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CONTENTS OF CD-ROM

Applets

Pattern Generator
Pan Balance

Blackline Masters

Readings from Publications of the National Council of Teachers of Mathematics

Young Children Doing Mathematics: Observations of Everyday Activities
Herbert P. Ginsburg, Noriyuki Inoue, and Kyoung-Hye Seo
Mathematics in the Early Years

Ready to Learn: Developing Young Children's Mathematical Powers
Carole Greenes
Mathematics in the Early Years

Literature and Algebraic Reasoning
Cheryl A. Lubinski and Albert D. Otto
Algebraic Thinking, Grades K–12: Readings from NCTM's School-Based Journals and Other Publications

The Psychological Features of Solving Problems with Letter Data
G. G. Mikulina
Psychological Abilities of Primary School Children in Learning Mathematics

What Comes Next?
William R. Speer and Daniel J. Brahier
Algebraic Thinking, Grades K–12: Readings from NCTM's School-Based Journals and Other Publications

Conceptions of School Algebra and Uses of Variables
Zalman Usiskin
Algebraic Thinking, Grades K–12: Readings from NCTM's School-Based Journals and Other Publications

Doing Algebra in Grades K–4
Zalman Usiskin
Algebraic Thinking, Grades K–12: Readings from NCTM's School-Based Journals and Other Publications

About This Book

Navigating through Algebra in Prekindergarten–Grade 2 is the first of four grade-band books that demonstrate how some of the fundamental ideas of algebra can be introduced, developed, and extended. The introduction to this book is an overview of the development of algebraic reasoning from prekindergarten through grade 12. Each of the three chapters that follow the introduction focuses on a basic idea of algebra. Chapter 1 deals with repeating and growing patterns, chapter 2 introduces the concepts of variable and equality, and chapter 3 introduces relations and functions.

Each chapter begins with a discussion of the foundational ideas and the expectations for students' accomplishments by the end of grade 2. This discussion is followed by student activities that introduce and promote familiarity with the basic ideas. At the beginning of each activity, the recommended grades are identified in the margin and a summary of the activity is presented. The goals to be achieved, the prerequisite skills and knowledge, and the materials necessary for conducting the activities are presented. Some of the activities have blackline masters, which are signaled by an icon and identified in the materials list and can be found in the appendix. They can also be printed from the CD-ROM that accompanies the book. The CD, also signaled by an icon, contains two applets for students to manipulate and resources for professional development.

All the activities have the same format. Each consists of three sections: "Engage," "Explore," and "Extend." The "Engage" section presents tasks designed to capture students' interest. "Explore" presents the core investigation that all students should be able to do. "Extend" offers additional activities for students who demonstrate continued interest and want to do some challenging mathematics. Throughout the activities, questions are posed to stimulate students to think more deeply about the mathematical ideas. After some questions, possible responses are shown in parentheses. Margin notes include teaching tips, anticipated student responses to some of the questions or activities, students' work, copies of blackline masters and solutions to problems on them, and quotations from *Principles and Standards for School Mathematics* (National Council of Teachers of Mathematics 2000). The discussion for each activity identifies connections with other content strands in the curriculum and to process strands, offers insights about students' performance, and suggests ways to modify the activities for students who are experiencing difficulty or who are in need of enrichment. Although grade levels are recommended, most of the activities can be modified for use by students at other levels in the pre-K–2 grade band. In order to make modifications that will most enhance students' learning, teachers are urged to observe students' performance by taking note of the appropriateness of their mathematical vocabulary, the clarity of their explanations, the robustness of the rationale for their solutions, and the complexity of their creations.

A cautionary note: This book is not intended to be a complete curriculum for algebraic reasoning in this grade band. It should, rather, be used in conjunction with other instructional materials.

Key to Icons



Principles and Standards



CD-ROM



Blackline Master

Three different icons appear in the book, as shown in the key. One alerts readers to material quoted from *Principles and Standards for School Mathematics*, another points them to supplementary materials on the CD-ROM that accompanies the book, and a third signals the blackline masters and indicates their locations in the appendix.