

MATHEMATICS PARENT GUIDE

FOURTH GRADE



Every Student. Every Day.

Medinah School District # 11

TABLE OF CONTENTS

Mathematics Philosophy.....	2
Best Practices - Characteristics of Mathematically Proficient Students.....	3
Progressions of Concepts.....	4
Grade-Level Introductory Letters.....	5
Grade-Level Vocabulary.....	6
Kindergarten	
First Grade	
Second Grade	
Third Grade	
Fourth Grade	
Fifth Grade	
Sixth Grade	
Seventh Grade	
Eighth Grade	
Grade Level Standards – Core Essentials.....	7
Kindergarten	
First Grade	
Second Grade	
Third Grade	
Fourth Grade	
Fifth Grade	
Sixth Grade	
Seventh Grade	
Eighth Grade	
Assessment.....	8

Mathematics Philosophy

The Medinah School District 11 Math Curriculum Committee affirms that students and teachers in grades K-8 have a well-developed and meaningful mathematics curriculum. The standards-based program is comprehensive and includes basic skills, problem solving, concept development, and critical thinking. This balanced, research-based curriculum encourages students to be thoughtful math practitioners.

“The Standards for Mathematical Practice describe ways in which developing student practitioners of the discipline of mathematics increasingly ought to engage with the subject matter as they grow in mathematical maturity and expertise throughout the elementary, middle and high school years.”

—*Common Core State Standards for Mathematics*, page eight

The eight Standards for Mathematical Practice are:

1. Make sense of problems and persevere in solving them
2. Reason abstractly and quantitatively
3. Construct viable arguments and critique the reasoning of others
4. Model with mathematics
5. Use appropriate tools strategically
6. Attend to precision
7. Look for and make use of structure
8. Look for and express regularity in repeated reasoning

The Math Committee recognizes that for effective implementation of this philosophy, ongoing support and cooperation from the home and school district are vital. To maximize the benefits of the allocated instructional time necessary for concept development, the majority of skill maintenance will take place outside the math classroom. Instructional support, depending upon grade level, includes technology resources, tutorials, homework, and home study. Ongoing staff development is fundamental as well.

The goal of the Medinah School District 11 math program is to ensure **all** students' **life-long** mathematical success.

Best Practices



Characteristics of Mathematically Proficient Students¹

Standards for Mathematical Practice

Student Characteristics

1. Make sense of problems and persevere in solving them.

Mathematically proficient students can

- Explain the meaning of a problem and restate it in their words.
 - Analyze given information to develop possible strategies for solving the problem.
 - Identify and execute appropriate strategies to solve the problem.
 - Evaluate progress toward the solution and make revisions if necessary.
 - Check for accuracy and reasonableness of work, strategy and solution.
 - Understand and connect strategies used by others to solve problems.
-

2. Reason abstractly and quantitatively.

Mathematically proficient students can

- Translate given information to create a mathematical representation for a concept.
 - Manipulate the mathematical representation by showing the process considering the meaning of the quantities involved.
 - Recognize the relationships between numbers/quantities within the process to evaluate a problem.
 - Review the process for reasonableness within the original context.
-

3. Construct viable arguments and critique the reasoning of others.

Mathematically proficient students can

- Use observations and prior knowledge (stated assumptions, definitions, and previous established results) to make conjectures and construct arguments.
 - Compare and contrast logical arguments and identify which one makes the most sense.
 - Justify (orally and in written form) the approach used, including how it fits in the context from which the data arose.
-

-
- Listen, understand, analyze, and respond to the arguments of others.
 - Identify and explain both correct and flawed logic.
 - Recognize and use counterexamples to refine assumptions or definitions and dispute or disprove an argument.
-

4. Model with mathematics.

Mathematically proficient students can

- Use a variety of methods to model, represent, and solve real-world problems.
 - Simplify a complicated problem by making assumptions and approximations.
 - Interpret results in the context of the problem and revise the model if necessary.
 - Choose a model that is both appropriate and efficient to arrive at one or more desired solutions.
-

5. Use appropriate tools strategically.

Mathematically proficient students can

- Identify mathematical tools and recognize their strengths and weaknesses.
 - Select and use appropriate tools to best model/solve problems.
 - Use estimation to predict reasonable solutions and/or detect errors.
 - Identify and successfully use external mathematical resources to pose or solve problems.
 - Use a variety of technologies, including digital content, to explore, confirm, and deepen conceptual understanding.
-

6. Attend to precision.

Mathematically proficient students can

- Understand symbols and use them consistently within the context of a problem.
 - Calculate answers efficiently and accurately and label them appropriately.
 - Formulate precise explanations (orally and in written form) using both mathematical representations and words.
 - Communicate using clear mathematical definitions, vocabulary, and symbols.
-

7. Look for and make use of structure.

Mathematically proficient students can

- Look for, identify, and accept patterns or structure within relationships.
- Use patterns or structure to make sense of mathematics and connect prior knowledge to similar situations and extend to novel situations.
- Analyze a complex problem by breaking it down into smaller parts.
- Reflect on the problem as a whole and shift perspective as needed.

8. Look for and express regularity in repeated reasoning.

Mathematically proficient students can

- Recognize similarities and patterns in repeated trials with a process.
- Generalize the process to create a shortcut which may lead to developing rules or creating a formula.
- Evaluate the reasonableness of results throughout the mathematical process while attending to the details.

¹http://www.ocde.us/CommonCoreCA/Documents/mathematicalpractices_characteristicsofproficientstudent_wisconson.pdf

Progression of Concepts



K-8 MATH

Progression of Concepts

KDG	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th
Counting and Cardinality								
Numbers and Operations in Base Ten				Ratios and Proportional Relationships				
		Numbers and Operations: Fractions			The Number Systems			
Operations and Algebraic Thinking				Expressions and Equations				
				Function				
Geometry								
Measurement and Data				Statistics and Probability				

Introductory Letter

by
Grade Level



Fourth Grade

enVisionMATH Common Core

enVisionMATH Common Core is a focused and coherent mathematics curriculum that provides in-depth instruction on a limited number of important categories of mathematics content. The program revolves around Big Ideas in mathematics that children need to know, and shows how these ideas are related. To convey the power of Big Ideas to students, they are translated into student-friendly Essential Questions presented at the beginning of each topic. Throughout the topic, numerous smaller ideas (called Essential Understandings) are linked into a coherent whole. Application of the eight math practices are weaved into every topic.

enVisionMATH	
Topic 1	Multiplication and Division: Meanings and Facts
Topic 2	Generate and Analyze Patterns
Topic 3	Place Value
Topic 4	Addition and Subtraction of Whole Numbers
Topic 5	Number Sense: Multiplying 1-Digit Numbers
Topic 6	Developing Fluency: Multiplying by 1-Digit Numbers
Topic 7	Number Sense: Multiplying by 2-Digit Numbers
Topic 8	Developing Fluency: Multiplying by 2-Digit Numbers
Topic 9	Number Sense: Dividing by 1-Digit Divisors
Topic 10	Developing Fluency: Dividing by 1-Digit Divisors
Topic 11	Fraction Equivalence and Ordering
Topic 12	Adding and Subtracting Fractions and Mixed Numbers with Like Denominators
Topic 13	Extending Fraction Concepts
Topic 14	Measurement Units and Conversions
Topic 15	Solving Measurement and Data Problems
Topic 16	Lines, Angles, and Shapes

Standards for Mathematical Practice

- ✓ Make sense of problems and persevere in solving them.
- ✓ Reason abstractly and quantitatively.
- ✓ Construct viable arguments and critique the reasoning of others.
- ✓ Model with mathematics.
- ✓ Use appropriate tools strategically.
- ✓ Attend to precision.
- ✓ Look for and make use of structure.
- ✓ Look for and express regularity in repeated reasoning.

Home School Connection:

Parent tutorial: <http://mypearsontraining.com/products/pearsonrealize/tutorials.asp?page=students>

Parents and students will also have online access to math videos, manipulatives, quizzes, and other resources. Look for upcoming information from your child's teacher that includes a username and password.

www.pearsonrealize.com

Vocabulary



EnVision Math

Common Core Vocabulary

Grade 4

Topic 1: Multiplication and Division: Meanings and Facts

- Breaking apart
- Factor
- Product
- Multiples
- Array
- Commutative Property of Multiplication
- Zero Property of Multiplication
- Identity Property of Multiplication
- Distributive Property of Multiplication

Topic 2: Generate and Analyze Patterns

- Compare
- Divide
- Multiply
- Regroup
- Repeating pattern

Topic 3: Place Value

- Odd
- Even
- Period
- Number line
- Digits
- Place value
- Standard form
- Expanded form
- Word form
- Compare

Topic 4: Addition and Subtraction of Whole Numbers

- Rounding
- Sum
- Difference
- Mental math
- Breaking Apart
- Compensation
- Tens
- Regroup
- Inverse operations

Topic 5: Number Sense: Multiplying by 1-Digit Numbers

- Multiples
- Arrays
- Factor
- Product
- Partial products
- Compensation

Topic 6: Developing Fluency: Multiplying by 1-Digit Numbers

- Product
- Array
- Factor
- Rounding

Topic 7: Number Sense: Multiplying by 2-Digit Numbers

- Equation
- Factors
- Product
- Rounding
- Compatible Numbers

Topic 8: Developing Fluency: Multiplying by 2- Digit Numbers

- Rounding
- Commutative Property
- Compatible
- Distributive Property

Topic 9: Number Sense: Dividing by 1 Digit Divisors

- Divisor
- Multiple
- Factor
- Quotient
- Product
- Division
- Remainder

Topic 10: Developing Fluency: Dividing by 1 Digit Divisors

- Array
- Compatible numbers
- Factors
- Partial product

Topic 11: Fraction Equivalence and Ordering

- Fraction
- Denominator
- Numerator
- Prime number
- Composite number
- Equivalent fractions
- Benchmark fraction

Topic 12: Adding and Subtracting Fractions and Mixed Numbers with Like Denominators

- Denominator
- Numerator
- Product
- Factor
- Mixed number
- Improper fraction

Topic 13: Extending Fraction Concepts

- Greater
- Digits
- Place value
- Number line
- Unit fraction
- Tenth
- Hundredth
- Decimal point

Core Essentials



4th Grade Core Essentials

Number and Operations in Base Ten

I can use and explain place value concepts for multi-digit whole numbers.

- I can look at a multi-digit number and determine that the digit to the left is 10 times greater than a given digit.
- I can use place value to help multiply or divide numbers.
- I can read and write multi-digit whole numbers using base-ten numbers.
- I can read and write multi-digit whole numbers using number names.
- I can read and write multi-digit whole numbers using expanded form.
- I can compare the size of two multi-digit numbers using place value and record the results with $<$, $>$, $=$.
- I can use place value understanding to round multi-digit whole numbers to any place.

I can use and explain how to do arithmetic with multi-digit numbers.

- I can fluently add and subtract multi-digit whole numbers.
- I can multiply a whole number of up to four digits by a one-digit whole number.
- I can multiply a two-digit number by a two-digit number using strategies based on place value and/or operation properties.
- I can explain two-digit by two-digit multiplication by using equations, rectangular arrays, and/or area model.
- I can divide a single digit number into numbers up to 9,999 in a variety of ways.
- I can show and explain division problems by using equations, rectangular arrays, and/or area models.

Operations and Algebraic Thinking

I can solve real world problems that require me to add, subtract, multiply, and divide whole numbers.

- I can explain why multiplying numbers in an equation in any order will get the same product.
- I can write verbal statements about multiplicative comparisons as equations.
- I can solve word problems involving multiplication and division using drawings.
- I can solve word problems involving multiplication and division by using equations and a symbol for an unknown.
- I can explain the difference between a multiplicative comparison and an additive comparison.
- I can solve multi-step word problems using addition, subtraction, multiplication and division with remainders.
- I can solve multi-step word problems using addition, subtraction, multiplication, and division using equations where a symbol is used for the unknown.
- I can determine if the answer makes sense by using mental math, estimation, and rounding.

I can explain how multiples and factors are related and used.

- I can find all factor pairs for a whole number between 1 and 100.
- I can show how a whole number is a multiple of each of its factors.
- I can determine if a whole number between 1 and 100 is a multiple of a one digit number.
- I can determine the numbers between 1 – 100 that are composite.
- I can determine the numbers between 1 – 100 that are prime.

I can create and explain various number and shape patterns.

- I can generate a number pattern that follows a given rule.
- I can generate a shape pattern that follows a given rule.
- I can look at a number pattern and determine additional pattern found within the sequence.
- I can look at a shape pattern and determine additional patterns found within the sequence.

Numbers and Operations – Fractions

I can order fractions and explain when they are equivalent.

- I can create and explain equivalent fractions using visual models.
- I can create and explain equivalent fractions even though the number and size of the parts of the fraction may change.
- I can compare two fractions by creating common numerators or common denominators.
- I can compare two fractions using a benchmark fraction.
- I can explain why fraction comparisons are only valid when they refer to the same whole.
- I can correctly record the comparison of fractions using $<$, $>$, $=$, and I can defend my answers.
- I can explain the concepts of adding and subtracting fractions with like denominators.
- I can decompose (break down) a fraction into a sum of fractions with the same denominator in more than one way.
- I can decompose (break down) a fraction into a sum of fractions with the same denominator and justify my answer using a visual fraction model.
- I can add mixed numbers with like denominators using a variety of strategies.
- I can subtract mixed numbers with like denominators using a variety of strategies.

I can use and explain unit fractions and relate what I know about arithmetic of whole numbers to the arithmetic of unit fractions.

- I can solve real-world problems involving addition of fractions.
- I can solve real-world problems involving subtraction of fractions.
- I can explain how a fraction a/b is a multiple of $1/b$.
- I can explain how multiplying a whole number times a fraction can be changed to a whole number times a unit fraction.
- I can use a visual fraction model to justify multiplying a fraction by a whole number.
- I can solve word problems involving multiplication of a fraction by a whole number using visual fraction models and equations.

I can change fractions with denominators of 10 or 100 to decimals and can explain how these decimals differ in size.

- I can write fractions with denominators of 10 to equal fractions with denominators of 100.
- I can add two fractions with the denominators of 10 and 100.
- I can write a fraction with denominators of 10 or 100 as decimals.

- I can locate a decimal on a number line.
- I can compare two decimals, explain my reasoning, and record the results using $<$, $>$, $=$.
- I can explain that comparisons between two decimals are only valid when they refer to the same whole.

Measurement and Data

I can explain how unit size affects the measurement and can solve real world problems involving measurement, perimeter, and area.

- I can explain the relative sizes of units within the same system.
- I can translate the larger units into equivalent smaller units.
- I can record measurement equivalence in a two column table or as number parts.
- I can solve real-world problems that require arithmetic with distances, liquid volumes, masses, time, and money.
- I can use the four operations to solve word problems using simple fractions and decimals.
- I can use the four operations to solve word problems expressing measurements given in a larger unit in terms of a smaller unit.
- I can use number lines and diagrams to illustrate solutions.
- I can solve real-world problems involving the perimeter of rectangles.
- I can solve real-world problems involving the area of rectangles.
- I can make a line-plot to display a set of data in fractions measured to the nearest $\frac{1}{2}$, $\frac{1}{4}$, or $\frac{1}{8}$ units.
- I can use information from a line plot to solve problems involving addition and subtraction of fractions.

I can draw, measure, and explain different concepts of angles.

- I can explain how an angle is made of two rays with common endpoints.
- I can explain how an angle is measured by its reference to a circle.
- I can define and explain a "one-degree angle" and how it is used to measure angles.
- I can explain how the measure of an angle is a multiple of the "one-degree" angle.
- I can use a protractor to measure whole degree angles.
- I can draw an angle of specified size, using a protractor.

- I can explain how when angles are joined in non-overlapping parts, the total measure is the sum of the parts.
- I can solve real-world problems involving addition and/or subtraction to find unknown angles on a diagram.

Geometry

I can draw and identify lines and angles and use these to classify shapes.

- I can draw and identify a point.
- I can draw and identify a line.
- I can draw and identify a line segment.
- I can draw and identify a ray.
- I can draw and identify a right angle.
- I can draw and identify an acute angle.
- I can draw and identify an obtuse angle.
- I can draw and identify perpendicular lines.
- I can draw and identify parallel lines.
- I can put 2-D figures in like groups based on whether certain sides are parallel or perpendicular.
- I can put 2-D figures in like groups based on whether certain angles are acute, obtuse, or right.
- I can identify right angles and can group right triangles from other triangles.
- I can identify line-symmetry.
- I can identify figures that have symmetry and can then draw the lines of symmetry.

Assessments



MEASURES of ACADEMIC PROGRESS (MAP)

Measures of Academic Progress (MAP) are state-aligned computerized adaptive tests that reflect the instructional level of each student and measure growth over time.

The assessment itself is unique in that it adapts to the student's ability, accurately measuring what a student knows and needs to learn. In addition, MAP tests measure academic growth over time, independent of grade level or age. Most importantly, the results educators receive have practical application to teaching and learning.

Students in Medinah take the mathematics and reading assessments in the fall, winter and spring from grades 1 thru 8. Each student is provided with a Rausch Unit Interval (RIT) score after testing. They are then given a RIT Target goal for the next assessment session.

Parents receive a summary of their student's progress in mathematics and reading. The report includes a growth chart, current test scores compared to a National perspective, and the projected RIT goal for students next session of testing.

Testing Seasons: FALL, WINTER, SPRING								
KDG	1st	2nd	3rd	4th	5th	6th	7th	8th
	Operations and Algebraic Thinking Number and Operations Measurement and Data Geometry					Operations and Algebraic Thinking The Real and Complex Number Systems Geometry Statistics and Probability		

AIMSWEB

At the foundation of Aimsweb is general outcome measurement, a form of curriculum-based measurement (CBM), used for universal screening and progress monitoring. This form of brief assessment measures overall performance of key foundational skills at each grade level and draws upon over thirty years of scientific research that demonstrates both its versatility to provide prediction of reading and math achievement as well as its sensitivity to growth.

The Power of CBM

Educators and researchers will tell you CBM is their assessment of choice for progress monitoring and Response to Intervention (RTI) because this method of general outcome measurement is:

- **Brief:** Can be administered frequently without disrupting instruction.
- **Predictive:** Provides accurate predictions of reading and math achievement.
- **Sensitive to Improvement:** An increase in ability will be reflected in rising scores on the measure.
- **Easy to administer and score:** Can be used accurately by a wide range of education personnel.
- A **valid** measure of skills that are central to the domain being measured (reading, math)
- **Standardized and reliable:** Producing consistent results across time or testing conditions.
- **Available in multiple equivalent forms** to reduce practice effects on retesting (up to 33 forms per measure, per grade)

Medinah School District #11 utilizes AIMSWeb assessments for both benchmarking of student performance in Fall, Winter, and Spring, and progress monitoring of targeted students, weekly or bi-weekly, throughout the school year. The chart below indicates specific test administration information for students in grade K-8. Unless otherwise noted, the AIMSweb tests are administered for both benchmarking and progress monitoring.

Testing Seasons: FALL, WINTER, SPRING								
KDG	1st	2nd	3rd	4th	5th	6th	7th	8th
<ul style="list-style-type: none"> • Tests of Early Numeracy (1st Grade Only) 	<ul style="list-style-type: none"> • Math Computation • Concepts and Applications 							
*Administered for progress monitoring only								