Foreword

In the fifteen years since standards became the centerpiece of science education reform, schools and teachers have engaged in a flurry of activity around standards. Developing and aligning curriculum and assessment with standards, mapping curriculum, and supporting implementation of a standards-based curriculum have been at the forefront of reform efforts in schools across the nation. While these are important efforts in ensuring all students have an opportunity to achieve science literacy, they do not go far enough. The missing link seems to be a focus on instruction. While some districts have targeted instruction through generic tools and strategies designed to improve general pedagogy, science teachers face many pedagogical challenges unique to the discipline of science. It is this special pedagogical content knowledge (PCK) that distinguishes good science teachers from great science teachers and transforms science classrooms into places where students can excel in science.

With this book, *What Successful Science Teachers Do: 75 Research-Based Strategies,* teachers now have a comprehensive resource they can use to continually hone their practice and transform good teaching into great teaching. It is through effective instruction—the interface between the student, curriculum, and assessment—that the vision of standards-based reform truly comes to life. This is a much-needed, timely resource. President Barack Obama and his education secretary, Arne Duncan, have started talking quite a lot about great teaching, resulting in one of the largest competitive teacher effectiveness programs: Race to the Top. States must try to identify great teachers, figure out how they got that way, and then create more of them.

A few years ago I read a highly regarded management book, *From Good to Great: Why Some Companies Make the Leap . . . and Others Don't* (Collins, 2001), that described how some companies go from being average to soaring toward greatness. Greatness was defined as being several times better than average over a sustained period of time. One of the most important lessons I learned from this book—equally applicable to a business or a school—is to critically examine what works best for others and to strive to understand, implement, and evaluate similar practices in your own

context. This is also much of the premise behind Race to the Top. In other words, consider giving up the "same old, same old" strategies that don't seem to be effective in moving students toward important learning goals in favor of considering research-based strategies that have been shown to work in classrooms.

However, in order to use research-based strategies, teachers must have access to the research in a ready-to-use, teacher-friendly format. That is exactly the kind of access that *What Successful Science Teachers Do* provides so well. The 75 strategies in the text, based on clear summaries of current research, cover a range of contextual considerations science teachers face in their daily interactions with students including inquiry-based instructional methods, collaborative teaching and learning, utilizing technology for student and teacher learning, assessment, culturally responsive teaching, gender issues, science and language literacy, and family connections.

One of the goals I focused on during my term as the 63rd President of the National Science Teachers Association (NSTA) was to identify strategies to help bridge the gap between research and practice. To my delight and amazement, this was a goal that resonated not only with the NSTA Research Division, but especially with practitioners in the field, both teachers and those who work to support teachers. One of the effective ways to do this is by making research more accessible to teachers through publications geared toward practitioners. Clearly teachers, science specialists, professional developers, preservice teachers, faculty and all who support science education have shifted from a reliance on individual bias and opinion to supporting the wisdom of their instructional decisions with the empirical evidence that comes from research. Furthermore, school administrators are increasingly asking the question "What research do you have to support this practice?" Finally, here is a well-researched book that can provide evidence on effective actions science teachers can take and the requisite classroom conditions necessary to facilitate learning for all students. Not only does it provide a summary of the research; most important, it provides teachers with the practical suggestions for applying the research findings, including caveats to be aware of when using research-based strategies in your own context.

In addition to the wealth of valuable information in this book, I find the format to be particularly appealing to practitioners. In 2008 Corwin published the best-seller *Science Formative Assessment: 75 Practical Strategies for Linking Assessment, Instruction, and Learning* (Keeley, 2008). As the author of this book and a professional developer who has worked with thousands of teachers and many school districts throughout the U.S., the comment I repeatedly hear is how teacher friendly the format is. One can pick a single strategy, focus on it, evaluate its success, and gradually increase one's repertoire of effective strategies by adding new ones. The format helps users easily understand the purpose of the strategy, the research behind it, and its implementation considerations. It moves

teachers away from selecting a strategy because it looks interesting or might be fun for students, to being purposeful in their selection of strategies. And the most important comment I hear is that building a school culture where these 75 formative assessment strategies are being used across classrooms is transforming teaching and learning. Many professional learning communities are using the book to examine and link strategies to their goals for student achievement. I'm excited to see a similar format in Glasgow, Cheyne, and Yerrick's book that is sure to elicit the same reaction from educators. As a matter of fact, one of the questions I often get is "Can you do a similar book that focuses on instructional strategies?" Well, the simple answer is that there is no need for me to do so! This book serves that very purpose and is a wonderful companion to *Science Formative Assessment.* After all, instruction and assessment are two sides of the same coin—you can't have one without the other. They are inextricably linked and complement each other.

I especially want to thank the authors for furthering the important goal of bridging the gap between research and practice and providing another resource to move the work of science professional learning communities forward. As experienced educators and researchers, the authors are well-attuned to the reality of schools and teaching. They do not present their ideas as remote armchair theorists but rather as educators who respect and understand K–12 teaching and learning. They do not provide you with a bag of tricks or abstract theories, but rather a well-thought-out set of research-based principles and strategies for you to consider. Becoming a great science teacher is a lifelong, continuous process. Whether you are new to teaching, a veteran teacher, or one who works with teachers and future teachers, this book is sure to become your well-worn, dog-eared companion as you strive to be a GREAT teacher or teacher educator.

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Sources

Collins, J. (2001). *From good to great: Why some companies make the leap . . . and others don't.* New York: HarperCollins.

Keeley, P. (2008). *Science formative assessment: 75 practical strategies for linking assessment, instruction, and learning.* Thousand Oaks, CA: Corwin.