Physics: The First Science. Peter Lindenfeld and Suzanne White Brahmia. 366 pp. Rutgers U.P., New Brunswick, NJ, 2011. Price: $57.60 (paper) ISBN: 978-0-8135-4937-8. (Kathy Shan, Reviewer.)

In my experience, students in life sciences and other non-physics or engineering fields take introductory physics classes not because they enjoy or are curious about physics but because they are required to. Physics classes have a reputation for being boring, difficult, and irrelevant to students' lives and are often treated by students as very difficult applied math classes. The typical introductory physics textbook, with its focus on derivations and formulas and often dry and difficult-to-follow text, does not help students to overcome these initial impressions of the subject.

Physics, the First Science, is not a typical introductory physics textbook. Lindenfeld and Brahmia intend this book for a standard, year long, algebra-based introductory physics course. This book covers most of the standard topics for this course, from classical Newtonian mechanics to electricity and magnetism to modern physics. Each chapter includes many in-chapter worked examples that are linked to end-of-chapter problems and exercises and many of the examples and problems are also linked to PhET simulations (phet.colorado.edu). This book is less than half the length of most introductory physics textbooks, with a bare bones approach to figures, vocabulary, and equations, and is correspondingly cheaper for students. However, even though the book is relatively short, the authors manage to pack it full of information and clear and relevant explanations. It is written in a conversational style that is meant to be read through without skipping around, although it will also be useful as a basic reference.

The book begins with a discussion of scales, from atomic to galactic. It then goes on to introduce the importance of units, formulas, and symbols to the study of physics before jumping right into a study of motion, including kinematics, forces, and momentum. Only after this do the authors devote a chapter to how scientific knowledge is organized and interpreted. This is one of my favorite chapters in the book, and I believe it will be one of the most useful to students in understanding how physics, and any science, actually works in all its messy glory, without the usual instruction-manual outline of scientific method that is found in many introductory texts. Next come energy, electricity, magnetism, and waves. The authors pay special attention to topics in modern physics, with chapters devoted to quantum physics and nuclear physics, and end the text with two chapters dealing with energy in the modern world and technological applications of modern physics. Each new topic is introduced with a discussion of how various phenomena appear in the real world and the simplifications and assumptions that physicists make in order to understand the underlying physics involved. This approach is particularly good on topics where many experienced instructors will agree that students have special difficulty, such as conservation laws and electric and magnetic fields.

Although mathematics is often referred to as the language of physics, the authors assume very little specialized mathematics knowledge on the part of students aside from basic high school algebra. They take great care to introduce mathematics ideas as needed and weave derivations and formulas into the text in a way that will be easy for students to understand. They do not, however, shrink from more difficult mathematical concepts, integrating these into the text almost seamlessly. This is especially true in their discussion of the Schrödinger equation, which is one of the clearest and most succinct explanations of this topic that I have ever seen in an introductory text.

Physics, the First Science is a book intended for a year long introductory course for non-physics majors and it will certainly work well in that context. The text is easy to read and well organized without being overwhelming for students. In addition, due to its exceptionally clear explanations and readable text, it may also be suitable in a one-semester survey course for non-science majors. I found this book to be a fun read for myself and I would recommend it for use in an introductory physics course.

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