Preface

What can this book do for you? It is the first independent review of curriculum materials for technology education in Grades K–8. The introductory chapter advocates using this book to become familiar with new resources and to examine many technology education products in more detail than has been possible before.

One of our advisors remarked that people often spend more time planning a week's vacation than they do planning for their decades of retirement. He was making an analogy to how the education system selects curriculum materials: Districts often spend only a few days and relatively few dollars selecting materials, in contrast to the years that students will use them and the thousands of dollars that they can cost. This guide can empower teachers and curriculum specialists to take a longer, deeper look at their choices.

In addition to being a guide to curricular resources, this book provides a good understanding of technology education. Chapter 2 defines and explains technology education. Readers glean the scope of technology from the description of the products in our reviews and from the products' own tables of contents and sample pages, reproduced at the end of each review.

What do we mean by technology education? A Gallup poll last year showed wide confusion among the public about the scope of technology and technology education. But after respondents received an explanation of technology, they overwhelmingly believed it should be taught in schools. We find similarly murky perceptions of technology within the U.S. education community. In contrast, modern technology education has already been a required school subject for ten-plus years in a dozen or more nations, including Australia, the Netherlands, New Zealand, and the United Kingdom.

Technology is broadly defined as changing the world to solve human problems. Students need to become technologically literate to enhance their lives in our technology-dependent world and for the well-being of our society. Technology can be understood by contrasting it with other fields. Technology is related to but different from science. Technology is related to but broader than engineering. Technology education does encompass how to use computers, other technological devices, or software in teaching, but it goes beyond such educational technology. The technology education community has its roots in industrial arts, but it has evolved toward something bigger, richer. We discuss all these distinctions.

Chapter 3 argues that it will take both technology and science educators to help students become technologically literate by the end of their schooling. For

this reason, we are excited and grateful that both the International Technology Education Association and the National Science Teachers Association are copublishing this book with Corwin.

Leaders in science and engineering education have for some time been trying to increase those communities' attention to technology education. For example, the *National Science Education Standards* explicitly call for some technology education, as do the Benchmarks from Project 2061 at the American Association for the Advancement of Science. The National Academy of Engineering recently made strong calls for more technology education in its report, *Technically Speaking.* Both the National Science Foundation and the National Aeronautic and Space Administration have significantly invested in promoting technology education.

The impetus for this book began in 2000, when the emerging field of technology education dramatically enhanced its credentials for becoming a more prevalent school subject in U.S. schools. By releasing its *Standards for Technological Literacy* (STL) in 2000, the International Technology Education Association provided an explicit vision for this discipline, similar to what the National Science Education Standards and the Benchmarks did for science education.

Now, almost five years after the release of the STL, can nationally available curricular resources help students in Grades K–8 become technologically literate? WestEd's National Center for Improving Science Education obtained a grant from the National Science Foundation to formally analyze curricular resources to investigate this question and questions about many other features of curricular resources. Chapter 4 outlines the kinds of resources we reviewed, how we found them, and why we selected them. As longtime science educators who have been allies of technology education for the last decade, we bring not only expertise but also independence and objectivity to this review. We are aided by Advisory Board members from technology and science education and technology businesses.

We intensively reviewed textbooks and cross-curricular products for technology education—page by page, sentence by sentence. Our results in Part II, Chapter 5 indicate that educators need to choose curricula carefully: Materials are moving toward the STL, but they have a ways to go. Such a result seems reasonable at the moment, because the STL push technology education in directions that build on that field's traditional experience, but also differ significantly from its past. For example, the STL heighten attention to understanding and carrying out the design process and give a contemporary portrayal of the designed world (e.g., increase attention to biotechnologies). It takes years for curriculum materials to evolve toward a new vision, in part due to the time needed to develop and bring major products to market. However, our aim is to help educators know exactly how today's resources can aid them in teaching technology education consistent with the STL.

Also in Part II of the book, we alert readers to contrasts among the student activities found in the products (Chapter 6). Knowledge about the design process and the abilities for carrying out technological design are core ingredients of technological literacy. We formally categorize and describe the structure of the activities (open-ended, guided, or fully directed), as well as the approach to technological design (e.g., using a full-scale design process versus focusing on only particular parts of it).

Chapter 7 helps readers contrast the kinds of student assessment built into products (end-of-chapter tests, student portfolios, performance assessment, etc.) and the kinds of support provided in teacher materials (support for using the curriculum, pedagogical advice and tools, support for promoting technological literacy, and more).

Part III, the largest portion of the book, contains reviews of individual resources:

- Core technology products (Chapter 8, five full reviews). Technology textbooks for the middle grades.
- Cross-curricular products (Chapter 9, seven full reviews). Elementary and middle grades products that integrate technology with other subjects.
- Supplemental products (Chapter 10, thirteen product descriptions). Elementary and middle grades products that focus on technology education but do not constitute an entire grade level or course.
- Informal and other resources (Chapter 11, more than 100 short descriptions). Typically not designed expressly for classroom instruction, but great reference materials, many of which do include student activities. Also includes Web sites and periodicals.

AUDIENCES ■

This book is useful to three main audiences:

- *Curriculum specialists, professional developers, administrators.* People who assist teachers in selecting and/or using curricular resources—curriculum specialists, professional developers, and administrators at the district and school levels;
- *Teachers*. Everyone who might teach technology education at the elementary or middle grades (including science teachers at the middle grades);
- *Curriculum developers.* Authors can gain insights for creating new curricular resources in technology education.

Special Note for the Elementary Grades

More technology education currently is taught in the middle rather than elementary grades. However, we are pleased to find resources that are created expressly for the elementary grades, a little more than half of the cross-curricular products and the supplementary resources reviewed in this book.

We recognize that it is especially difficult for elementary teachers to tackle every school subject and to address shifting recommendations from year to year about what relative balance to strike among them. So it is with great respect that we appeal to elementary educators to take a look at yet another subject area.

We advance four rationales for doing so: Achieving technological literacy by the end of high school will be more attainable if instruction begins from the get-go; early exposure could prompt children to dream of a wider range of possibilities for what they might like to become someday (e.g., engineers in addition to scientists); technology education is great fun for young children

(and students of all ages); and it stimulates their creativity, social intelligence, and motor skills, in addition to their overall cognitive development.

We hope this book will prompt and enable U.S. educators to help greater numbers of U.S. students become technologically literate.

■ ACKNOWLEDGMENTS

Most of all, we want to thank educators who use this book to begin or deepen their efforts to help students become technologically literate.

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Ted Britton,
Bo De Long-Cotty, and
Toby Levenson, San Francisco