

Science Instruction in the Middle and Secondary Schools: Developing Fundamental Knowledge and Skills (7th Edition)

By Eugene L. Chiappetta, Thomas R. Koballa

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This science methods textbook is designed to provide middle and high school science teachers with the skills they need to help students become scientifically and technologically literate. To be successful, beginning teachers must master the basic functions of teaching. They are:

- Understanding the purpose of science teaching
- Planning science lessons that are engaging and lead to meaningful learning
- Managing the science learning environment in ways that emphasize student responsibility
- Assessing students science learning throughout the instructional process
- Teaching in a way that is both active and personally rewarding.

Once these basic skills have been mastered, then pre-service teachers are ready to tackle the other important topics relevant to science teaching and learning. In order to meet this goal, the authors immediately engage their readers with six introductory chapters on these basic skills. The remaining chapters focus on the foundational areas of science education and strategies for science teaching. Many vignettes and examples of classroom practices are included to reinforce the chapter content. The appendices provide *Puzzling Situations*, science demonstrations, science laboratory activities, and a scoring key for the science inventory found in Chapter One.

New To This Edition:

NEW: Opens each of the six introductory chapters with revised vignettes that serve as advanced organizers of the chapter—Focuses on the basic functions of science teaching—purpose: planning, assessing, teaching, and managing.

NEW! Correlates the chapter content with the NSTA/NCATE 2003 Professional Standards for Science Teacher Preparation—Facilitates the

preparation of the NCATE review process at many universities.

NEW! Uses backwards design strategies (Wiggins & McTighe, 2005) to guide the discussion of instructional planning in Chapter Three—Emphasizes unit planning (rather than lesson planning) and the state science standards.

- Guided by backward design strategies, the book stresses the use of state and locally developed curriculum frameworks and science literacy (strand) maps presented online by the National Science Digital Library.

NEW! Introduces a *Beginning Science Teacher's Checklist for evaluating lesson assessment practices (Chapter 4)*—These three sections focus on assessment practices that should be addressed before, during, and after a lesson.

NEW! Addresses Differentiated Instruction in *Chapter 8 Diverse Adolescent Learners and Differentiated Instruction*—Suggests ways teachers can address the diverse learning needs of today's students.

NEW! Emphasizes the use of *Technological Tools of Science Learning* such as computer data collection probe-ware and graphing calculators in Chapter 15—Discusses their use in student investigations.

NEW! Addresses learning through talk and argumentation in sections of Chapter 11—Shows uses of discussion, demonstration, and lecture in science teaching.

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Editorial Review

From the Back Cover

Provides you with the fundamental knowledge and skills you need to plan and teach middle and secondary science!

Teacher candidates and novice teachers will find this textbook an invaluable tool to help them understand and enact the basics of science teaching and learning. Numerous application exercises, science teaching vignettes, and other pedagogical features encourage readers to apply what they learn and to reflect critically on the implications for classroom practice.

Organization of the Text:

- Six introductory chapters in Part I focus on the basic functions of science teaching: purpose, planning, assessing, teaching, and managing.
- Part II presents essential information on the diverse adolescent learners teachers will encounter in their classrooms, and relevant learning theories.
- Strategies for teaching science through inquiry in middle and secondary schools are covered in Part III.

New to This Edition:

- **Revised vignettes** open each of the six introductory chapters and serve as advanced organizers of the chapter while focusing on the basic functions of science teaching: purpose, planning, assessing, teaching, and managing.
- Chapter content is **correlated with the NSTA/NCATE 2003 Professional Standards for Science Teacher Preparation**, helping novice teachers more effectively plan their instruction by showing the connections between content and standards.
- **Backwards design** strategies have been added to guide the discussion of instructional planning.
- **Beginning Science Teacher's Checklist** is introduced to help new teachers evaluate lesson assessment practices.
- **Coverage of Differentiated Instruction** suggests ways teachers can address the diverse learning needs of today's students.
- **Emphasis is placed on the use of Technological Tools of Science Learning**, such as computer data collection, probe-ware, and graphing calculators, and their use in student investigations.
- **Learning through talk and argumentation** is addressed within the context of science teaching.

About the Author

Eugene L. Chiappetta is a professor of science education in the Department of Curriculum and Instruction at the University of Houston. Dr. Chiappetta holds a bachelor's degree in Biology from Allegheny College and master's degree in General Science, and a Ph.D. in Science Education from Syracuse University. He has coauthored many textbook analysis research

studies, using the nature of science as a framework. Recently, a recipient of the National Association for Research in Science

Teaching Paper Award for *Examination of Science Textbook Analysis Research Conducted on Textbooks Published over the Past*

100 Years in the United States, The “Skoog Cup” for Significant Contributions and Leadership in the Development of

Quality Science Education in Texas, and “Teaching Excellence” Award in the College of Education.

Professor Chiappetta

teaches undergraduate and graduate courses in science education and has coordinated teacher certification and science

education programs for over three decades.

Thomas R. Koballa, Jr. is a professor of science education in the Department of Mathematics and Science Education at

the University of Georgia. Dr. Koballa holds a bachelor’s degree in Biology and master’s degree in Science Education from

East Carolina University, and a Ph.D. in Curriculum and Instruction from the Pennsylvania State University.

He is past

president of the National Association for Research in Science Teaching and the recipient of the Association of Science

Teacher Education’s Outstanding Mentoring Award. He teaches undergraduate and graduate classes in science education

and has authored or coauthored more than 50 journal articles and chapters. His current research foci include science

teacher learning and mentoring.

Users Review

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Shirley Dildy:

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