

## Lower School Overview

In grades 1-6, we mainly follow the Beast Academy curriculum from Art of Problem Solving. Quoting their own description, “Beast Academy is a full math program from Art of Problem Solving for kids ages 6-13. We teach problem solving and logical thinking by covering grade-level standards in greater depth than other elementary math curricula.”

### KINDERGARTEN

The mathematics curriculum in kindergarten at MLCA aims to build a number of important skills that will form a strong foundation for success in math in future grades. There are several key aspects to the program:

- Counting and number recognition
- Arithmetic skills
- Special projects and topics (e.g., geometry, spatial reasoning, and logic)
- Fun games that reinforce each of these core areas.

The curriculum includes materials from a variety of sources, including worksheets from Jane Kats’ [Mousematics](#) workbooks and Golden Key Russian School’s math enrichment curriculum.

### FIRST GRADE

One of the main goals of first grade math is to continue building a strong number sense and to start becoming comfortable with the concept of place value. The students explore different strategies for addition and subtraction within 20 and then learn how to use place value to add 2- and 3-digit numbers.

In addition to arithmetic, we have several units on geometry; we play with creating shapes out of smaller ones and taking them apart in different ways, explore symmetry, and learn about polygons. Throughout the year, we also solve many “word problems” and explore different problem solving strategies such as drawing a picture, guessing and checking, and looking for patterns.

### SECOND GRADE

In second grade, the students delve deep into the study of our base-10 number system. We begin with exploring some ancient number systems, most of which did not have the concept of place value and some of which had the beginnings of it. We then study place value in the context of our number system. We learn how place value helps us easily compare numbers, as well as add and subtract multi-digit numbers.

During the second half of the year, the students complete a unit on measurement, then come back to some more sophisticated addition and subtraction strategies and explore the concept of

parity (odds and evens). Throughout the year, there is a big emphasis on problem solving and the students learn about different problem solving strategies.

### THIRD GRADE

In third grade, we mainly focus on topics in arithmetic and geometry. In geometry, we begin with a unit on shapes in which we will learn about different types of angles and polygons, and work on some tricky problems with matchsticks and polyominoes (shapes made out of squares). Our second geometry unit is on the perimeter and area of rectilinear shapes (shapes that can be broken up into rectangles). Later in the year, we have a chapter on measurement, which has problems on the topics of weight, temperature, volume, time, and money.

On the arithmetic front, we start with a unit on skip counting. Then, we spend a lot of time on multiplication, becoming comfortable with the concept, practicing computations, and learning to use the distributive property. Toward the end of the year, we work on division, fractions and estimation.

### FOURTH GRADE

In fourth grade, we continue with standard arithmetic topics such as fractions, multiplication, division, prime factorization and introduction to negative numbers, as well as some basic geometry. In addition, students are introduced to some less standard topics such as estimation, counting (as in foundation for combinatorics), and the binary system. The goal of this year is to understand the concept of fractions, become proficient in multi-digit multiplication and long division, and be able to calculate the area of rectilinear shapes and triangles.

### FIFTH GRADE

In fifth grade, we cover topics generally encountered in a standard pre-algebra class. The goal is for students to become very comfortable working with fractions, decimals, and negative numbers. Linear equations, exponents, ratios, and percents are introduced, with further exploration in following years. We also explore some less standard topics such as probability, number theory, statistics, and sequences.

### SIXTH GRADE

Starting in 6th grade, there are two tracks in math class: Honors and AoPS. The main difference between the tracks is the pace and not the depth with which the material is covered.

#### Honors track

- In 6th grade, students continue studying Pre Algebra topics on a more advanced level. The main topics covered are square roots, exponents, ratios, percents, and linear equations. Towards the end of the year, we work on select Algebra 1 topics.

- Students are exposed to additional challenging problems through Alcumus, which is an online Art of Problem Solving resource, or Art of Problem Solving textbooks. The goal for the students this year is to become very comfortable using algebra tools in their work, setting up and solving equations in problem solving.

AoPS track

- Prerequisites: Finish level 5 Beast Academy (books or online) as well as a significant amount of the Prealgebra book before the start of 6th grade.
- Expectation: Students in this track will take Introduction to Algebra A and Introduction to Number Theory from the Art of Problem Solving. These courses are extremely fast paced and require roughly an hour and a half of homework per night.