

THE PATH TO EARLY MATH

What Preschool Teachers Need to Know



Ingrid Crowther, EdD

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TABLE OF CONTENTS

Acknowledgments	iv
Introduction.....	1
Chapter 1: Understanding Developing Math Concepts.....	4
Chapter 2: The Role of the Facilitator: Supportive Environments, Interaction, and Documentation.....	24
Chapter 3: One-to-One Correspondence.....	40
Chapter 4: Forming Sets.....	78
Chapter 5: Object Counting.....	102
Chapter 6: Patterning	146
Chapter 7: Measurement	174
Chapter 8: Two- and Three-Dimensional Geometric Shapes.....	200
Chapter 9: Parts and Wholes: Beginning Understanding of Fractions	226
Chapter 10: Computation: Addition and Subtraction.....	246
References and Recommended Reading.....	272
Index.....	275

INTRODUCTION

A variety of books have been published in the area of math, but most of these deal with instruction for school-aged children. According to international research, there is an overwhelming need to focus on appropriate early math development. Most early childhood educators have received very little formal training in math for the early years. Math is a strong predictor of future academic success and is therefore critical to providing strong, firm foundations to young children that lead to lifelong learning. This book attempts to bridge that gap.

Philosophy of This Book

Young children's learning is based on interactions with the important people in their lives: other children, families, early childhood educators, and community members. Math learning, too, begins with the child. Adults build on each child's interests, experiences, and abilities to create appropriate learning environments that function as a third teacher. All parts of the learning environment—home, indoor, outdoor—are equally important. Children's learning depends on their background experiences, which provide opportunities for increased motivation, transfer of skills and abilities from one setting to another, and maximized learning.

Children's environments need to be rich in language. Adults can support language acquisition by providing realistic vocabulary that leads to future understanding of concepts. Therefore, this book has a distinct focus on language acquisition and enhancement. Children love to explore and learn to use the language associated with their explorations. They need to hear language to form the connections between the words and the concepts that they are exploring.



Often adults oversimplify the language they use with children, a practice that deprives them of the richness of spoken language within contexts. It has been said that children taste words. I have certainly witnessed this. Christopher, a two-year-old, loved big words. When he heard a word he liked, he would say it over and over again and finally tried using it in context. For example, he loved the word *annoyed*. On a visit to a store with his mother, he was asked not to touch things but just look. He turned to his mother and asked, "Will the clerk get annoyed?"

The teacher's role is to document learning, coordinate children's activities, interact with families, and ensure that children are engaged as protagonists in active play activities. Additionally, with the increased diversity within most child-care programs, teachers can gain knowledge of ethnic and cultural groups within the child-care community and establish partnerships with families.

Teachers can then embrace and represent various cultural elements to create an environment rich in materials, resources, and experiences.

Organization of the Book

The chapters follow a developmental order. Chapter one sets the stage with an overview of pertinent common concepts for all chapters. The beginning of each chapter provides the learning outcomes for that chapter, followed by a concise definition of the concepts covered and the ages and stages of development related to the skills discussed in the chapter. Each chapter includes specific descriptions of how to set up an appropriate learning environment and how to support interactions and activities within that environment. Student activities at the end of each chapter provide opportunities for independent study or group discussion during class times.

The key concepts in this text are based on children's real experiences, and the theory, methodology, and strategies are integrated with these experiences in mind. Photographs of children engaged in activities that demonstrate specific math concepts and written scenarios to illustrate the activities will support your understanding of how to implement the approaches in your classroom. Each activity includes a description of

how to set up appropriate learning environments, including a materials list and additional resources that are relevant to a specific concept area, as well as a series of applied learning exercises and a glossary of terms.

Ways to Use This Book

You may be a teacher who is looking for ways to strengthen the math learning in his early childhood classroom. You may be part of a community of practice, a group of educators who want to learn more about teaching math in developmentally appropriate ways. You may be an educator in a community college or other teacher-training program who wants to offer her students an easy-to-use reference and guide for helping young children develop their math competencies and skills. Irrespective of who you are or what philosophy you follow, this text will help you to hone your skills and abilities to make math learning a fun and worthwhile activity in your setting.



CHAPTER

01

Understanding Developing Math Concepts



"Mathematical thinking is cognitively foundational, and children's early knowledge of math strongly predicts their later success in math."

-Clements and Sarama, "Math in the Early Years: A Strong Predictor for Later School Success"

Across the world, parents, citizens, departments of education, and governments are concerned about the poor math competence of children in the educational systems. “[T]he current situation of more than 20 percent of young Europeans not reaching a minimum level of basic skills in mathematics and science is alarming” (European Commission Directorate-General for Education and Culture, 2013).

In North America, concern has mounted that children’s math abilities are decreasing. Many school boards and politicians are looking at ways to improve math instruction in the educational systems. “Math has become a flashpoint in many parts of the country as falling test scores have ignited debate about how the subject is being taught in schools” (Alphonso, 2018). “Over the past decade, there has been no progress in either mathematics or reading performance, and the lowest-performing students are doing worse” (Carr, as quoted in Camera, 2019). Debates have arisen on how to improve math skills, especially for young children.

Math: A Predictor of Future Academic Success

Much research has focused on developing literacy in reading as a predictor of later school success. Research is now beginning to show, however, that early math development is one of the most consistent predictors of later academic performance. A study conducted by Greg J. Duncan and colleagues (2007) found that children’s understanding of early math concepts such as knowledge of numbers and ordinality—first, second, third, and so on—are the most powerful predictors of later learning. Similarly, in a report for the Education Commission of the States, researchers Douglas Clements and Julie Sarama (2013) conclude that preschool math also predicts later reading achievement and oral language abilities, including vocabulary competence, making inferences, independent reading activities, and using grammatical complexities. “Given the importance of mathematics to academic success in all subjects, all children need a robust knowledge of mathematics in their earliest years.”

Math is a consistent predictor of future success. Many of the core math skills are also foundational to other learning competencies. Math skills encourage active problem solving.

THE PATH TO EARLY MATH

Early math development is one of the most consistent predictors of later **academic performance**.

According to international research, there is an overwhelming need to focus on appropriate early math development. Most early childhood educators have received very little formal training in math for the early years. This book attempts to bridge that gap. Whether you are a teacher looking for ways to strengthen the math learning in your early childhood classroom, an educator in a community of practice who wants to learn more about teaching math in developmentally appropriate ways, or a teacher-educator who wants to offer students an easy-to-use reference and guide for helping young children develop their math competencies and skills, this text will help you make math learning a fun and worthwhile activity in your setting.

Filled with photographs of children engaged in real experiences that demonstrate specific math concepts, chapters follow a developmental order. With a distinct focus on language acquisition and vocabulary enhancement, each chapter describes how to set up an appropriate learning environment to support interactions and activities related to the skills discussed.

- One-to-one correspondence
- Forming sets
- Object counting
- Patterning
- Measurement
- Parts and wholes
- Two- and three-dimensional geometric shapes
- Computation



Ingrid Crowther, EdD, is an experienced educator, having taught in early childhood, elementary, and university programs. She is an educational consultant, speaker, and prolific author who has published numerous articles and textbooks for the early-years field. Dr. Crowther works in Canada and internationally to increase quality practices in early-years settings.


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