

TEACHING CHILDREN SCIENCE

A DISCOVERY APPROACH FOURTH EDITION

JOSEPH ABRUSCATO



Teaching Children Science

A Discovery Approach



FOURTH
EDITION

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University of Vermont

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*This book is dedicated to Anne Marie, Elizabeth, and Charlotte
who continue to give meaning to life.*

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Preface to the Fourth Edition



I continue to receive and appreciate the kind words and helpful feedback that has come from across North America and far beyond regarding the previous edition of *Teaching Children Science*. Once again I am pleased to enhance a volume that elicits such positive responses to both its content and its style. My personal recollection of the ponderous and tedious education textbooks that I used as an undergraduate continues to motivate me to prepare resource materials that make direct, personal connections to readers. For this reason, I am most proud of comments from students who use the book and “learn so much from it” and “enjoy” it. Imagine that, a methods book that people enjoy! Thank you.

Let me point out some of the significant enhancements to the previous edition. They fall into five categories:

- New chapters
- New features
- New approach to the B chapters
- A resource manual for students called “For the Teacher’s Desk”
- CNN video segments to support key chapters

- *New chapters*

Chapter 2 Learning Theories: How Can I Use Key Ideas from Learning Theory to Create a Discovery-Based Classroom?

I believe that this is one of the most practical presentations of the key ideas related to how children learn science that you are likely to find. I’ve included discussions of Gardner’s work on multiple intelligences, constructivism, and learning styles along with material on the classic approaches to learning.

Chapter 6 Assessment Techniques: How Can I Use Authentic Assessment Techniques to Measure a Child’s Progress?

This chapter focuses on the nature, advantages, and limitations of traditional student assessment techniques and emphasizes recent work on the use of authentic assessment in the science classroom.

Chapter 9 Using New Technology: How Can I Incorporate and Manage the New Technologies in My Discovery-Based Classroom?

This chapter offers information on how to assess the quality of the software and hardware one is likely to use in the modern classroom, how to create multimedia presentations, how to deal with the possibilities that arise when a classroom goes “on-line,” and how to manage materials, equipment, and time as they relate to the new technologies.

- *New features*

- Real Teachers Talking* in Chapters 1 through 9

- A brief conversation between two teachers about a topic or topics dealt with in the chapter. You can use this to spark discussion or as a stimulus for writing.

- Make the Case* in Chapters 1 through 9, 10, 13, 16

- A problem situation to which individual students or cooperative learning groups must develop a response after assessing their own prior knowledge and conceptions.

- Unit plan starter ideas in Chapters 10, 13, and 16

- Ideas from a variety of sources including Project 2061 to help students begin the development of teaching units.

- Lesson plan starter ideas in Chapters 10, 13, and 16

- Ideas from a variety of sources to help students begin the development of lessons.

- Classroom enrichment starter ideas in Chapters 10, 13, and 16

- In-class learning centers, bulletin boards, field trips, and cooperative learning projects.

- Lists of *Science and Children* and *Science Scope* articles in Chapters 10, 13, and 16

- Lists of articles will make it easier for students to locate resource materials to support their units and lessons.

- *New approach and experiences in the B chapters*

- Each B chapter now has activities grouped as follows:

- Attention Getters for Young Children

- Attention Getters for Middle-Level Children

- Discovery Activities for Young Children

- Discovery Activities for Middle-Level Children

- Demonstrations for Young Children

- Demonstrations for Middle-Level Children

- *A resource manual entitled For the Teacher's Desk*

- At the end of the book and in two parts: a classroom enrichment handbook and a science source address book.

- *Cable News Network (CNN) video segments*

- A video tape that is available from Allyn and Bacon on a complimentary basis for instructors who use *Teaching Children Science*. It contains short segments from CNN broadcasts that can be used in association with the *Make the Case* feature in Chapters 1 through 9, 10, 13, and 16. Please note that viewing the videotape is not required for the feature.

How This Book Is Organized

Part I **Strategies and Techniques for Teaching Children Science**

Chapters 1–9

The first nine chapters of this book deal with major topics that will shape what you teach, how you teach, and how you interact with children.

To help you focus your reading and discussion in these chapters, keep in mind that each chapter has a consistent format that includes the following components:

A Look Ahead: a list of the topics discussed in the chapter

Text: a discussion of a number of specific topics.

Real Teachers Talking: excerpts from conversations between teachers that will stimulate your own thinking and your discussions with others.

Make the Case: a thought-provoking challenge for individual students or cooperative learning groups.

Going Further: learning activities that you may do on your own or as part of a cooperative learning group.

Summary: a review of the main ideas in the chapter

Suggested Readings: a list of books and articles that will help you extend your study of the chapter's main points.

Part II–IV **Methods, Content, and Activities for Teaching Science and Technology Units**

Each of these parts begins with a chapter (10, 13, 16) of practical “starter” ideas to help you plan and teach the science units and lessons named in each part. These chapters are followed by “A” and “B” chapters. “A” chapters (11A, 12A, 14A, 15A, 17A, 18A) discuss the content for these units and lessons. “B” chapters (11B, 12B, 14B, 15B, 17B, 18B) offer activities that are appropriate for the units and lessons. These activities are grouped as Attention Getters, Discovery Activities, and Demonstrations.

Part V **For the Teacher's Desk**

The materials in this final section are provided as a resource for you to use now and in the future. They include:

Your Classroom Enrichment Handbook

Keeping Living Things . . . Alive
 The Plant Picker
 Safety Management Helper
 Materials To Keep In Your Science
 Closet
 The Metric Helper
 Content Coverage Checklists
 Your Science Survival Bookshelf
 The Magazine Rack

Your Science Source Address Book

Free and Inexpensive Materials
 The Wish Book Companies
 Telecommunications and
 Internet Resources
 Software Sellers
 Bilingual Child Resources
 Special Needs Resources
 Science Teachers Associations
 NASA Teacher Resource Centers
 Planetarium Locator
 Science Museum Locator

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In addition I would like to thank reviewers and survey respondents for their valuable suggestions: Stan Chu, Bank Street College of Education; William Hughes, Ashland University; Raymond Jobin, Keene State College; Archibald Sia, California State University, Northridge; Rene Stofflett, University of Illinois; Barbara Kasten, Trinity College; Bonnie Kotvis, Alverno College; Margaret Mason, William Woods College; J. Philip McLaren, Eastern Nazarene College; Lucy J. Orfan, Kean College of New Jersey; and Harold Roberts, Hendrix College.

If you have used *Teaching Children Science* before, you may notice a new feature in chapters 1 through 9 called *Real Teachers Talking: A Starting Point for Thinking, Talking, and Writing*. I wish to acknowledge the real teachers who were kind enough to take the time to participate in conversations about the chapter topics. They are Chris Copes, Suzanne Fields, Susy Griffin, Wendi Harada, Suzy Ho, Nancy Hunter, Cheryl Ilnicki, Candice Nelson, Amy Okino, Debra Payne, Bonnie Petersen, Danette Quilausing, Kathlynn Tabandera, Chris Wakida, and Janet Weiss. I took a few editorial liberties to condense their conversations so I have used pseudonyms in the text itself. I am sure their dialogues will provoke your thinking. Thank you all.

I wish you great success as you work with this the fourth edition of *Teaching Children Science*. As I have said in previous prefaces, the order of the words in the title is purposeful, we are teaching children science—it is not the other way around.

Joseph Abruscato
 Burlington, Vermont

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