

Lower School

MATH LITERACY TEACHING STUDENTS TO BE MATHEMATICIANS

At the Lower School, the goal of our math program is to teach our students how to think and act like mathematicians. Our math instruction takes a constructivist approach where teachers create learning situations that enable students to actively engage in math and do the work of mathematicians. The National Council of Teachers of Mathematics identified five cognitive processes that students must engage in to understand mathematical concepts: problem solving, reasoning and proof, communication, connections and representations. We help our students to use these cognitive processes by asking them to tackle realistic math problems and by building new understandings upon their prior knowledge.

There are three concepts that are revisited in our math curriculum: number sense, computation and problem solving. We revisit these concepts because they are essential to the foundation of mathematical understanding. Number sense is described by Trafton and Thiessen (1999) as “a cluster of ideas, such as the meaning of a number, the ways of representing numbers and the relationships among numbers.” It is important our students learn they can manipulate numbers to make sense of a math problem. According to Dr. Valerie Henry, number sense is “an important key to mathematical power.” Dr. Henry has been working with SMES Lower School teachers to give them strategies to use in the classroom to teach our students to master number sense relationships.

In the area of computation, we are helping our students master their accuracy and fluency. For example, teaching students to calculate mentally builds their ability to reason and fosters their number sense. “When students calculate mentally, they can estimate before they solve problems so they can judge whether the answer they arrive at makes sense” (Burns, 2007). We are encouraging students to use part-whole thinking, for example, teaching students the various ways to add two numbers that equal ten. Students who have a strong number sense understand the relationship among numbers and when they are taught part-whole thinking are able to master computation. With a strong foundation in number sense and computation, our students will be better equipped to think critically and to tackle and solve math problems that are presented to them.

Another important part of our math program is asking students to share the strategy or process they used to solve mathematical problems and to use math vocabulary in their explanations. For example, we want our students to use the term “subtract” not “minus.” Students are explicitly taught math vocabulary terms such as product, factor and equation. When versed in the language of mathematics, students have an essential tool as they know what they are being asked to do when they read a math problem.



At the Lower School, we are differentiating our math instruction. This differentiation is varied as we offer our students opportunities to work in both homogeneous and heterogeneous groupings. For example, teachers might divide the entire grade level into three homogeneous groups or they might ask students in the same classroom with different mathematical abilities to collaborate with one another in small groups. Burns (2007) suggests that fostering student interaction is an effective way to help students learn math concepts.

We are also proud to have some of our fourth and fifth grade students participate in Math Olympiad. Our students meet weekly to practice solving creative math problems to prepare for contests with students from other schools. The goals of Math Olympiad are for students to develop an enthusiasm for mathematics, a deep understanding of math concepts and to develop mathematical creativity. Through research-based teaching strategies, differentiated instruction and enrichment opportunities, our Lower School mathematics curriculum prepares our students to be math literate - an essential skill for the 21st century.

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