

by Joel J. Mintzes, James H. Wandersee & Joseph D. Novak. 2000. Academic Press (525 B Street, Suite 1900, San Diego, CA 92101-4495). 386 pp. Hardback \$69.95.



Although the cognitive revolution led to the development of a number of instructional approaches designed to promote understanding, conceptual change, and meaningful learning, there is still a consensus opinion that science education is failing on many fronts. In a 1997 *Kappan* article Charles Anderson and Okhee Lee asked the question, "Will students take advantage of opportunities for meaningful science learning?" Anderson and Lee concluded that learners always retain control over their personal agendas and commitments, thus teachers must begin by understanding the learners and their goals. They further argued that "... the success of science teaching depends on creating social bonds in which the teacher and the curriculum lead the students to identify the goal of scientific understanding as their own personal goal" (p. 724).

The editors and contributors to **Assessing Science Understanding** would likely agree with Anderson and Lee on these points, but they would add that assessment is one of the critical factors that will encourage learners to accept the goal of scientific understanding as a personal goal. They argue that "... poor assessment practices in the elementary and secondary schools (and in colleges and universities) are clearly among the most significant impediments to *understanding and conceptual change*" (p. xix). They attribute the failure of cognitive methods to have the desired impact on achievement to the fact that changes in assessment have lagged behind changes in instruction resulting in a "... progressive decoupling (i.e. a "misalignment") of instruction and assessment in science education" (p. xx). With this volume, they seek to lay the groundwork for bringing assessment and instruction into alignment.

Assessment techniques addressed in this volume include concept maps, epistemological vee diagrams, interview protocols, image-based biology tests, observation rubrics, portfolios, SemNet software, written products, and multiple choice tests. It is difficult to imagine that a reflective teacher who is interested in improving one's practice would not find something of value in these pages. Additional chapters provide the theoretical rationale

for these methods or address issues in science education assessment such as the role of national and international testing, the psychometric issues involved in performance measures, and the limitations of paper and pencil tests.

A companion volume to **Assessing Science Understanding** edited by the same group provides a theoretical rationale and methods for **Teaching Science for Understanding** (1998, Academic Press). With these two volumes the editors intend to provide a strong theoretical basis for science education, linking theory to practice in ways that will contribute to the development of a science of science education. The intended audience for both **Assessing Science Understanding** and its companion volume includes science teachers, graduate students, teacher educators, curriculum developers, and researchers. Accordingly the chapters are written in a somewhat more informal style than one normally finds in a research article. However, these volumes are not step-by-step "how to" guides. The success of this project will depend on the extent to which the intended audience is willing to dig into the references, reflect on the lessons within the book, and also reflect on teaching practice as they experiment with ways to improve it. If these books, and others like them, have their intended impact, science education will have a bright future.

Anderson, C. W. & Lee, O. (1997). Will students take advantage of opportunities for meaningful science learning? *Phi Delta Kappan*, 78, 720-724.

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SYSTEMATICS & BIODIVERSITY

The Variety of Life: A Survey and a Celebration of all the Creatures that Have Ever Lived. By Colin Tudge. 2000. Oxford University Press (198 Madison Ave., New York, NY 10016-4314). 684 pp. Hardback \$45.



The field of taxonomy, or systematics, is currently undergoing rapid changes as cladistic theory, molecular biology, and new fossil discoveries reshape our understanding and interpretation of phylogenetic relationships. This book begins with a detailed review of the history of systematics, and provides an excellent update on the progress and contribu-

tions of cladistics to modern systematics. In this well-researched text, the author attempts to strike a balance between classical taxonomy and modern cladistics, a practical interpretation of the data that he names "Neolinnaean Impressionism."

The bulk of the text contains a survey of all creatures, flora and fauna, extant and extinct. Each major group is described with phylogenetic trees, illustrations, and detailed text. The mammalian taxonomy, my specialty area, was current and well-researched, as was the section on human evolution. The phylogenetic diagrams and descriptions included in the text would serve as useful supplements to standard zoology, botany and microbiology texts.

The book concludes with an impassioned plea for conservation of biodiversity in the face of rising human populations. The author focuses on the difficulties of surviving the next 500 to 1000 years, the proposed "demographic winter" for both humans and the creatures that share planet Earth. He emphasizes that both habitat conservation and captive breeding efforts will be required to save the maximum diversity of species.

The author provides clear and compelling arguments for retaining a central focus on the teaching of taxonomy in our biology courses. As we all know, the need to learn taxonomy is a very difficult "sell" to make to today's students, and I found his arguments so compelling that I have already used them to revise my taxonomy lecture notes.

The author clearly demonstrates his passion for the field of systematics as a tool to understanding the wonder of life in all its variety. He writes in a clear and engaging style. His explanation of cladistics, a complex subject with difficult terminology, is one of the best I've read in a long time. He reminds us that systematics is a dynamic and challenging field of scientific study.

This is a book printed in a refreshingly classic style that is easy on the eyes. The elegant sketches and two-tone illustrations are used effectively throughout the text. The taxonomic diagrams are clear and easy to understand.

I'd recommend this book for college-level biology teachers and for those of us, biologists and nonscientists alike, who simply wish to brush up on the latest progress in systematics. This classic book is a clear and cogent analysis of the current state of the field

and would be a welcome addition to any biologist's bookshelf.

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YOUNG SCIENCE

Living with Deafness. By Emma Haughton. **Living with Cerebral Palsy.** By Paul Pimm. **Living with Leukemia.** By Patsy Westcott. **Living with Blindness.** By Patsy Westcott. (Ages 9-12). 2000. Raintree Steck-Vaughn Publishers (4515 Seton Center Pkwy, Austin, TX 75759). 32 pp. Hardback \$23.00 each.

 Any illness, especially those that are serious or chronic, are difficult for children to understand. These excellent books are a part of a series dedicated to helping children understand such diseases. Other topics covered in individual volumes in this series include asthma, diabetes, Down syndrome, and epilepsy.

Each book introduces three or four individuals and describes their diagnoses, treatments, and how they live with their particular illness or disability. The basic biology is explained along with tests, treatments, and other information related to the condition. The information is accurate, realistic, and written in a concise manner to maintain a child's interest.

The illustrations are large and colorful and the text is interesting and informative. A glossary of technical and medical terms used in the book is provided. Other information, such as lists of addresses, books, magazines and web sites for further information, are located in the back of the book.

Written for children, these volumes would be an excellent addition to any elementary school or public library. They could also be recommended to any child facing such serious illness or disability.

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Grow Your Own Pizza: Gardening Plans and Recipes for Kids. By Constance Hardesty. 2000. (Ages 9-12). Fulcrum Publishing (16100 Table Mountain Pkwy, Ste. 300, Golden, CO 80403). 128 pp. Paperback \$16.95.

 This delightful book on gardening encourages children and parents to share in the fun. The contents include 21 garden plans, orga-

nized by three levels of difficulty: easy, medium and advanced. Each garden plan includes recipes that kids and parents can cook together using the harvest from their garden.

The book gives detailed planting instructions, with clear illustrations, for both garden plots and container gardens. The author suggests the best varieties of seeds to plant, and gives planting and harvesting tips. There is also a "Green Thumb Guide" that goes over the basics of successful gardening: preparing the soil, planting, watering, feeding, weeding, pest control and composting. The author is also careful to point out safety tips in both the garden and kitchen, and encourages parent participation in the projects.

It's written in a style that is easy and engaging for kids. Gardens are creatively designed to appeal to children's imaginations. Garden names include, "Queen Margherita's Pizza Garden" (easy), the "Cake and Ice Cream Garden" (medium), and the "A-maze-ing, Never-Ending Salad Garden" (advanced). The recipes included will satisfy both child and adult palates.

I highly recommend this book to parents and children. It is a great outdoor activity to share together, and you will find enough creative garden

plans and recipes to keep you happily gardening for many years to come. Enjoy !

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CHILDREN'S SCIENCE

Nature's Paintbrush: The Patterns and Colors Around You. By Susan Stockdale. 1999. (Ages 3-8). Simon & Schuster Children's Publishing Division (1230 Avenue of the Americas, New York, NY 10020). 22 pp. Hardback \$15.00.

 **Nature's Paintbrush: The Patterns and Colors Around You** is a beautifully illustrated children's book that explores patterns, colors and textures using animals. It discusses and displays warning colors, camouflaging, protective coloring, and attractive coloring. The author also includes the techniques used to make the illustrations. This a beautiful book written for children ages 3-8.

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