Pittsburgh Middle School Math Pathways

	Pathway 1	Pathway 2	Pathway 3
5th Grade	Grade 5 Math	Grade 5 Math	Grade 5 Math
6th Grade	Grade 6 Math	Grade 6 Math	Grade 6/7 Math
7th Grade	Grade 7 Math	Pre-Algebra	Enriched Pre-Algebra
8th Grade	Grade 8 Math	Algebra I	Enriched Algebra 1
9th Grade Considerations	Algebra 1	Honors Geometry, Geometry, Honors Algebra II, Algebra II	Honors Geometry, Geometry, Honors Algebra II, Algebra II

*****Pathway 4 Acceleration:**
Some Pathway 3 students may be invited to complete Algebra 1 during the summer following their 7th grade year. Those students then may qualify for the opportunity to attend a diocesan high school for Honors Geometry and Biology as 8th graders.

******Enriched Algebra I also available at some Diocesan High Schools***

Criteria for Placement

Student data from 4th, 5th, and 6th grade is considered as a part of the evaluation for Middle School Math Groups:

- teacher input
- IOWA test scores national percentile

- benchmark math scores
- previous achievement in math
- demonstrated ability to read with comprehension
- demonstrated mastery of number facts and fluency
- extent to which the child has demonstrated a habit to work to the best of his ability
- absence from school
- quality and reliability of homework
- consistent, work ethic and achievement

In addition to the above considerations for placement in Pathway 2 or 3:

- a consistent, demonstrated ability to follow rules
- a habit of obedience, self–discipline, respect & honesty

As initial course planning begins, courses will be assigned to each student based on an internal staff review of assessment data, including, but not limited to, IOWA Assessment data, Measures of Academic Progress, curriculum-based assessments, student mathematical work samples, prior course grades, and teacher recommendations. To be enrolled in an Algebra 1 course, students must demonstrate proficiency in the Algebra readiness exam.

Pathway Requests/Acceleration

A parent may NOT request specific educational pathways for their child. Each student must independently demonstrate the prerequisite skills and work ethic necessary for success in any given path. Student readiness will be assessed through a pre-test to evaluate their skill level, complemented by teacher and administrator evaluations of their work habits, determining suitability for enrichment or acceleration. Placing a student in a course pathway without the necessary preparation can lead to adverse and harmful outcomes. For accelerated pathways, it is essential that students are ready to fulfill additional requirements, which may include independent work beyond regular classroom instruction to master compacted content effectively.

DOP MATH PROGRAM GUIDANCE

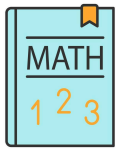
adapted from the Diocese of Cincinnati

- Diocese of PIttsburgh Curriculum
- Components of an Effective Student-Centered Math Classroom
- K-8 Math Lesson Framework Rationale
- Pennsylvania Department of Education SAS Mathematical Practices Standards
- Sample Daily Schedules
- Instructional Strategies
- A Clear Focus
- Explicit Direct Instruction
- Get the Students to Engage in the Content
- Multiple Exposures
- Students Apply their Knowledge
- Build Students Self-Efficacy
- Get Students Working Together
- Assessment Guidance (Diagnostic Assessments, Formative Assessments, Summative Assessments)
- Math Mindset in the Classroom
- Professional Growth

Diocese of Pittsburgh Math Resources

The Diocese of Pittsburgh Resource hub is an evolving tool designed to empower teachers in delivering an effective and engaging math curriculum. All resources are aimed to support the competencies required at each grade level. This list is a product of the collaborative efforts of numerous mathematics teachers who have contributed their insights and expertise. Within these links, you will find a curated selection of textbooks, innovative digital tools, enriching supplemental materials, and interactive activities. Each resource has been chosen for its educational value and its ability to integrate seamlessly with our curriculum goals.

Recommended Textbooks



Digital Tools and Websites