0

QUICK GUIDE

0.1 LIFE IS SHORT

The purpose of this manual

This manual is meant to be a fairly complete discussion of the philosophy behind *Six Ideas That Shaped Physics* as well as a distillation of things those of use teaching the course have learned during more than a decade of experimentation. If you read it all, I think that you will gain a solid understanding of how this course is meant to work and a number of ideas about how to offer a successful *Six Ideas* course.

On the other hand, life is short, and some parts of this manual are definitely more important than others. The purpose of this section is to help you locate these important things quickly and make decisions about what to read.

The most crucial sections

WARNING! Our experience suggests that the course can actually *fail* to work well if you either (1) assign and grade homework in the traditional way, or (2) design a syllabus whose pace is too high for your particular students. If you read nothing else, please read **sections 4.6 and 4.8** about homework, and **section 2.8** about how to pace the course appropriately. This minimum amount of reading will help you avoid the most serious potential problems.

Section 2.2 and the online FAQ page also provide some useful discussion of the chapter overviews, a often misinterpreted feature of the second edition. Read these if you do not understand why I have these overviews.

Chapters 1 and 6 are the most important

I strongly urge you to take the time to read **chapter 1** and **chapter 6** at least. Chapter 1 discusses the basic philosophy of the course, and chapter 6 discusses how one might realize that philosophy in a concrete course structure. Chapters 2 through 5 really provide detailed background for chapter 6, which has a number of backward references that you can use to dig out more information about topics that particularly interest you.

If I were to place the remaining chapters in decreasing order of importance, I would would say read **chapter 3** and **chapter 4** next (about equally important), and then **chapter 2**, then **chapter 7**. **Chapter 5** is relevant only if you are planning to make major changes in your lab program.

The sidebars can help you find information quickly

Note that you can use the sidebars provided throughout the manual to quickly skim over the ideas in any section. This provides you a quick way to determine whether there is something there that you may want to read more carefully. These sidebars also provide a quick way to review a section.

Finally, please do understand that every unusual element of the *Six Ideas* text and the course structure in chapter 6 has a specific logic behind it. Before you throw out, modify, or oppose any element, please take the time to understand why that element is there. You should be able to find the logic behind every element somewhere in this instructor's manual.

0.2 GETTING CONNECTED

Like the course, this instructor's manual is a work in progress. You can learn about corrections and/or extensions to this manual by monitoring the *Six Ideas* web site, whose URL is

The *Six Ideas* web site

`http://www.physics.pomona.edu/sixideas/`

How to access the special instructor's web site

Finally, I will maintain a special instructor's web site for posting information such as problem solutions or example exams and quizzes that I don't want the general public to be able to access. I would also like to know who is using the course, in case I can be helpful, or in case I need to send you e-mail about

some important news. If you will send the following information to me via e-mail (at `tmoore@pomona.edu`):

(1) Your name
(2) Your e-mail address
(3) Your institution
(4) The number of students taking your course
(5) Which units you are using

I will send you information about how to access this special instructor's site.

0.3 ACKNOWLEDGMENTS

Thanks!

A number of people have contributed in important ways to this instructor's manual. Michael Hessling and Van Nguy put in a tremendous amount of effort generating first drafts of problem solutions (a large fraction of the words appearing in the solutions to unit N, E, Q, and T are theirs), and helping me with proofreading and typesetting. Brian Daub and Nate Smith have also contributed to the second edition of this manual. I couldn't have done this manual without them, and I am immensely grateful for their help. Thanks also to Catherine Mader for contributing her cache of solutions. The original ideas lying behind elements of this manual come from many sources (some of which I can no longer remember), but I know that I am indebted to Edwin Taylor, Bruce Sherwood, Lillian McDermott, Priscilla Laws, Eric Mazur, David Hestenes, Arnold Arons, Ron Thornton, David Sokoloff, Alan Van Heuvelen, Richard Hake, Patricia Heller, Sheila Tobias, Fred Goldstein, Daniel Schroeder, Bob Hilborn, Rosanne Di Stefano, Don Holcomb, John Rigden, John Mallinckrodt, Randy Knight, David Tanenbaum, Alfred Kwok, and Alma Zook: thanks to these and to others unnamed. Thanks as well to my editors David Dietz, J. P. Lenney, Spencer Cotkin, and Daryl Bruflodt for guidance, support, patience, and understanding. My parents Stanley and Elizabeth were very supportive and helpful during the final push on first edition of this manual. Finally, thanks to Joyce, Brittany, and Allison for their love and support during this whole project.