



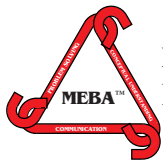
INTRODUCTION

Mathematics Experience-Based Approach (**MEBA**[™]) is a systematic approach for teaching mathematics that develops an understanding and memory of mathematics that lasts a lifetime, can be applied in numerous “real-life” problem solving contexts, and grows to meet the world’s challenges and changes. To achieve this, all concepts and algorithmic procedures are organized and taught so that students connect symbols with related physical and pictorial models. In addition, the instructional process stresses the relationship between and among mathematical concepts and operations.

A solid foundation in place value is one of the major cornerstones of MEBA. Regrouping using the decomposition of number method for addition and the comparison method for subtraction facilitates mental math and estimation skills. The array model for basic facts multiplication and the related algebraic extension for regrouping help students estimate large products. The operation of division is connected to multiplication to aid students in estimating quotients.

Routine and nonroutine problem solving and cooperative communication initiated orally and extended into writing are the heartbeat of mathematics instruction. Students commence their experiences with word problems in the primary grades. As they advance through the grades all types of a particular operation are explored and differentiated to further enhance their proficiency with solving word problems e.g. the comparison form of subtraction is contrasted with the take-away and missing addend forms. Students actively learn the different forms of each operation through the systematic and developmental linking of concrete, pictorial, and symbolic representations. While, one-step problems are initially experienced, students later delve into multi-step problems with irrelevant data or not enough information. The instructional focus is on when, why, and how to use various operations in real-world situations. In dealing with nonroutine problem solving, students use problem-solving heuristics as well as a series of interactive **Mathematics Pentathlon**[®] games dealing with problems that continually undergo change, much like real-world problem situations. Essentially, from these experiences, students develop strategic reasoning: the ability to consider alternative options and formulate a plan many steps in advance. In this manner students learn how to think both deductively and inductively.

MEBA has evolved over 20 years of our staff development work with teachers. Its implementation has been tested again and again in the classroom, in instructional sessions with students considered “gifted” or “talented” in mathematics as well as “at risk” students, and in clinical practice. We have been privileged to witness the profound change this instructional approach has had on both teachers and students as well as how this change positively affects parents, administrators and other members of the educational community. The impact of our work with numerous schools from many socio-economic settings over this time period has resulted in a series of printed materials that assists teachers in implementing MEBA. This publication, **Place Value & Rounding**, is the second in this series.



MEBA uses a framework that consists of seven components (pages 9 - 10 for a complete description). One of the basic components of the MEBA framework is a sequence to systematically and developmentally connect mathematics concepts using concrete, pictorial, and symbolic representations. We refer to this sequence as Sequenced Instructional Modes (SIMs™). This publication guides teachers to progress through this sequence while developing the fundamental mathematics concept of number sense. The MEBA series consists of twelve publications of critical mathematics concepts, algorithmic procedures, and problem-solving applications. These publications are listed below. **

- 1) Developing Number Sense Through Standard Configurations & Number Transforms**
- 2) Place Value/Rounding**
- 3) Inequality/Equalization**
- 4) Addition/Subtraction Basic Facts Through Ten**
- 5) Addition/Subtraction With Regrouping (Includes Sums & Differences 11-18)**
- 6) Multiplication/Division Basic Facts**
- 7) Multiplication/Division With Regrouping**
- 8) Fractions: Partitioning, Representation, Equivalence, and Comparisons**
- 9) Operations Using Fractions**
- 10) Decimals**
- 11) Time, Money, & Measurement**
- 12) Geometry**

** The format of a binder was used so that teachers could add their own ideas or incorporate other resources at the appropriate instructional level.