# CROSSING BORDERS IN LITERACY AND SCIENCE INSTRUCTION

PERSPECTIVES ON THEORY AND PRACTICE

E. WENDY SAUL

# **Contents**

Acknowledgments	viii

Contributors ix

1 Introduction F. WENDY SAUL

## SECTION I: DESCRIBING THE LANGUAGES OF SCIENCE 11

#### CHAPTER 1

Language in the Science Classroom: Academic Social Languages as the Heart of School-Based Literacy 13 JAMES PAUL GEE

## CHAPTER 2

The Literacies of Science 33 JAY L. LEMKE

## CHAPTER 3

Gestures: The Leading Edge in Literacy Development 48 WOLFF-MICHAEL ROTH

# SECTION II: THE ROLE OF LITERACY INSTRUCTION IN SCIENCE

#### CHAPTER 4 Why Do Future Scientists Need to Study the Language Arts? 71 LARRY D. YORE

#### CHAPTER 5 Science Is Not Written, But It Can Be Written About 95 ROBERT E. YAGER

# SECTION III: EXPANDING ACCESS TO SCIENCE 109

#### CHAPTER 6

Girls in Science: Creating Symmetrical Opportunities for Acquiring Scientific Literacy 111
BARBARA J. GUZZETTI

#### CHAPTER 7

The Science of Reading and the Reading of Science: Successes, Failures, and Promises in the Search for Prerequisite Reading Skills for Science 123

Michael L. Kamil and Elizabeth B. Bernhardt

#### CHAPTER 8

Knowing and Being in Science: Expanding the Possibilities 140 Allan Feldman

# SECTION IV: TEACHING SCIENCE AS A DIALOGIC PROCESS 159

#### CHAPTER 9

Promoting Dialogic Inquiry in Information Book Read-Alouds: Young Urban Children's Ways of Making Sense in Science 161 Christine C. Pappas and Maria Varelas, with Anne Barry and Amy Rife

#### CHAPTER 10

Improving Science Instruction With Information Books: Understanding Multimodal Presentations 190
Laura B. Smolkin and Carol A. Donovan

#### CHAPTER 11

Readers Are Scientists: A Reflective Exploration of the Reasoning of Young Scientists, Readers, Writers, and Discussants 209

Jeanne Reardon

# SECTION V: SELF-QUESTIONING AND METACOGNITION 225

#### CHAPTER 12

Multiliteracies and Self-Questioning in the Service of Science Learning 226

Donna E. Alvermann

#### CHAPTER 13

Reading Comprehension and Science Inquiry: Metacognitive Connections 239 LINDA BAKER

SECTION VI: CHOOSING SCIENCE TRADE BOOKS 259

#### CHAPTER 14

Choosing Informational Books for Primary-Grade Classrooms: The Importance of Balance and Quality 260 MARIAM JEAN DREHER AND ANITA N. VOELKER

#### CHAPTER 15

Highly Recommended Trade Books: Can They Be Used in Inquiry Science? 277

Danielle J. Ford

#### CHAPTER 16

How Not to Get Lost on *The Magic School Bus*: What Makes High Science Content Read-Alouds? 291 Laura B. Smolkin and Carol A. Donovan

SECTION VII: SCIENCE WRITING HEURISTICS 315

#### CHAPTER 17

Learning From Text Designed to Model Scientific Thinking in Inquiry-Based Instruction 316
SHIRLEY J. MAGNUSSON AND ANNEMARIE SULLIVAN PALINCSAR

#### CHAPTER 18

Students' Science Notebooks and the Inquiry Process
MICHAEL P. KLENTSCHY AND ELIZABETH MOLINA-DE LA TORRE

#### CHAPTER 19

The Science Writing Heuristic: Using Writing as a Tool for Learning in the Laboratory 355
Carolyn S. Wallace, Brian Hand, and Eun-Mi Yang

# SECTION VIII: EVALUATING COMMERCIAL TEXT MATERIALS 369

#### CHAPTER 20

Better Textbooks, Better Readers and Writers 370 Cynthia Shanahan

#### CHAPTER 21

Choosing Science Textbooks: Connecting Research to Common Sense 383
WILLIAM G. HOLLIDAY

#### CHAPTER 22

Integrating Science and Literacy Instruction With a Common Goal of Learning Science Content 395
HAROLD PRATT AND NORBY PRATT

# SECTION IX: REACHING TEACHERS 407

#### CHAPTER 23

Mind Engagement: What Is Not Typically Accomplished in Typical Science Instruction 408
ROBERT E. YAGER

#### CHAPTER 24

"Reading the World Before Reading the Word": Implications for Professional Development of Teachers of Science 420 HUBERT M. DYASI AND REBECCA E. DYASI

#### AFTERWORD

What's Next? A View From the Editor's Perch

E. Wendy Saul

AUTHOR INDEX 455

SUBJECT INDEX 463

Marti Protess Univers Ithough there is little argument that an important connection exists between literacy and science, much is not known about how literacy–science learning takes place. How does knowledge in one area affect learning in the other? How can teachers provide meaningful literacy–science connections in the classroom? How important are these connections? Teacher educators, reading educators, and science educators answer questions such as these in this collection that aims to reduce the competition and lack of understanding between the science and humanities communities.

Editor E. Wendy Saul offers a variety of pieces to help educators address the literacy-science connection:

- Quasi-theoretical pieces to help you think differently about how language and the specific discourse of science work together
- Literature reviews to help you understand trends in the literature
- Case studies to help you recognize exemplary teacher practices
- Evaluations of particular interventions to help you forgo the assumption that there is agreement on best practices

Each thought-provoking chapter encourages you to reflect on your own beliefs and find new ways to foster the literacy-science connection among your students and colleagues.

**E. Wendy Saul** is the Allen B. and Helen S. Shopmaker Professor of Education at the University of Missouri–St. Louis, St. Louis, Missouri, USA.





