

Mathematics Curriculum for Mulberry School

In the **first grade**, arithmetic is taught largely through movement—walking and stomping, clapping, throwing a beanbag—and through lively oral games. First graders are introduced to the quality of numbers, and Roman and Arabic numerals; as well, they learn to count, first rhythmically, by ones, twos, threes, fours, fives, and tens. Students will learn number bonds one through ten, as well as doubles and halves from one through ten. Through imaginative stories, the four processes (addition, subtraction, multiplication, and division) are practiced. Students also learn to solve simple number problems, using manipulatives if necessary. The concept of place value is introduced.

Physical movement is still an important part of arithmetic lessons in **second grade**. Students continue to work with the concept of place value. Students practice with the four processes, eventually working with three digits. Students will learn multiplication and division of two digit numbers by one digit numbers. They learn to use regrouping for addition and subtraction. Multiplication tables through 12×12 are practiced through movement and choral recitation. Students will have a working knowledge of tables one through twelve. Students are encouraged to find patterns within the tables, and magic squares are introduced. A selection of representative problems is then copied into main lesson books or completed as practice sheets. Mental arithmetic, flashcards, and games are all used to develop the children's concentration and flexibility in thinking with numbers.

Third graders are introduced to whole number operations, as well as longer word problems. A focus on imperial and organic measurement, with lessons on linear measurement, liquid and dry volume, time, money, and temperature, emphasizes the practical application of math. The number line is introduced for adding and subtracting, moving by 10's then 1's. Students are expected to recite tables 1-12 in chorus and individually; committing the multiplication tables to memory. Freehand geometry is introduced. Homework and mental arithmetic games help to strengthen math skills.

A whole new realm of numbers is introduced in **fourth grade**—those from zero to one. Students are introduced to the concept of common fractions; they learn to manipulate these fractions in the four basic processes, and are introduced to inequalities. Double-digit by double-digit multiplication and long division are introduced. Mental arithmetic now involves multiple steps. Estimation and methods for checking answers are taught. Multiplication and division tables are reviewed in and out of order.

The **fifth grade** year begins with a review of the four processes, place value, rounding, and word problems, with special attention given to practice and drill in fractions. Decimals are then introduced. Students work with the four processes using decimals (money and metric measurements) and practice conversion from fraction to decimal and vice-versa. There is also a focus on order of operations, number systems, mental arithmetic, factorization, and multiple-step word problems. Homework assignments allow for essential practice for the whole class. Free hand geometry continues.

In **sixth grade**, measurement, fraction, and decimal review leads into ratio and proportion, balancing simple equations, and business math which form the core of the math curriculum. The class learns the rudiments of basic economics and how to calculate taxes, simple interest, discounts, and other percentages. They also learn how to create and read pie charts and bar and line graphs. Large value Roman numerals are introduced to link the math curriculum with the history curriculum. Geometry is also introduced in sixth grade. Students learn the correct use of the compass, straightedge, and protractor.

Algebra is introduced in *seventh grade* and students work with signed numbers, polynomials, the Golden Rule (do to one side what you do to the other), and the “unwrapping” principle (solving equations systematically). Math classes cover powers and roots, ratio and proportion, metric measurement, the order of operations, signed numbers and the four rules, factoring, graphic representation of data, and work with variables, expressions and equations. Students also learn to evaluate algebraic expressions, to use formulas, to add and subtract like terms, and to write and solve equations. Students learn the commutative, associative and distributive laws in algebra. Problems of geometric measurement – perimeter, area and volume – are solved through algebraic equations. Textbooks may be used to support the math lessons (Saxon 8/7)

In geometry, seventh grade students explore the pentagon and the pentagram, the spiral and the Golden Mean. The students see that these principles underlie natural forms such as the pinecone as well as paintings and works of architecture. The class studies the Fibonacci series of numbers and the Pythagorean Theorem. Students also learn perspective drawing and create geometric drawings, carefully constructed, using geometric instruments.

Eight-grade math focuses first on algebra, including linear equations, manipulating polynomials, multiplying and dividing monomials and binomials, and performing operations on negative and positive numbers. All previously introduced concepts are reviewed at a more advanced level. Students learn to solve linear equations and to work with rational and irrational numbers. Textbooks are used to supplement the math blocks (Saxon Algebra One Half).

In geometry, students learn congruence of triangles, parallel and perpendicular segments, and the angles created by transversals. They learn to use geometric formulas in the calculation of perimeter, area and volume. The five Platonic solids are introduced and students fashion three-dimensional models of them out of paper or clay.