

# MIDDLE SCHOOL CURRICULUM

## Mathematics

The purpose of this program is to build confidence and mathematical strength that a student needs to succeed. In order to achieve a smooth, incremental development that will challenge and strengthen each individual, there are six levels that cover material from the beginning of the 5<sup>th</sup> grade through geometry. High school geometry standards are applied. Each student is evaluated and placed into the level that most closely matches his/her ability. Proper placement, regardless of current grade level, ensures that each student will achieve mastery of the acquired skills. Special emphasis is placed on logic, mathematical vocabulary, interpretation of the written word, the importance of patterns, and the communication of ideas that lead to computational accuracy and conceptual development. PG

### Skill Areas

#### **Data, Graphs, and Facts**

- Experience and understand
  - Reading graphs, tables, and data
  - Interpretation of graphs, tables, maps, and data.
  - Organization and creation of:
    - Lists
    - Tables
    - Bar graphs
    - Pictographs
    - Line graphs
    - Circle graphs
    - Histograms
    - Box and Whisker Plots
    - Scatter Plots
  - Locating and plotting ordered pairs on a coordinate plane
  - Identifying misleading graphs
  - Selecting appropriate graphs
  - Locating, plotting, and graphing integers on a number line
  - Computing averages
  - Measures of central tendency
    - Mean, median, and mode

#### **Place Value Systems and Operations:**

- Experience and understand
  - Identification of corresponding place values
  - Rounding
  - Estimating
  - Finding, completing, and extending patterns and sequences of whole numbers, fractions, and integers
  - Addition, Subtraction, Multiplication, and Division of:
    - Whole numbers
    - Fractions and mixed numbers
    - Decimal fractions
    - Integers
    - Percents
  - Conversion of improper fractions to mixed numerals
  - Conversion of mixed numerals to improper fractions
  - Reducing of fractions
  - Comparing and ordering whole numbers, fractions, decimals, percents, and integers

- Ratios and proportions
- Rates
- Exponents
- Powers
- Square Roots
- Scientific Notation
- Prime Factorization
- Percents
  - Conversion to and from fractions and decimals
  - Calculating percent of a number
- Absolute value of a number
- Counting Techniques
- Divisibility Tests
- Greatest Common Factor
- Problem Solving Strategies
- Least Common Multiple
- Order of operations
- Writing and solving word problems
- Probability
- Venn Diagrams
  - Permutations
  - Combinations
- Properties
  - Identity of addition
  - Identity of multiplication
  - Commutative of addition
  - Commutative of multiplication
  - Associative
  - Distributive
- Punnett square
- Identifying and applying formulas
  - Simple Interest
  - Pythagorean Theorem
  - Percent increase and decrease
  - Percent equation

## **Algebra**

- Subsets
  - Integers
  - Rational
  - Irrational
  - Real Numbers
- Operations
  - Inverse
  - Opposites
  - Reciprocal
  - Taking a root
  - Fractional powers
- Understand and use rules of exponents
- Absolute Value
  - Equations
  - Inequalities
- Solve linear equations and inequalities
  - Simplify expressions

- One variable
- Solve multi-step problems
  - Monomials
  - Polynomials
- Graph linear equations
  - Compute x- and y- intercepts
  - Sketch region defined by linear inequality
  - Point-slope formula
    - Identify points on a line
    - Identify x- and y- axis intercepts
  - Parallel lines
    - Identify related slopes
  - Perpendicular lines
    - Identify related slopes
- Solve linear systems
  - Equations in two variables
    - Sketch related solution sets
  - Inequalities in two variables
    - Sketch related solution sets
- Apply factoring techniques
  - Second- and simple third- degree polynomials
    - Find one common factor in all terms of a polynomial
    - Recognize the difference of two squares
    - Recognize perfect squares of binomials
- Simplify Polynomial Fractions
  - Factor numerator and denominator
  - Reduce to lowest terms
- Solve Rational Expressions and Functions
  - Computationally
  - Conceptually
- Quadratic Equations
  - Solve
    - Factor
    - Complete the square
    - Identify roots of a second-degree polynomial
    - Identify x-intercepts through graphing
  - Graph
    - Identify x-axis intercepts (0, 1, or 2 points)
    - Apply quadratic formula
    - Apply factoring techniques
  - Application in a practical form
- Concepts and comprehension of Relations and Functions
  - Identify a Relation of a Function as defined by:
    - Graph
    - Set of ordered pairs
    - Symbolic expression
- Determine Range and Domain
  - Defined by graph, set of ordered pairs, or a symbolic expression
  - Independent variables
  - Dependent variables

## Geometry

**The four big ideas of geometry are covered: working with diagrams central to geometric thinking, variance and invariance, definitions, and written proof to prove.**

**Key Areas:**

- Basics of Geometry
- Reasoning and Proof
- Perpendicular and Parallel lines
- Congruent Triangles
- Properties of Triangles
- Quadrilaterals
- Similarity
- Right Triangles and Trigonometry
- Transformations
- Circles
- Area of Polygons and Circles
- Surface Area and Volume

Textbook and Resources:

- Larson, R., Boswell, L., and Stiff, L. *McDougal Littell Geometry*. Illinois: Houghton Mifflin Company, 2001. Print.
- The Geometer's Sketchpad
- Graphing Calculator

DM, MP, DB 1/29/15 PG 2/4, SS 2/22/15