

Center for Innovation in Education

Mathematics Their Way®

Mathematics Their Way is currently in operation in kindergarten, first, and second grade classrooms in all 50 states, the Canadian provinces, various Department of Defense Dependent Schools (DODDS), and many International Schools and American Schools abroad.

PROGRAM DESCRIPTION

Mathematics Their Way presents an activity-centered, child-centered, manipulative math program in which the children learn through the five senses. The program is designed to meet the needs of kindergarten, first, and second grade students. The children follow a sequence of activities, varying between total group, small group, and independent work. The goal of the activities is to help children develop an understanding of and insight into the patterns of mathematics. The activities are designed to help young children see relationships and interconnections in mathematics and to enable them to deal flexibly with mathematical ideas and concepts.

EDUCATIONAL PHILOSOPHY

The teaching of mathematics in the elementary grades is often centered around the content of the math textbooks which are in vogue at the time and not on what is developmentally or philosophically right for the child. Teachers using *Mathematics Their Way* are teaching mathematics “their” (the children’s) way. A page of abstract symbols, no matter how carefully designed or simplified, cannot involve the child’s senses in the way real materials can. Symbols are not the concept, they are only a representation of the concept and as such are abstractions describing something which is not visible to the child. Real materials, on the other hand, can be used by the child to come to a clear understanding of the concepts which lie behind the symbols. The goal of the program is to teach in such a way that all children will be able to understand mathematical concepts regardless of their abilities.

The program is one in which the teacher becomes a facilitator of knowledge rather than a dispenser of information. The teacher learns to trust that children have already assembled a considerable amount of useful knowledge on their own. The teacher helps to provide ways for children to organize this knowledge and bring it out in a systematic, logical, usable form. The goal of the program is to teach children how to learn. Learning is limitless. *Mathematics Their Way* takes away the arbitrary and unrealistic boundaries that are placed around areas of learning through the traditional textbook approach.

PROGRAM HISTORY

Mary Baratta-Lorton (the author of *Mathematics Their Way*) and her husband Bob were trained as classroom teachers in a special program designed to prepare them for work in inner city schools. The absence of suitable materials for use with educationally disadvantaged students led the Baratta-Lorton’s both to develop their own curriculum and to share this developed curriculum with other classroom teachers. Initially, the sharing was through workshops. The ideas to be shared were also recorded in book form so teachers who attended workshops would have a reference guide as they implemented the new curriculum in their classrooms. Teachers who were unable to attend a workshop could implement the ideas on their own if they wished, using the book as a curriculum guide for the primary level. The *Mathematics Their Way* program was developed in the classroom by a classroom teacher who worked daily with children.

The Center continues to work with its instructors by providing inservices with outstanding professionals not only in the field of mathematics, but in other areas as well. Center instructors are knowledgeable about alternative forms of assessment as well as the implementation of the National Council of Teachers of Mathematics (NCTM) *Curriculum and Evaluation Standards for School Mathematics*. The vast majority of our instructors are classroom teachers who face the daily challenges experienced by the participants who take the course. The ongoing exposure to new ideas and thinking extends and enhances *Mathematics Their Way*, which has withstood the test of time.

STUDENT AUDIENCE

Approximately 400,000 teachers use this book as a curriculum guide in their classroom. *Mathematics Their Way* works well with bilingual, special education, and gifted students as well as all levels of ability within a standard classroom. Because of the environmental arrangement and the open-endedness of the activities, children with varying levels of ability can work successfully side by side.

CURRICULAR STRUCTURE

I. Free Exploration

- A. Children have opportunities to explore new materials in their own way.
 - 1. Children are free to organize and explore in their own way and spend whatever time they choose with each material.
 - 2. No one evaluates their exploration or suggests they should be exploring other ideas.

II. Pattern One

- A. Children are introduced to linear and geometric patterns
 - 1. Children learn to make patterns, then copy, extend, and predict patterns.
 - 2. Children are lead to see the beauty and structure of abstract mathematical patterns.

III. Sorting and Classifying

- A. Children learn to organize objects according to their properties or attributes.
 - 1. Children develop logical thinking and language skills.
 - 2. Children learn that logical thinking provides the language of mathematics.

IV. Counting

- A. Children have opportunities to develop skills with the counting sequence.
 - 1. Children acquire skills in counting forward; counting backward; counting on.
 - 2. The skill of invariance is reinforced.

V. Ccomparing

- A. Children develop the concept of more, less, and the same.
 - 1. Children make comparisons of length, quantity, volume, and duration.
 - 2. The idea that “more” is not better is emphasized.

VI. Graphing

- A. Children extend their comparing skills and solve the problem of “How many more?” through visual comparisons of objects in a variety of graphs.
 - 1. Children encounter daily problem solving situations.
 - 2. School experiences are graphed to provide visual representation of mathematical concepts.

VII. Number at the Concept Level

- A. Children explore each number from one to ten.
 - 1. Children discover the possible arrangements and combinations of materials for each quantity.
 - 2. No written symbols are used at this stage.

VIII. Number at the Connecting Level

- A. Children are introduced to the traditional mathematical symbols when they are ready to use symbols to label their work.
 - 1. Children do not yet write the symbols, but rather, gain familiarity with the meaning of the symbols by decoding them as the children match the symbols as familiar quantities and processes.
 - 2. Children continue to use concrete materials while connecting the symbols.

IX. Number at the Symbolic Level

- A. Children write the traditional mathematical symbols by recording a variety of mathematical experiences. Concrete materials continue to be used at this level.
1. The concept of the numbers from one to ten are fully developed and symbolized abstractly.
 2. Symbols are connected to known events to provide a meaningful base for understanding the symbols.

X. Pattern Two

- A. The child's experience with pattern is extended.
1. The experiences prepare the children for the number patterns they will discover in their place value activities.
 2. The children gain a deeper sense that patterns form the underlying basis for mathematics.

XI. Place Value

- A. Children explore and discover the structure of the number system.
1. Lower bases are explored to see patterns produced.
 2. Base ten and its pattern are explored.

XII. Pattern Book Experiments

- A. Children draw on all the skills in their previous work through a series of experiments which enable them to look for patterns in mathematical situations.
1. Experiences with addition and subtraction.
 2. Experiences with multiplication and division.

UNIQUE METHODOLOGY

The *Mathematics Their Way* classroom is one in which children are encouraged to think, explore, discover, and experience. A wide variety of materials are used: pattern blocks, geoboards, Unifix cubes, wooden cubes, Power Blocks, tiles, rice, common objects, and junk boxes. Both the teacher and students gather materials from the environment to fill the junk boxes: buttons, seed pots, lids, nuts, pits, bottle caps, eucalyptus pods, shells, nuts and bolts, rocks, acorn tops, old keys, bread tags, etc.

The variety of familiar materials gathered from the child's world enable a teacher to begin where the child is, in his or her own world, and gradually build a bridge to the adult world of abstraction. Because the materials are real and physically present before the child, they engage the child's senses, and are, in themselves, enjoyable and rewarding. The materials provide motivation for learning at the same time that they provide the tools for exploration and problem solving.

The unique methodology...

- approaches the child's levels of understanding in a meaningful sequence, beginning at the concept level and passing through the connecting level to the symbolic level.
- surrounds the child with the concept in many different ways. This approach has also been called "diversified redundancy."
- establishes an environment that enhances self concept and social interaction.

SUMMARY

The Center for Innovation in Education is a nonprofit educational organization which provides support to teachers who use the Mathematics Their Way philosophy of teaching. This support takes the following forms:

1. Holding 30 hour workshops on the teaching of Mathematics Their Way across the U.S. and Canada throughout the year.
2. Holding follow-up classes for participants during the school year to assist teachers with implementation of the program.
3. Providing math kits and materials at reasonable prices to teachers.

For additional information, please contact us.

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