



Science K-8: An Integrated Approach (11th Edition)

By Edward Victor, Richard D. Kellough, Robert H. Tai

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Packed with the science content future teachers must know, and based on the premise that integrated learning by inquiry is the cornerstone of effective science teaching, the eleventh edition of this classic again focuses on the four developmental components of both teaching and learning—the *why*, *what*, *how*, and *how well* of teaching. Unique to this text are complete content outlines covering the big ideas of life, earth, and physical science. Teachers can use these outlines and sequence concepts to build science units with an assurance they will be complete. Content correlates with NSES standards, while being ideally balanced between the attention span of kindergartners and the genuine interest of eighth graders, addressing the full range of learners in between. Includes thorough coverage of the relationship among curriculum standards, assessment, and high-stakes achievement testing. Thorough, current science content fills in any gaps in students fundamental science knowledge and readies them for current science curriculum standards. Includes up-to-date lists of science-oriented websites. For future elementary and/or middle school teachers.

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Editorial Review

From the Back Cover

Packed with the science content future teachers must know, and based on the premise that integrated learning by inquiry is the cornerstone of effective science teaching, this book focuses on the four developmental components of both teaching and learning—the why, what, how, and how well of teaching. The authors present an eclectic approach to teaching, sharing the best of practice, the most useful research, and the lessons learned from their own rich array of teaching experience. Content correlates with NSES standards, while being ideally balanced between the attention span of kindergartners and the genuine interest of eighth graders, addressing the full range of learners in between. Includes thorough coverage of the relationship among curriculum standards, assessment, and high-stakes achievement testing. Thorough, current science content fills in any gaps in students fundamental science knowledge and readies them for current science curriculum standards. Includes up-to-date lists of science-oriented websites. For future elementary and/or middle school teachers.

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Our intent for *Science K-8: An Integrated Approach* is to provide a contemporary source of appropriate and relevant pedagogy, subject-matter content, learning activities, and resources for people preparing to teach science to children of grades K-8. Others who will find it to be a useful reference are experienced teachers, administrators, and science curriculum specialists.

Exemplary K-8 educational programs are rooted in celebrating and building upon the diverse characteristics and needs of young people. To become and to remain exemplary, teachers in such programs must be in a continual mode of inquiry, reflection, and change. It is no different for us as the authors of this book. In a continuing effort to prepare a comprehensive and exemplary book on teaching science to children of grades K-8, we are in a *continual mode of inquiry* into the latest findings in research and practice, in *constant reflection* as we listen to and assess the comments from practitioners in the field and from users and reviewers of the book, and in *steady change* as we respond to the challenge of providing new coverage for integrating methods and resources.

Organization of This Edition: An Overview

Competent teaching is a kaleidoscopic, multifaceted, eclectic process. When preparing and writing a book for use in one segment of a program for teacher preparation, by necessity one must separate that kaleidoscopic process into separate parts, which is probably impossible to do in a way that makes the most sense to everyone using the book.

This book continues to be divided into two parts. For the sake of clarity and sensible organization for this tenth edition, Part One was reorganized to address what we consider to be the four developmental components of teaching and learning:

- *why*—the rationale to support the components that follow
- *what*—the content, processes, and skills you will be helping children learn
- *how*—how you will do it
- *how well*—how well you are doing it

Together, these four components constitute the essentials of effective instruction. The visual map above

illustrates how these four components are divided.

It is neither likely nor advisable that one should or could effectively learn about one component entirely exclusive of the others. The four components are inextricably intertwined, with each affected by and dependent upon the others. Indeed, teaching and learning are reciprocal processes that depend on and affect one another. For example, for the sensible organization of this book, assessment is addressed as the fourth and final component of competent instruction even though it is really an integral part of an ongoing process in the total educational arena. For example, one cannot thoroughly plan for the instruction (Chapter 7) without considering the learning objectives (Chapter 2) and the assessment strategies (Chapter 8).

Our Beliefs: How and Where They Are Reflected in This Book

As a teacher, your greatest resources are the children you teach and the adults with whom you work. This is not a book of recipes; we are preparing teachers, not chefs. We cannot tell you what will always succeed best with your students; you will know them better than we do. In this book we do share the best of practice, the most useful of research findings, and the richest of experiences.

Integrated learning by inquiry is the cornerstone of effective science instruction for the twenty-first century. We present strategies that integrate learning and provide illustrations of how they may be used. Active learning by student inquiry and teaching for thinking are emphasized in this book. You are probably well aware that professional education is rampant with its own special jargon, which can be confusing to the neophyte. The use of the term *direct teaching* (or its synonym, *direct instruction*), and its antonym, *direct experiences*, are examples of how confusing the jargon can be. The term *direct teaching* (or *direct instruction*, or *expository teaching*, or *teacher-centered instruction*) can also have a variety of definitions, depending on who is doing the defining. In this book, we try to keep our use of terminology simple and succinct. For example what we mean by *integrated approach to learning* is addressed in Chapter 1, and *inquiry* is addressed in Chapter 5.

Effective science teaching doesn't just happen. Certain understandings and behaviors are absolutely fundamental for the most effective teaching and learning to occur. Fundamental understandings include the nature of science and how children learn science (Chapter 3). Fundamental teacher behaviors (Chapter 4) create the conditions needed to enable students to think and to learn, whether the learning is a further understanding of a science concept, the internalization of attitudes and values, the development of cognitive processes, or the actuating of the most complex behaviors (all addressed in Chapter 2). Clearly, at least some of the fundamental teacher behaviors are also instructional strategies. Questioning is one example. The difference is that the behaviors must be in place for the most effective teaching to occur, but strategies (Chapter 5) are more or less discretionary; that is, they are pedagogical techniques from which you may select but are not obligated to use. For example, questioning and the use of silence are fundamental teaching behaviors (discussed in Chapter 4), whereas lecturing (Chapter 5) and taking children on a field trip (Chapter 6) are not. Therefore, you see, your task is two-fold: (1) develop your awareness of and skills in using the fundamental teaching behaviors, and (2) develop your repertoire and skills in selecting and using appropriate instructional strategies for facilitating children's learning of science. Only beginning now, your understanding and development of these skills will continue throughout your teaching career.

To be most effective, a teacher must use an eclectic style in teaching. Rather than focus your attention on particular models of science instruction, we emphasize the importance of an eclectic model—that is, one in which you select and integrate the best from various instructional approaches. For example, while much of the time you will want to use an indirect, social-interactive, student-centered approach that features process-based, cooperative learning and project-based learning, there are times when you will want to use a direct, expository, and content-centered approach. More often the exemplary teacher is doing both at the same time, that is, using what we refer to as *multilevel instruction* (see Chapter 5). Our desire is to present understanding and guidelines that will assist you in developing the skills necessary for selecting and using a

specific approach. Practice, experience, time, and reflection are your best allies for increasing your effectiveness in implementing multilevel instruction.

Users Review

From reader reviews:

Barbara Harp:

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