

Exercises An average of over a hundred exercises on all levels of difficulty follow each chapter. They are of three kinds, multiple choice, questions, and problems:

- **Multiple Choice** An average chapter has 41 Multiple-Choice exercises (with answers) that act as a quick, painless check on understanding. Correct answers provide reinforcement and encouragement; incorrect ones identify areas of weakness.
- **Exercises** Exercises consist of both questions and problems arranged according to the corresponding text section. Each group begins with questions and goes on to problems. Some of the questions are meant to find out how well the reader has understood the chapter material. Others ask the reader to apply what he or she has learned to new situations. Answers to the odd-numbered questions are given at the back of the book. The physics and chemistry chapters include problems that range from quite easy to moderately challenging. The ability to work out such problems signifies a real understanding of these subjects. Outline solutions (not just answers) for the odd-numbered problems are given at the back of the book.

“The multiple-choice exercises and the questions and problems are a very nice feature of this book and it is definitely above average. . . . There is a good balance between the conceptual versus computational questions.”

—Omar Franco Guerrero, *University of Delaware*

Online Homework and Resources

McGraw-Hill’s *The Physical Universe* website offers online electronic homework along with a myriad of resources for both instructors and students. Instructors can create homework with easy-to-assign algorithmically generated Exercises from the text and the simplicity of automatic grading and reporting. *The Physical Universe*’s end-of-chapter Exercises appear in the online homework system in a variety of open-ended and multiple-choice formats.

Instructors also have access to PowerPoint lecture outlines, the Instructor’s Manual, PowerPoint files with electronic images from the text, clicker questions, quizzes, animations, suggested web links and experiments, and many other resources directly tied to text-specific materials in *The Physical Universe*. Students have access to a variety of self-quizzes, key term matching exercises, animations, web links, and more.

See www.mhhe.com/krauskopf to learn more and register.

Complete Set of Electronic Book Images and Assets for Instructors

Build instructional materials wherever, whenever, and however you want!

150	4-48	Chapter 4	Energy and the Future
			<p>c. sugar cane d. natural gas</p> <p>39. Compact fluorescent lightbulbs are a. more efficient than incandescent bulbs but less efficient than LEDs b. more efficient than incandescent bulbs and about as efficient as LEDs c. more efficient than both incandescent bulbs and LEDs</p> <p>d. about the same in efficiency as incandescent bulbs and LEDs</p> <p>40. Of the following, the strategy for coping with future energy shortages with the most in its favor is to a. burn more coal b. produce more oil from tar sands c. divert more agricultural land to making biofuels d. increase energy efficiency and energy conservation</p>
Exercises			
		4.1	Population and Prosperity
		1.	What are the three main factors that will require changes in today’s patterns of energy production and consumption?
		4.2	Energy Consumption
		2.	Even if the developed countries stabilize or reduce their energy consumption in years to come, worldwide energy consumption will increase. What are the two main reasons for this?
		3.	The average rate of energy consumption per person in the United States is about how many times the world average: twice, three times, four times, over four times?
		4.	List the fossil fuels in the order in which they will probably be used up.
		5.	Explain how sunlight is responsible for these energy sources: food, wood, water power, wind power, fossil fuels
		6.	What energy sources cannot be traced to sunlight falling on the earth?
		4.3	Global Warming
		7.	Approximately what proportion of the world’s population lives on or near coasts and so may be under future threat from rising sea level?
		8.	Give two reasons why global warming is causing sea level to rise.
		9.	Once the polar ice sheets have melted beyond a certain amount, melting will continue even if CO ₂ emissions stop rising. Why?
		10.	The oceans as well as the atmosphere are growing warmer. What does this imply for tropical storms such as hurricanes?
		11.	When was the last time world temperatures were as high as they are likely to be in 2100 if current rates of CO ₂ emission continue: hundreds of years ago, thousands of years ago, millions of
		4.4	Carbon Dioxide and the Greenhouse Effect
		12.	Every body of matter radiates light. What is characteristic of light radiated by something very hot, such as the sun? Of light radiated by something at ordinary temperatures, such as the earth’s surface?
		13.	What is the nature of the greenhouse effect in the earth’s atmosphere?
		14.	List the chief greenhouse gases in the atmosphere. What property do they share?
		15.	About half the CO ₂ from burning fossil fuels enters the atmosphere. What becomes of the rest?
		16.	Why is deforestation so important in global warming?
		17.	List the fossil fuels in the order in which they contribute to world CO ₂ emissions.
		4.5	Liquid Fuels
		18.	What fuel liberates the most energy per gram when it burns? What is produced when it burns?
		19.	Most of the world’s oil is used as a fuel for what purpose?
		20.	How do the oil reserves in tar sands compare with the reserves of ordinary crude oil? What are some of the disadvantages of tar sand oil?
		21.	What methods are available to reduce pollution by car exhausts?
		22.	What are some of the reasons why the average fuel efficiency of cars in the United States is the lowest in the world?
		4.6	Natural Gas
		23.	The amount of CO ₂ emitted per kilowatt-hour of electricity by a gas-fired power plant is about half that emitted by a coal-fired plant. What do you think is the reason that coal-fired plants are much more common?

Accessed from your textbook's website, an online digital library containing photos, artwork, animations, and other media types can be used to create customized lectures, visually enhanced tests and quizzes, compelling course websites, or attractive printed support materials. All assets are copyrighted by McGraw-Hill Higher Education, but can be used by instructors for classroom purposes. The visual resources in this collection include:

- **Art** Full-color digital files of all illustrations in the book can be readily incorporated into lecture presentations, exams, or custom-made classroom materials. In addition, all files are pre-inserted into PowerPoint slides for ease of lecture preparation.
- **Photos** The photos collection contains digital files of photographs from the text, which can be reproduced for multiple classroom uses.
- **Tables and Worked Examples** Tables and Worked Examples that appear in the text have been saved in electronic form for use in classroom presentations and/or quizzes.
- **Animations** Numerous full-color animations illustrating important processes are also provided. Harness the visual impact of concepts in motion by importing these files into classroom presentations or online course materials.

Also residing on your textbook's website are:

- **PowerPoint Lecture Outlines** Ready-made presentations that combine art, animation, and lecture notes are provided for each chapter of the text.
- **PowerPoint Slides** For instructors who prefer to create their lectures from scratch, illustrations, photos, tables, and worked examples from the text are pre-inserted by chapter into blank PowerPoint slides.

Computerized Test Bank Online

A comprehensive bank of test questions is provided within a computerized test bank powered by McGraw-Hill's flexible electronic testing program EZ Test Online (www.eztestonline.com). EZ Test Online allows you to create paper and online tests or quizzes in this easy to use program!

Imagine being able to create and access your test or quiz anywhere, at any time without installing the testing software. Now, with EZ Test Online, instructors can select questions from multiple McGraw-Hill test banks or author their own, and then either print the test for paper distribution or give it online.

Test Creation

- Author/edit questions online using the 14 different question type templates.
- Create printed tests or deliver online to get instant scoring and feedback.
- Create questions pools to offer multiple versions online—great for practice.

- Export your tests for use in WebCT, Blackboard, PageOut, and Apple's iQuiz.
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Online Test Management

- Set availability dates and time limits for your quiz or test.
- Control how your test will be presented.
- Assign points by question or question type with drop down menu.
- Provide immediate feedback to students or delay until all finish the test.
- Create practice tests online to enable student mastery.
- Your roster can be uploaded to enable student self-registration.

Online Scoring and Reporting

- Automated scoring for most of EZ Test's numerous question types.
- Allows manual scoring for essay and other open-response questions.
- Manual rescoring and feedback is also available.
- EZ Test's grade book is designed to easily export to your grade book.
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Support and Help

- User's Guide and built-in page-specific help.
- Flash tutorials for getting started on the support site.
- Support Website—www.mhhe.com/eztest.
- Product specialist available at 1-800-331-5094.
- Online Training: <http://auth.mhhe.com/mpss/workshops/>.

Personal Response Systems

Personal Response Systems (“Clickers”) can bring interactivity into the classroom or lecture hall. Wireless response systems give the instructor and students immediate feedback from the entire class. Wireless response pads are essentially remotes that are easy to use and engage students, allowing instructors to motivate student preparation, interactivity, and active learning. Instructors receive immediate feedback to assess which concepts students understand. Questions covering the content of *The Physical Universe* text and formatted in PowerPoint are available on *The Physical Universe* website.

“I require students to use eInstruction's remotes. I use the remotes to measure whether students have mastered some of the important concepts. . . . I find them very useful—they give me immediate feedback—they allow daily attendance to be taken quickly and rather painlessly.”

—Robert J. Backes, *Pittsburg State University*

“I use the website materials to prepare all my lectures in PowerPoint, since I develop my lectures to my liking. All tests are prepared using

the test bank provided by the publisher. . . . These materials have tremendously lightened my workload. I haven't had to re-invent the wheel so to speak. I can change my exams every semester and shuffle my answers from class to class. Well done."

—Colley Baldwin, *Medgar Evers College, CUNY*

Student Study Guide

Another helpful resource can be found in *The Physical Universe Student Study Guide*. With this study guide, students will maximize their use of *The Physical Universe* text package. It supplements the text with additional, self-directed activities and complements the text by focusing on the important concepts, theories, facts, and processes presented by the authors.

Primis Online

This text can be customized in print or in an electronic format to meet exact course needs. McGraw-Hill's Primis Online allows instructors to select desired chapters and preferred sequence and to choose supplements from the many science items on our database. Visit <http://www.primiscontentcenter.com/> to begin today.

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