

## COLLEGE PHYSICS



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Putting It All Together

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## PREFACE

What should a student expect to find in a physics textbook? What should be included that the reader will find useful and worth his or her effort? And what things that are commonly included in physics textbooks might effectively be left out? These are the questions that motivated us as we produced this book. We would like to preface our book by stating how it all worked out. We would like to explain what the reader may expect to find and not to find in these pages.

First, most students in general college physics classes will depend on lectures by the professor for the introduction of new material, for explanations of the principles that describe how the universe behaves. But new material will often not be grasped at the first presentation. An important goal of a textbook should be to provide a second look at the principles the student has learned in class. We want to be as clear as we can; we want to get quickly to the point of the principles being taught, without getting off on tangents; but we also want to provide enough background information that the situations where the principles apply are clearly understood.

Second, with an eye to learning where the principles apply, we provide many worked examples in which we use the principles to solve sample problems. But we do not feel that our examples need to explain how to solve all physics problems that the student may ever encounter. On the contrary, the goal of the worked examples is simply to help the reader understand the principles by showing typical ways in which they apply. In particular, students should not expect to be able to read a problem from the back of the chapter and then browse through the worked examples to find one that tells them exactly how to solve their problem. That would mean that we were teaching procedures, not principles.

Third, the path the student should follow through the textbook should be clear. Many textbooks attach boxes and sidebars and web links, places where the reader will find all kinds of supplemental material to their narrative. These provide all kinds of supplemental material, such as biographies of famous physicists, block diagrams showing how to solve certain kinds of problems, summaries of reasoning strategies, concept checks, etc. This often leaves the reader not knowing whether to stop and follow a parallel path or jump forward to stay with the text. We provide a single string to follow. Even when we break the narrative to display a worked example, the example is meant to be read in sequence. It will usually be introduced in the main text and then discussed in the text afterwards.

Fourth, the text should be readable. We find that a more informal style is easier to follow and more interesting. We talk with the reader about the physics. If we find something funny about our subject, we will share it with the reader. If we know of something that is difficult to understand, we will try to summarize and restate it in clear, short sentences.

Fifth, the entire text should be short and to the point. Most textbooks spend pages and pages explaining interesting ways in which the principles of the chapter can be used to understand everyday things as diverse as the tides in the Bay of Fundy or the iridescence of dragonfly wings. We understand why books do this. We, ourselves, are fascinated by these applications and would dearly love to tell you all about them. But it all takes time to read and, truth be told, it does not help the student learn the physics any better or any more quickly. You will find a few such applications in our pages, but only a few.

In summary, let us just say that we have tried to always keep in mind that this book is for you, not for us.