

**MONTGOMERY TOWNSHIP SCHOOLS**

**MATHEMATICS**

Grade: 4

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**MONTGOMERY TOWNSHIP SCHOOLS**  
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## I. OVERVIEW

The K-5 Mathematics Program of Montgomery Township is designed to provide students with a strong content base in mathematics while promoting and instilling the skills of problem solving, communication in mathematics, making mathematical connections, and reasoning. The principle component of the district program, the *Everyday Mathematics* program, is organized into six mathematical content strands including: operations & computation, numeration, patterns/functions & algebra, data & chance, measurement & reference frames, and geometry that cover a wide variety of skills and concepts. These content strands provide a rich yet balanced curriculum. Every strand is addressed throughout all grade levels of the program. Each grade level builds on and extends concept understanding in order for children to approach each new challenge from a firmly established foundation.

Within the content of *Everyday Mathematics*, emphasis is placed on:

- A problem-solving approach based on everyday situations that develop critical thinking skills and the reversibility of concepts.
- Frequent practice of basic skills through ongoing program routines and mathematical games.
- An instructional approach that revisits topics regularly to ensure full concept development.
- Activities that explore a wide variety of mathematical content and offer opportunities for students to apply the basic fact skills to geometry, measurement, and algebra.

The *Everyday Mathematics* instructional design is developed through student interest while maximizing student learning. This design includes:

- High expectations for all students
- Concepts and skills developed over time and in a whole variety of contexts
- Balance among mathematical strands
- Dynamic real-world applications
- Multiple methods and strategies for problem solving
- Concrete modeling as a pathway to abstract understanding
- Collaborative learning in partner and small group activities
- Cross-curricular applications

Throughout the delivery of the K-5 Mathematics curriculum various tools/technology are employed including manipulatives, calculators, and computers. A strong focus of the program is on promoting high levels of mathematical thought through experiences, which extend beyond traditional computation. The program is directly correlated to the *New Jersey Core Curriculum Content Standards* and is designed to adequately prepare students for the New Jersey statewide assessment program.

## II. RATIONALE

The K-5 math course sequence is intended to prepare students for the fourth grade statewide assessment (ESPA - Elementary School Proficiency Assessment) and for Math Topics II and Pre-Algebra. To that end the K-5 Mathematics Program mission is two-fold: to provide students with content-specific skills and concepts, and to develop problem-solving skills and strategies, communication, and reasoning. By incorporating the above into the everyday work and play, these ideas will shape our students' ways of thinking about mathematics and foster the development of mathematical intuition, mathematical literacy, and understanding.

## III. STANDARDS

The Montgomery Township Mathematics Program is aligned with the NJ Core Curriculum Content Standards. These standards and their associated strands are enumerated below:

- 4.1 All students will develop number sense and will perform standard numerical operations and estimations on all types of numbers in a variety of ways. (A,B,C)\*
  - A. Number Sense
  - B. Numerical Operations
  - C. Estimation
  
- 4.2 All students will develop spatial sense and the ability to use geometric properties, relationships, and measurement to model, describe and analyze phenomena.
  - A. Geometric Properties
  - B. Transforming Shapes
  - C. Coordinate Geometry
  - D. Units of Measurement
  - E. Measuring Geometric Objects
  
- 4.3 All students will represent and analyze relationships among variable quantities and solve problems involving patterns, functions, and algebraic concepts and processes.
  - A. Patterns and Relationships
  - B. Functions
  - C. Modeling
  - D. Procedures
  
- 4.4 All students will develop an understanding of the concepts and techniques of data analysis, probability, and discrete mathematics, and will use them to model situations, solve problems, and analyze and draw appropriate inferences from data.
  - A. Data Analysis (Statistics)
  - B. Probability
  - C. Discrete Mathematics—Systematic Listing and Counting
  - D. Discrete Mathematics—Vertex-Edge Graphs and Algorithms

\*These letters represent cross-referencing to the district goals.

- 4.5 All students will use mathematical processes of problem solving, communication, connections, reasoning, representations, and technology to solve problems and communicate mathematical ideas. (A,B,C,D,E,N,U)
- A. Problem Solving
  - B. Communication
  - C. Connections
  - D. Reasoning
  - E. Representations

**Workplace Readiness Standards and Strands are enumerated below:**

- 8.1 Self – Management
  - A. Self – Management
  - B. Interpersonal Skills
- 8.2 Career Awareness
  - A. Career Awareness
  - B. Employability Skills
- 8.3 Critical Thinking
  - A. Critical thinking
- 8.4 Computer Applications
  - A. Specific Applications
  - B. Social Aspects
  - C. Research
  - D. Problem Solving
- 8.5 Technology Education  
(Engineering and Technological Design)
  - A. Nature and Impact of Technology
  - B. Design Process and Impact Assessment
  - C. Systems in the Designed World
- 8.6 Career/Technical Arts (Practical Arts)
  - A. Career Planning and Employability Skills
  - B. Consumer/Life Skills
  - C. Safety

## IV. Knowledge & Skills

### A. Knowledge

1.)

Introduction to the Student Reference Book 4.1-4.5, Points, Line Segments, Lines, and Rays 4.2A, Angles, Triangles, and Quadrangles 4.2A, D, Parallelograms 4.2A, Polygons 4.2A, Drawing Circles with a Compass 4.2 D, E, Circle Constructions 4.2 E, Hexagon and Triangle Constructions 4.2E.

2.)

A Visit to Washington, D.C. 4.4, 4.5A-E, Many Names for Numbers 4.1A, Place Value in Whole Numbers 4.3A, Place Value with a Calculator 4.3A, 4.5F, Organizing and Displaying Data 4.4A, 4.5E, The Median 4.4A, Addition of Multi-digit Numbers 4.1B, Displaying Data with a Bar Graph 4.4A, 4.5 E, Subtraction of Multi-digit Numbers 4.1 B.

3.)

Multiplication Facts 4.1B, Multiplication Facts Practice 4.1B, More Multiplication Facts 4.1B, Multiplication, and Division and Fractions 4.1B, World Tour: Flying to Africa 4.5A-E, Finding Air Distances 4.2D, 4.5A-E, A Guide for Solving Number Stories 4.1B, 4.5A, True or False Number Sentences 4.1B, Parentheses in Number Sentences 4.1B, Open Sentences 4.1B, Logic Problems 4.4B, 4.5D, E.

4.)

Decimals: Review of Basic Concepts 4.1A, Comparing and Ordering Decimals 4.1A, 4.3A, Estimating with Decimals 4.1C, Decimal Addition and Subtraction 4.1A, Decimals in Money 4.2D, Thousandths 4.3A, Metric Units of Length 4.2D, Personal References for Metric Length 4.2D, E, Measuring in Millimeters 4.2D,E, Decimal Place Value 4.3A

5.)

Extended Multiplication Facts 4.1A, Multiplication Wrestling 4.1A,4.5A-E, Estimating Sums 4.1C, Estimating Products 4.1B,C, The Partial-Products Algorithm for Multiplication (Part 1) 4.1B,4.4D, The Partial-Products Algorithm for Multiplication (Part 2) 4.1B,4.4D

5.7 Lattice Multiplication 4.1B, Big Numbers 4.3A, Powers of 10 4.1A,4.3A, Rounding and Reporting Large Numbers 4.1A,4.3A, World Tour: Traveling to Europe 4.4D,4.5A-F

6.)

A Multiples Strategy for Division 4.1B, The Partial-Quotients Division Algorithms 4.1B, 4.4D, Multiplication and Division Number Stories 4.1B,4.5A, Expressing and Interpreting Remainders 4.1B, Rectangular Coordinate Grids for Maps 4.2C, 4.5C, Rotations and Angles 4.2B, Using a Circle Protractor 4.2E, The Half-Circle Protractor 4.2E, The Global Grid System 4.2C, Latitude and Longitude 4.2A,C

7.)

Review of Basic Fraction Concepts 4.3A, Fractions of Sets 4.3C, Pattern-Block Fractions 4.3A, Fraction Addition and Subtraction 4.3D, Clock Fractions 4.3C, Many Names for Fractions 4.3A, Equivalent Fractions 4.1A,4.3B, Fractions and Decimals 4.1B, Comparing Fractions 4.1A, The ONE for Fractions 4.3A, Probability, Fractions, and Spinners 4.4B, A Cube-Drop Experiment 4.1B,4.5A-E

8.)

Kitchen Layouts and Perimeter 4.2E, Scale Drawings 4.2E, Area 4.2E, What is the Area of My Skin? 4.2E,4.5A-E, Formula for the Area of a Rectangle 4.3A, Formula for the Area of a Parallelogram 4.3A,B, Formula for the Area of a Triangle 4.3A,B, Geographical Area Measurements 4.2E,4.5A-E

9.)

Fractions, Decimals, and Percents 4.3A, Converting "Easy" Fractions to Decimals and Percents 4.3A, Using a Calculator to Convert Fractions to Decimals 4.3A,D, Using a Calculator to Convert Fractions to Percents 4.3A,D, Conversions among Fractions, Decimals, and Percents 4.3A, Comparing the Results of a Survey 4.4A,4.5E, Comparing Population Data 4.4A, Multiplication of Decimals 4.1B, Division of Decimals 4.1B

10.)

Explorations with a Transparent Mirror 4.2A, Finding Lines of Reflections 4.2A, Properties of Reflections 4.2A, Line Symmetry 4.2A, Frieze Patterns 4.2A, Positive and Negative Numbers 4.1B

11.)

Weight 4.2A, Geometric Solids 4.2B, Constructing Geometric Solids 4.2E, A Volume Exploration 4.2A,E, A Formula for the Volume of Rectangular Prisms 4.3A, Subtraction of Positive and Negative Numbers 4.1B, Capacity and Weight 4.1B,4.2D

12.)

Introducing Rates 4.3C, Solving Rate Problems 4.1B,4.3A, Converting between Rates 4.3A, Comparison Shopping: Part 1 4.3A, Comparison Shopping: Part 2 4.3A, World Tour Wrap-Up 4.3A,4.5A-E

## B. Attitudes

The student will:

1. appreciate that mathematics is a part of everyday life.(4.5C)
2. develop an understanding that numbers have meaning. (4.5B,C,D,E)

## V. STRATEGIES

Students will be involved in cooperative learning and individual study throughout mathematics instruction. Much of the instruction will incorporate problem-based learning, including hands-on activities, manipulatives, projects, journals, and class discussions, as well as other strategies determined by the teacher.

- Given a group or individual problem-solving situation, students will use a variety of mathematical perceptions such as seeing patterns, making comparisons, estimating amounts, etc... to deduce a solution.
- Given a set of oral or written problems, students will understand the mathematical context, recognize the operative significance of the symbols, and calculate the solutions.
- Given manipulatives, games, models, calculators, computers, and other technology, students will solve problems appropriate to the unit or skill being studied.
- Differentiating Instruction - See Appendix B: Strategies Used to Differentiate Instruction in the Math Classroom

## **VI. EVALUATION**

Students learning will be evaluated on a daily basis through teacher observation and anecdotal note-taking. Active participation, concrete understanding of skills using manipulatives, abstract mastery of skills, and responsibility for and completion of homework assignments will be considered during the evaluation of individual students. Age appropriate and specific assessments will be given to whole classes three times a year (September, January, and May) and to individuals as often as needed.

## **VII. REQUIRED RESOURCES**

1. Text: Everyday Mathematics, SRA/McGraw-Hill, Chicago, IL. 2004. (ISBN# 0-07-600020-6)
2. NJ Mathematics Curriculum Frameworks (see building principal)
3. Teacher's Resource Planner Package:
  - Student Math Journals Vol. I & II
  - Teacher's Lesson Guide Vol. I & II
  - Math Masters
  - Teacher's Reference Manual
  - Home Connection Handbook
  - Minute Math+
  - Assessment Handbook
4. Software:
  - Teacher's Assessment Assistant CD Rom
  - *Exemplars* CD Rom Vol. I & II

## **VIII. SCOPE AND SEQUENCE**

### **Unit 1 Naming & Constructing Geometric Figures**

- 1.1 Introduction to the Student Reference Book
- 1.2 Points, Line Segments, Lines, and Rays
- 1.3 Angles, Triangles, and Quadrangles
- 1.4 Parallelograms
- 1.5 Polygons

- 1.6 Drawing Circles with a Compass
- 1.7 Circle Constructions
- 1.8 Hexagon and Triangle Constructions
- 1.9 Unit 1 Review and Assessment

## **Unit 2            Using Numbers & Organizing Data**

- 2.1 A Visit to Washington, D.C.
- 2.2 Many Names for Numbers
- 2.3 Place Value in Whole Numbers
- 2.4 Place Value with a Calculator
- 2.5 Organizing and Displaying Data
- 2.6 The Median
- 2.7 Addition of Multidigit Numbers
- 2.8 Displaying Data with a Bar Graph
- 2.9 Subtraction of Multidigit Numbers
- 2.10 Unit 2 Review and Assessment

## **Unit 3            Multiplication & Division; Number Sentences & Algebra**

- 3.1 Multiplication Facts
- 3.2 Multiplication Facts Practice
- 3.3 More Multiplication Facts
- 3.4 Multiplication, and Division, and Fractions
- 3.5 World Tour: Flying to Africa
- 3.6 Finding Air Distances
- 3.7 A Guide for Solving Number Stories
- 3.8 True or False Number Sentences
- 3.9 Parentheses in Number Sentences
- 3.10 Open Sentences
- 3.11 Logic Problems
- 3.12 Unit 3 Review and Assessment

## **Unit 4            Decimals & Their Uses**

- 4.1 Decimals: Review of Basic Concepts
- 4.2 Comparing and Ordering Decimals
- 4.3 Estimating with Decimals
- 4.4 Decimal Addition and Subtraction

- 4.5 Decimals in Money
- 4.6 Thousandths
- 4.7 Metric Units of Length
- 4.8 Personal References for Metric Length
- 4.9 Measuring in Millimeters
- 4.10 Decimal Place Value
- 4.11 Unit 4 Review and Assessment

**Unit 5            Big Numbers, Estimation, and Computation**

- 5.1 Extended Multiplication Facts
- 5.2 Multiplication Wrestling
- 5.3 Estimating Sums
- 5.4 Estimating Products
- 5.5 The Partial-Products Algorithm for Multiplication (Part 1)
- 5.6 The Partial-Products Algorithm for Multiplication (Part 2)
- 5.7 Lattice Multiplication
- 5.8 Big Numbers
- 5.9 Powers of 10
- 5.10 Rounding and Reporting Large Numbers
- 5.11 World Tour: Traveling to Europe
- 5.12 Unit 5 Review and Assessment

**Unit 6            Division; Map Reference Frames; Measures of Angles**

- 6.1 A Multiples Strategy for Division
- 6.2 The Partial-Quotients Division Algorithms
- 6.3 Multiplication and Division Number Stories
- 6.4 Expressing and Interpreting Remainders
- 6.5 Rectangular Coordinate Grids for Maps
- 6.6 Rotations and Angles
- 6.7 Using a Circle Protractor
- 6.8 The Half-Circle Protractor
- 6.9 The Global Grid System
- 6.10 Latitude and Longitude
- 6.11 Unit 6 Review and Assessment

**Unit 7            Fractions and Their Uses; Chance and Probability**

- 7.1 Review of Basic Fraction Concepts
- 7.2 Fractions of Sets
- 7.3 Pattern-Block Fractions
- 7.4 Fraction Addition and Subtraction
- 7.5 Clock Fractions
- 7.6 Many Names for Fractions
- 7.7 Equivalent Fractions
- 7.8 Fractions and Decimals
- 7.9 Comparing Fractions
- 7.10 The ONE for Fractions
- 7.11 Probability, Fractions, and Spinners
- 7.12 A Cube-Drop Experiment
- 7.13 Unit 7 Review and Assessment

## **Unit 8            Perimeter and Area**

- 8.1 Kitchen Layouts and Perimeter
- 8.2 Scale Drawings
- 8.3 Area
- 8.4 What is the Area of My Skin?
- 8.5 Formula for the Area of a Rectangle
- 8.6 Formula for the Area of a Parallelogram
- 8.7 Formula for the Area of a Triangle
- 8.8 Geographical Area Measurements
- 8.9 Unit 8 Review and Assessment

## **Unit 9            Percents**

- 9.1 Fractions, Decimals, and Percents
- 9.2 Converting "Easy" Fractions to Decimals and Percents
- 9.3 Using a Calculator to Convert Fractions to Decimals
- 9.4 Using a Calculator to Convert Fractions to Percents
- 9.5 Conversions among Fractions, Decimals, and Percents
- 9.6 Comparing the Results of a Survey
- 9.7 Comparing Population Data
- 9.8 Multiplication of Decimals
- 9.9 Division of Decimals
- 9.10 Unit 9 Review and Assessment

## **Unit 10      Reflections and Symmetry**

- 10.1 Explorations with a Transparent Mirror
- 10.2 Finding Lines of Reflections
- 10.3 Properties of Reflections
- 10.4 Line Symmetry
- 10.5 Frieze Patterns
- 10.6 Positive and Negative Numbers
- 10.7 Unit 10 Review and Assessment

## **Unit 11      3-D Shapes, Weight, Volume, and Capacity**

- 11.1 Weight
- 11.2 Geometric Solids
- 11.3 Constructing Geometric Solids
- 11.4 A Volume Exploration
- 11.5 A Formula for the Volume of Rectangular Prisms
- 11.6 Subtraction of Positive and Negative Numbers
- 11.7 Capacity and Weight
- 11.8 Unit 11 Review and Assessment

## **Unit 12      Rates**

- 12.1 Introducing Rates
- 12.2 Solving Rate Problems
- 12.3 Converting between Rates
- 12.4 Comparison Shopping: Part 1
- 12.5 Comparison Shopping: Part 2
- 12.6 World Tour Wrap-Up
- 12.7 Unit 12 Review and Assessment

# Fourth Grade *Everyday Mathematics*

## Unit 1

B	D	S	Learning Goal By Assessment Rubric Indicators
			Name, draw, and label line segments, lines and rays
			Name, draw, and label angles, triangles, and quadrangles
			Identify and describe right angles and parallel lines and line segments
			Solve addition and subtraction facts
			Identify properties of polygons
			Classify quadrangles according to side and angle properties
			Use a compass and straightedge to construct geometric figures

## Unit 2

B	D	S	Learning Goal By Assessment Rubric Indicators
			Use the statistical landmarks maximum and minimum
			Have a successful strategy for subtracting multidigit numbers
			Have a successful strategy for adding multidigit numbers
			Read and write numerals to hundred-millions; give the value of the digits in numerals to hundred-millions
			Give equivalent names for numbers
			Display data with a line plot, bar graph, or tally chart
			Use the statistical landmarks median, mode, and range

## Unit 3

B	D	S	Learning Goal By Assessment Rubric Indicators
			Solve basic multiplication facts
			Understand the relationship between multiplication and division
			Solve open sentences
			Insert parentheses to make true number sentences; solve problems with parentheses
			Determine whether number sentences are true or false
			Use and explain strategies for solving addition and subtraction number stories
			Use a map scale to estimate distances
			Solve basic division facts

## Unit 4

B	D	S	Learning Goal By Assessment Rubric Indicators
			Draw and measure line segments to the nearest centimeter
			Use dollars-and-cents notations
			Express metric measures with decimals
			Convert between metric measures
			Read and write decimals to thousandths
			Compare and order decimals
			Draw and measure line segments to the nearest millimeter
			Use personal references to estimate lengths in metric units
			Solve 1- and 2-place decimal addition and subtraction problems and number stories

## Unit 5

B	D	S	Learning Goal By Assessment Rubric Indicators
			Compare large numbers
			Estimate sums
			Solve extended multiplication facts
			Make magnitude estimates for products of multidigit numbers
			Solve multidigit multiplication problems
			Round whole numbers to a given place
			Read and write numbers to billions; name the values of digits in numerals to billions
			Use exponential notation to represent powers of 10

## Unit 6

B	D	S	Learning Goal By Assessment Rubric Indicators
			Have a successful strategy for solving whole-number division problems
			Express the remainder of a whole-number division problem as a fraction and the answer as a mixed number
			Interpret the remainder in division problems
			Name and locate points specified by ordered number pairs on a coordinate grid
			Identify acute, right, obtuse, straight, and reflex angles
			Make turns and fractions of turns; relate turns and angles
			Use a circular protractor and a half-circle protractor to measure and draw angles
			Use and explain strategies for solving multiplication and division number stories
			Identify locations on Earth for which latitude and longitude are given; find latitude and longitude for given locations

## Unit 7

B	D	S	Learning Goal By Assessment Rubric Indicators
			Identify the whole for fractions
			Identify fractional parts of a collection of objects
			Identify fractional parts of regions
			Rename fractions with denominators of 10 and 100 as decimals
			Apply basic vocabulary and concepts associated with chance events
			Compare and order fractions
			Find fractions equivalent to a given fraction
			Add and subtract fractions

## Unit 8

B	D	S	Learning Goal By Assessment Rubric Indicators
			Use formulas to find area of rectangles, parallelograms, and triangles
			Find the perimeter of a polygon
			Estimate the area of a figure by counting unit squares and fractions of unit squares inside the figure
			Make and interpret scale drawings

## Unit 9

B	D	S	Learning Goal By Assessment Rubric Indicators
			Give equivalencies between hundredths-fractions, decimals and percents
			Use a calculator to rename any fractions as a decimal or percent
			Find a percent or a fraction of a number
			Give equivalencies between "easy" fractions (fourths, fifths, and tenths), decimals, and percents
			Use an estimation strategy to divide decimals by whole numbers
			Use an estimation strategy to multiply decimals by whole numbers

## Unit 10

B	D	S	Learning Goal By Assessment Rubric Indicators
			Use a transparent mirror to draw the reflection of a figure
			Identify lines of symmetry, lines of reflection, reflected figures, and figures with line symmetry
			Translate figures
			Add integers
			Rotate figures

## Unit 11

B	D	S	Learning Goal By Assessment Rubric Indicators
			Add positive and negative integers
			Estimate the weight of objects in ounces or grams; weigh objects in ounces or grams
			Solve cube-stacking volume problems
			Describe properties of geometric solids
			Use a formula to calculate the volume of rectangular prisms
			Subtract positive and negative integers

## Unit 12

B	D	S	Learning Goal By Assessment Rubric Indicators
			Solve rate problems, using rate tables as necessary
			Find unit rates
			Calculate unit prices to determine which product is the "better buy"
			Evaluate the reasonableness of rate data
			Collect and compare rate data
			Find unit rates