Montgomery County R-II School District

Curriculum Area: MATH

Kindergarten:

1. Count with 1-1 correspondence concrete objects to compose and decompose values to 10
2. Rote count to 100; recognize to 31
3. Create and continue AB, ABB patterns
4. Demonstrate understanding of math concepts (above, below, front, behind, shorter, longer, same)
5. Describe passage of time
6. Identify and know value of penny, nickel, dime and quarter
7. Sort items according to attributes.

First Grade:

1. Read, write and compare whole numbers less than 100
2. Compose or decompose whole numbers up to 20 using multiple strategies such as known facts, doubles, and close to doubles, tens and one place value.
3. Use strategies to develop fluency with basic number relationships of addition and subtraction for sums up to 20
4. Extend patterns of shape, or a simple numeric pattern
5. using addition or subtraction, represent a mathematical situation as an expression or number sentence
6. Describe, name and interpret relative positions in space (left, right)
7. Select the appropriate tool for the attribute being measured (size, temperature, time, weight)
8. Tell time to the nearest half hour
9. Count money to a dollar, including half dollar
10. Represent one to one correspondence data using pictures and bar graphs

Second Grade:

1. Read, write and compare whole numbers less than 1,000
2. Recognize unit fractions of a shape

3. Skip count by multiples of numbers less than 10
4. Represent/model a given situation involving two-digit whole number addition or subtraction
5. Demonstrate fluency including quick recall with basic number relationships of addition and subtraction for sums up to 20
6. Apply and describe the strategy used to compute 2 digit addition or subtraction problems with regrouping; and using place value.
7. Model situations that involve addition and subtraction of whole numbers, using pictures, objects or symbols
8. Select an appropriate unit and tool for the attribute and to the nearest inch, centimeter, degree, hour and pound
9. Tell time to the nearest fourth (quarter) hour
10. Count money to a $5
11. Pose questions and gather data about themselves and their surroundings
12. Sort and classify items according to their attributes and organize data about the items
13. Represent one-to-many correspondence data using pictures and bar graphs

Third Grade:

1. Read, write and compare whole numbers up to 10,000
2. Represent halves, thirds and fourths
3. Represent/model a given situation involving multiplication and related division using various models including sets, arrays, areas, repeated addition/subtraction, sharing and partitioning
4. Use strategies to develop fluency with basic number relationships (9x9) of multiplication and division
5. Apply and describe the strategy used to compute up to 3-digit addition or subtraction problems
6. Represent patterns using words, tables or graphs
7. Describe location using common language and geometric vocabulary (forward, back, right left, N, S, E, W, perimeter, area and shapes)
8. Identify/Justify and use the appropriate unit o measurement (linear, time, weight, and liquid volumes)
9. Determine change from $5 and +/- money values to $5

Fourth Grade:

1. Demonstrate knowledge of place value, greater than & less than, rounding and estimation.
2. Demonstrate fluency with basic number relationships (12x12) of multiplication and related division
3. Apply and describe the strategy used to compute a given multiple of 2 digit by 2 digit numbers and related division facts
4. Analyze patterns using words, tables and graphs
5. Name and identify properties of 1-3 dimensional shapes and describe attributes of lines, angles and 2-3 dimensional shapes/objects using appropriate geometric vocabulary and tools.
6. Identify and justify the unit of measurement (linear, capacity and weight; including perimeter and area) in customary and metric units.
7. Determine change from $10, add and subtract money to $10
8. Create tables or graphs to represent categorical and numerical data.
9. Extend understanding of fraction equivalence and ordering – using the 4 operations; and convert to decimals and percentages.

Fifth Grade:

1 Recognize and generate equivalent forms of commonly used fractions and decimals
2 Apply and describe strategy used to compute a division problem up to 3 digit by 2 digit and addition and subtraction of fractions and decimals
3 Represent and analyze patterns using words, tables and graphs
4 Using all operations represent mathematical situation as an expression or number sentence using a letter symbol
5 Analyze and classify 2 and 3 dimensional shapes by describing the attributes
6 Convert from one unit to another within a system o measurement (customary and metric)
7 Describe methods to collect, organize and represent categorical and numerical data
8 Extend understanding of place value to include whole numbers, decimals and fractions; identify greater than, less than and be able to round.

Sixth Grade:

1. Be able to recognize and generate equivalent forms of fractions, decimals, and percents
2. Multiply and divides positive rational numbers
3. Represent and describe patterns with tables, graphs, pictures, symbols, rules or words
4. Apply properties of operations (including order of operations) to positive rational numbers
5. Solve problems involving perimeter or area of polygons
6. Be able to organize and analyze data
7. Use coordinate systems to construct geometric shapes
8. Solve problems using rate and ratio
9. Find the range and measures of center, including mean, median, and mode

Seventh Grade:

1. Write and algebraic expression
2. Evaluate expression using substitution
3. Solve one and two step equations
4. Solve problems using proportional reasoning
5. Graph on a coordinate plane
6. Find the area and perimeter of geometric shapes
7. Find measures of center and spread using various mathematical representations
8. Use order of operations
9. Perform operations on rational numbers
10. Perform operations integers

Eighth Grade:

1. Use the distributive property
2. Solve multi-step equations
3. Use order of operations with real numbers and substitution
4. Compile with percents
5. Use the Pythagorean
6. Combine like terms
7. Find the slope of a line from a table, graph, or equation
8. Generate a table of values and use it to graph a line

9. Graph inequalities
10. Reposition shapes using formal transformations

Essential Math:

1. Apply operations to positive whole numbers and fractions, using mental computations or paper-and-pencil calculations for simple cases.
2. Determine statistical measures of central tendency.
3. Solve problems involving proportions.
4. Identify 2- and 3-dimensional figures and identify their parts.
5. Solve problems of angle measure, including triangles and other polygons.
6. Determine the area, perimeter, surface area, and volume of geometric figures, including cones, spheres, and cylinders.
7. Apply operations to real numbers, using mental computations or paper-and-pencil calculations for simple cases and technology for more complicated cases (Integers, fractions, and decimals).
8. Solve linear equations.
9. Use the concepts of conditional probability for independent and compound events.
10. Simplify expressions using square roots.

Applied Math:

1. Apply operations to positive whole numbers, decimals, and fractions, using mental computations or paper-and-pencil calculations for simple cases.
2. Determine statistical measures of central tendency.
3. Solve problems involving ratios and proportions.
4. Understand and compare the properties of units of measurement. Judge the reasonableness of their measurement.
5. Solve problems involving percents.
6. Use the concepts of conditional probability for independent and compound events.

7. Determine the area, perimeter, surface area, and volume of geometric figures, including cones, spheres, and cylinders.
8. Apply operations to integers, using mental computations or paper-and-pencil calculations for simple cases and technology for more complicated cases.
9. Solve linear equations.

Algebra:

1. Determine and use statistical measures of central tendency to solve problems.
2. Use the concepts of conditional probability for independent and compound events.
3. Apply operations to real numbers, using mental computations or paper-and-pencil calculations for simple cases and technology for more complicated cases (Whole numbers, integers, fractions, and decimals).
4. Use and solve equivalent forms of equations (linear, inequalities, and absolute value).
5. Graph and analyze linear equations and inequalities.
6. Use, solve and graph systems of linear equations or inequalities with 2 variables.
7. Describe the effects of operations, such as multiplication, division and computing powers and roots on magnitudes of quantities and effects of computation on precision which include the judging of reasonableness of numerical computations and their results.
8. Use symbolic algebra to represent and solve problems that involve quadratic relationships, including simplifying expressions with square roots.
9. Describe and use algebraic manipulations, including factoring and rules of integer exponents and apply properties of exponents (including order of operations) to simplify expressions.

Geometry:

1. Write geometric proofs and proofs by contradiction

2. Know, derive, and solve problems involving perimeter, area, lateral area, surface area, and volume
3. Use special triangles (30-60-90) – (45-45-90) to determine angle and side relationships
4. Use theorems relating to the properties of parallel lines cut by a transversal, properties of quadrilaterals, and the properties of circles
5. Use properties of complementary, supplementary, vertical, and exterior angles
6. Prove the congruency and similarity of triangles and use the concept of CPCTC
7. Know basic concepts of radicals and make calculations
8. Use Pythagorean Theorem and distance formula to fine the missing lengths of sides of right triangles
9. Use Trig anomic functions (SIN, COS, TAN) to solve unknown length or angle of a right triangle
10. Solve problems involving the use of chords, tangents, secants, and inscribed angles of circles

<u>Algebra II:</u>

1. Solve problems involving proportions
2. Compare and contrast various forms of representations of patterns
3. Describe the effects of parameter changes on functions
4. Compare and order rational and irrational numbers, including finding their approximate locations on a number line
5. Logs – Use symbolic algebra to represent and solve problems that involve exponential, quadratic and logarithmic relationships

<u>Pre-Calculus:</u>

1. Verify trigonometric identities and solve trigonometric equations
2. Define the trigonometric functions of angles
3. Indentify the trigonometric functions and values using the unit circle
4. Analyze graphs of trigonometric functions using degrees and radians
5. Analyze and graph rational, polynomial, exponential, and logarithmic functions
6. Model data with linear and nonlinear functions
7. Review algebra and geometry concepts

Statistics:

1. Estimation
2. Probability
3. Measures of central tendency
4. Organizing data
5. Normal curve
6. Sampling – random, stratification, systematic, cluster

Calculus:

1. Logarithmic, Exponential – Inverse function, Differentiation and Integration
2. Integration – Sigma Notation, Fundamental Theorem of Calculus, Substitution
3. Differentiation – Definition with limits, Basic Rules, Product Rule, Quotient Rule, Implicit
4. Applications of Derivative – Extrema, Concavity, Optimization, Differentials
5. Limits