

Basic Math Fact Fluency

A Position of the Knox County Schools Mathematics Department

**Question**

How do we help students develop and retain basic math fact fluency?

**Knox County Schools Mathematics Department Position**

Fluency with basic math facts is an essential skill necessary for success in mathematics. Fluency with basic math facts is the ability of students to be able to efficiently, flexibly, and accurately perform basic operations (addition, subtraction, multiplication, and division) with whole numbers. To develop mastery of basic math fact fluency, students need experiences in developing number sense or in using numbers flexibly. Students need opportunities to discover patterns in numbers, relationships between numbers, structures in counting, to make connections between numbers and sets of numbers, and to strengthen their understanding and skill through frequent distributed practice.

In the early grades, students are expected to develop fluency with whole numbers in addition, subtraction, multiplication, and division. Therefore, computational fluency expectations are addressed throughout the Tennessee Math standards (TDOE, 2016). Procedural fluency extends students’ computational fluency and applies in all strands of mathematics. It builds from initial exploration and discussion of number concepts to using informal strategies and the properties of operations to develop general methods for solving problems (NCTM, 2014).

Success with acquiring basic math facts, and the study of mathematics in general, depends on a foundation of strong number sense or the ability to work flexibly with numbers (Baroody, 2006; Boaler, 2015). For example, emphasis in the early grades on making ten multiple ways helps students understand and recognize the basic number combinations that build understanding of place value and formal procedures for the basic operations (addition, subtraction, multiplication, and division) in later grades. Basic fact fluency builds upon a strong sense of number, the relationships between numbers, and understanding of operation all of which help students construct meaning of both number and the basic operations. Students build basic fact fluency by constructing meaning of numbers through the investigation and discovery of patterns and relationships including opportunities to relate known facts to unknown facts (Baroody, 2006). For example, students may struggle to quickly recall multiplication facts for 7. Students might discover that breaking apart or “decomposing” 7 into 5 and 2 can help them determine the product more quickly than counting by 7s. (For example, 7 x 4 is the same as 5 x 4 plus 2 x 4.)

Students need to be efficient and accurate in performing basic operations with whole numbers (NRC, 2001). Number sense is inhibited by an over-emphasis on speed and memorization because deep thinkers are discouraged from thinking about numbers and are at risk for disengaging from mathematics entirely. The stress of timing math facts can be damaging to students at all achievement levels and can be attributed to the onset of math anxiety (Boaler, 2015). Fluency is more comprehensive than speed as learning takes time and cannot be accelerated by emphasizing speed at the expense of understanding (Boaler, 2014; King & Bay-Williams, 2014). Difficulty with memorizing basic math facts requires more study of patterns, opportunities to construct relationships, and building on what students already know (Baroody, 2006). Students should be able to practice recalling facts using number sense without the added stress of speed. Efficient application of strategies becomes automatic as students are given frequent, distributed practice that emphasizes number sense and understanding over speed.

**References and Additional Resources**

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