

Mathematics

The goal of the Montgomery County Public Schools pre-K–12 mathematics program is for all students to achieve mathematical proficiency through mastery of mathematical skills, concepts, and processes. The end result is the ability to think and reason mathematically and use mathematics to solve problems in authentic contexts.

The mathematics curriculum at each grade level is organized into units of instruction. The following statements provide an overview of what students should know by the end of each unit of Math 4. Throughout all units, students will apply concepts and skills to solve problems, communicate and reason mathematically, and make mathematical connections.

Unit 1

- Recognize and apply place value patterns in numbers through millions.
- Organize, display, and analyze data using line plots and line graphs.
- Determine and distinguish among mean, median, mode, and range, using concrete materials.
- Classify angles as acute, obtuse, or right.
- Identify and describe the sides, angles, edges, vertices, and faces of solid figures.
- Draw circles, triangles, and quadrilaterals given their dimensions.
- Identify and describe points, lines, line segments, and rays.

Unit 2

- Demonstrate mastery of basic multiplication and division fact families.
- Identify and apply multiples and factors of numbers.
- Solve for the unknown or variable in an equation.
- Generalize a pattern by stating a rule.
- Write and simplify numeric expressions using number properties.
- Complete a function table using a given rule.

Unit 3

- Compare and order fractions and mixed numbers.
- Compare decimals to the hundredths using numerals, pictures, and objects.
- Describe the relationship between fractions and decimals.
- Add and subtract fractional numbers with like denominators using models and pictures.
- Add and subtract decimals using models and pictures.
- Solve problems involving estimation with fractions and decimals.
- List all possible outcomes for a simple probability situation.
- Express the probability of an event with equally likely outcomes as a fraction.
- Multiply fractions and whole numbers using models and pictures.

Unit 4

- Multiply any whole number by a 2- or 3-digit factor.
- Divide any whole number by a 1-digit divisor.
- Estimate products to determine the reasonableness of answers.
- Estimate and determine elapsed time.

Unit 5

- Identify translations, reflections, and rotations of figures.
- Select appropriate attributes and use standard units to solve measurement problems.
- Solve problems involving area, perimeter, volume, and elapsed time.

- Develop and use formulas to solve problems involving area and perimeter of rectangles.
- Identify situations that are represented by a negative number.

Curriculum Resources for Parents

Parents should first consult the recommended resources listed under "How Parents Can Access Curriculum Resources," page ii.

Sites recommended by the
National Council of Teachers of Mathematics:

National Council of Teachers of Mathematics Illuminations, www.illuminations.nctm.org. From the NCTM website. A comprehensive organization of math investigations, lessons, tools, and resources. Call 703-620-9840.

Math Archives, "Topics in Mathematics," www.archives.math.utk.edu/topics/. Dozens of basic and advanced math topics with links to related sites and lessons. Contact SunSite, University of Tennessee, Mathematics Dept., Knoxville, TN 37996.

Education Place, "Brain Teasers," www.eduplace.com/math/brain/. Provided by Houghton Mifflin Company, this site contains a weekly word problem and solution for Grades 3–4, 5–6, and 7–8.

Figure This, www.figurethis.org/. National Council of Teachers of Mathematics. Funded by the U.S. Department of Education and the National Science Foundation. Go to "Math Index." The site provides puzzle-type applications in a variety of algebra, geometry, measurement, number, and statistics/probability subtopics, and includes answers. Each item features a note on where the math can be applied in the real world. Contact NCTM, 1906 Association Drive, Reston, VA 20191-1502. Call 703-620-9840.

Math Forum @ Drexel, www.mathforum.org. Drexel University. A large site with a useful arithmetic/early mathematics link of activities and problems related to basic operations and other basic mathematical topics. Provides a vast selection of resources. Contact the Math Forum, 3210 Cherry Street, Philadelphia, PA 19104. Call 800-756-7823.

Helping Your Child Learn Math, Produced by USDE, 1999, www.ed.gov/pubs/parents/Math/. Provides math applications to real-life situations. This second edition of Helping Your Child Learn Math is for parents of children in kindergarten through fifth grade. It has been revised to include a variety of activities that will help children learn and apply mathematical concepts such as geometry, algebra, measurement, statistics, and probability in a useful and fun way. All of the activities in this book relate math to everyday life and complement many of the math lessons that children are learning in school. Call 800-USA-LEARN.

OTHER MATH SITES:

www.multiplication.com, www.multiplication.com/parents.htm. The parents page provides multiple strategies for teaching the times tables. Also includes games, flashcards, worksheets, other activities, and other resources. The site employs two instructional strategies—traditional and interactive/innovative techniques with pictures, rhymes, and stories.

AAA Math, www.aaamath.com. This site contains hundreds of pages of basic math skills, which are sorted by math topics and grade levels K–8. It includes explanations of topics, practice, games, problems, and interactive practice activities. A traditional, yet fun, approach. Contact AAA Math, Box 16498, Albuquerque, NM 87191

Reading/Language Arts

The Montgomery County Public Schools elementary reading/language arts program reflects the integrated nature of a balanced literacy program. The elementary reading program provides instruction in the five components of reading—Phonemic Awareness (in kindergarten and Grade 1 only), Phonics, Vocabulary, Fluency, and Comprehension—and engagement in independent reading. Both reading purposes—Reading for Literary Experience and Reading to Be Informed—receive equal instructional attention. The elementary language arts program encompasses writing instruction, which includes teaching the writing process and traits of effective writing (Ideas, Organization, Word Choice, Voice, Sentence Fluency, and Conventions). The three writing purposes—Writing to Express Personal Ideas, Writing to Inform, and Writing to Persuade—receive instructional attention. The processes of listening and speaking are integrated into all of the components of a comprehensive, balanced literacy program.

Reading

Vocabulary

- Uses knowledge of word parts and root words, and identifies relationships between words (e.g., synonyms, antonyms, analogies) to determine meaning.
- Acquires and expands vocabulary through reading a variety of material.

Fluency

- Reads grade-level text accurately with expression.

Comprehension

- Reads grade-level text for different purposes: literary experience (e.g., stories, poems, plays) and reading to be informed (e.g., articles and directions).
- Applies reading strategies used before, during, and after reading text.

BEFORE-READING STRATEGIES

- Determines a purpose for reading.
- Previews text and formulates questions.
- Uses background knowledge and previews text to make predictions and ask questions.

DURING-READING STRATEGIES

- Makes connections to the text.
- Confirms or alters predictions.
- Visualizes or makes mental pictures to understand text.
- Determines importance of information in text.
- Uses strategies to fix what does not make sense.
- Rereads to confirm or alter understanding.
- Uses characteristics of fiction and informational text to aid comprehension.
- Understands characters, setting, problem/solution, and plot when reading for a literary experience.
- Makes inferences (i.e., draws conclusions, identifies cause/effect relationships).
- Uses common text features when reading to be informed.

AFTER-READING STRATEGIES

- Responds to reading through discussion.
- Revisits the text to think about what was learned.
- Rereads to clarify or extend meaning.
- Identifies author's message.
- Summarizes text.
- Responds to comprehension questions in writing.
- Selects and independently reads at least 25 grade-level-appropriate books.

Writing

- Uses the writing process (prewriting, first draft, revising, editing/proofreading, publishing).
- Writes independently for a variety of purposes (for personal expression, to inform, to persuade) and for an extended period of time.
- Determines purpose and audience and maintains focus for writing.
- Revises writing by using criteria or checklists.
- Edits writing using grade-level-appropriate language conventions correctly (compound and complex sentences, dialogue, varied punctuation with accuracy, usage) to clearly communicate message.
- Shows evidence of traits of effective writing.
- Uses resources effectively to spell words.
- Develops multiple paragraphs and maintains focus for writing.
- Uses descriptions to make a topic or message clear to the reader.
- Uses strong beginnings to engage the reader.
- Develops a research question based on a selected topic and uses two or more resources to locate information.

LISTENING AND SPEAKING SKILLS AND STRATEGIES ARE LEARNED AND APPLIED DURING READING AND WRITING INSTRUCTION.

- Gathers and conveys information from listening.
- Determines a speaker's point of view by tone of voice and body language.
- Plans and delivers effective oral presentations and uses criteria for peer review.

TEXT CHARACTERISTICS

- Book and print features
- Sentence complexity
- Content
- Themes
- Ideas
- Language and literary features
- Text structure.

By examining how the book supports the developing reader and the challenges that are present, appropriate books can be matched to students for small-group instruction to help them progress as readers. Text characteristics provide a guide to help teachers select the best text to use for instructional purposes. Grade-level-appropriate books are designated by the following list of criteria.

Grade 4 Text Characteristics

- Longer chapter books that present a range of problems; multiple episodes related to a single plot.
- Themes that require interpretation and understanding.
- Multiple characters; development is shown through what they say and do.
- New genre introduced—autobiography and mystery.
- Vocabulary/terminology is sophisticated and varied and requires interpretations of meaning.
- New multisyllabic words require a quick analysis.
- Highly complex sentences require a full range of punctuation important to understanding the meaning of the text.
- Informational text with several organizational patterns and multiple text features.

Curriculum Resources for Parents

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Reading/Language Arts

National Council of Teachers of English, www.ncte.org/search?q=parents. Designed specifically to help parents help their children. Assorted topics. Contact NCTE, 1111 Kenyon Road, Urbana, IL 61801-1096. Call 217-328-3870 or 877-369-6283.

International Reading Association, www.reading.org/InformationforParents.aspx. Go to a variety of topics—also in Spanish. Contact IRA, 444 North Capitol Street, NW, #630, Washington, D.C. 20001. Call 202-624-8800.

Helping Your Child Publication Series

ed.gov/parents/academic/help/hyc.html

Designed to provide parents with lessons and activities to help their school aged and preschool children master reading, understand the value of homework and develop skills.

Other Reading/Language Arts Sites:

Guide to Grammar and Writing, Capital Community College, Hartford, Conn. <http://grammar.cc.commnet.edu/grammar>. This site contains an extensive collection of grammar, mechanics, language, usage, and writing topics, easily accessed by multiple indexes. This very comprehensive site addresses rules, examples, exercises, and quizzes. Call 806-906-5000.

Read, Write, Now! Activities for Reading and Writing Fun, www.udel.edu/ETL/RWN/Activities.html. Produced by the U.S. Department of Education in collaboration with the International Reading Association and Reading is Fundamental. This site includes reading activities and reading lists for children through Grade 6. Listed as a resource in MCPS website Weblinks/"Internet Resources: Great for Homework." Call 800-860-9228 or 800-872-5327.

NOTE: Please be aware that Internet sites occasionally discontinue and addresses often change.