**BOOKS**

**What the 7th Grader Should Know About Microbes — Or, Is That “What the College Student Should Know?”**

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Even though these two books are part of a series for K-8 students, I reviewed them to see if they might interest my undergraduates. Because our introductory biology course focuses on eukaryotic cells and their cell structure, practically the only prokaryotes recognized by students entering microbiology courses are MRSA and *Escherichia coli*.

In this book series, “A Class of Their Own” is used figuratively as a catchphrase. There are six books in the series, including others on Animals, Plants, Fungi, and Protists. The books are aimed at reading level grade seven, and are designed to be of interest to grades five through eight. The two books I reviewed have an identical section with an excellent description of the difference between Domains and Kingdoms. Their characterization does recognize the Domains as super groups; however, the books emphasize organizing living organisms using the Kingdom model. In an attempt to reconcile new knowledge (Archea) with the Kingdom model, they name six Kingdoms, instead of the five Whittaker originally described. In this model, Archea and Bacteria are listed as separate Kingdoms rather than as a joint Monera Kingdom. After researching this depiction, I discovered that many schools, both K-12 and college-level, use the Six Kingdom nomenclature, rather than the Domains. This practice does not give very good representation to the wide variety of organisms in the ‘Protists’ (which are now believed to contain several different Kingdoms) or slime mold group. Now that I know that many students learned this simplistic and somewhat misleading system in secondary school, I can directly address this issue in my classes.

Along with an Introduction, Archea has six chapters: “Archean Biology”; Sulfur Lovers”; Recyclers”; “Methane Makers”; “Euryarchaeota, Salt Lovers”; and “Newly Discovered Archeans.” The description of the mechanics of aerobic respiration was excellent, especially for the target student population, as was that of anaerobic respiration. For aerobic respiration, the author describes the process as complex, involving many small steps, creating certain end products, and requiring oxygen. For anaerobic respiration, he mentions nitrate and sulphate are used instead of oxygen. However, there is no discussion of the process of fermentation, and fermentation end products lactic acid and ethanol are misidentified as being products of anaerobic respiration.

The writer uses great descriptors, and the language of this small book had me going to the dictionary for words I was unfamiliar with, such as solfatara. This book is definitely a good review — and preview — of the Archea and will provide great background information for students of any age.

Illustrations, including many photographs, are on every page. Perhaps the best accolade is the fact that I myself learned a lot by reading this, filling in some of the gaps in my own knowledge. More careful proofreading would be good, since the Table of Contents identifies two Chapter...
Fives. To be really useful as a text or even as a preview, the metabolism description must be rewritten and clarified to include fermentation. This is a topic that many students struggle with, and students who read the book without already having a clear idea of the difference between respiration and fermentation will perhaps become more confused.

The sister book, Bacteria, also has an Introduction. Its five chapters are: “Bacterial Biology”; Bacilli”; “Cocci”; “Curved Bacteria”; and “The Mycobacteria.” Again, especially for a book intended for grades five through eight, this is an excellent introduction to Bacteria. There are great illustrations on each page, and care was taken by the author to include a variety of topics, including yogurt bacteria and Deinococcus, and some basic microbial ecology, in addition to microbial-caused diseases. There are several descriptions, however, which are troublesome. The author carefully defines prokaryotes as lacking a membrane around a nucleus (page 8), implying that they have a nucleus. This terminology is continued throughout the book. For instance, on page 15, a description of transformation includes the phrase: “If the new DNA is put into the nucleus or is a complete plasmid ...” The author also states only gram-negative bacteria have fimbriae, indicating a slight confusion on the author’s part between fimbriae and pili. A third issue is the lack of distinction between walls and membranes, when the thick outer wall of a bacterial spore is described as composed of many membranes (page 21). Even with these three issues, I learned a lot by reading this book. For instance, I learned that under some conditions, the ocean surface glows in a state called “milky sea,” which is possibly caused by high numbers of Vibrio harveyi. I will also spurn sushi in future, after reading about pufferfish accumulating the toxin TTX, made by intestinal bacteria.

Overall, these little books provide an interesting, well-illustrated introduction to Bacteria and Archaea. Because of the flaws described above, however, students of any grade level should be provided with careful guidance when reading these books. Without that guidance, students may develop misunderstandings about important information, making it more difficult for them to comprehend material in our classes. Excellent, current information is given at a level that is considerably higher than the presumed target audience. In addition, the books are available at a reasonable cost. I will have them available in the lab for students to browse, and think they will be successful at giving my students an idea of the great diversity of these two Domains we study. However, I will probably buy another pair of copies. I don’t want these wandering away — they are just too enjoyable!

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