Visualizing Nutrition
Everyday Choices

Fourth Edition

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How Is Wiley Visualizing Different?

Wiley Visualizing is based on decades of research on the use of visuals in learning.[1] The visuals teach key concepts and are pedagogically designed to **explain, present, and organize** new information. The figures are tightly integrated with accompanying text; the visuals are conceived with the text in ways that clarify and reinforce major concepts, while allowing students to understand the details. This commitment to distinctive and consistent visual pedagogy sets Wiley Visualizing apart from other textbooks.

Wiley Visualizing texts offer an array of remarkable photographs, maps, media, and film from photo collections around the world. Visualizing images are not decorative, which can often be distracting to students, but purposeful and the primary driver of the content. These authentic materials immerse the student in real-life issues and experiences and support thinking, comprehension, and application.

Together these elements deliver a level of rigor in ways that maximize student learning and involvement. Wiley Visualizing has proven to increase student learning through its unique combination of text, photographs, and illustrations, with online video, animations, simulations, and assessments.

1. **Visual Pedagogy.** Using the Cognitive Theory of Multimedia Learning, which is backed up by hundreds of empirical research studies, Wiley's authors create visualizations for their texts that specifically support students' thinking and learning. For example, visuals help students identify important topics, organize new information, and integrate new material with prior knowledge.
2. **Authentic Situations and Problems.** *Visualizing Nutrition: Everyday Choices, 4e* offers an array of remarkable photographs, maps, and media. These materials immerse the student in real-life issues related to nutrition and thereby enhance interest, learning, and retention.[2]
3. **Designed with Interactive Multimedia.** *Visualizing Nutrition: Everyday Choices, 4e* is tightly integrated with WileyPLUS, our online learning environment that provides interactive multimedia activities in which learners can actively engage with the materials. The combination of textbook and *WileyPLUS* provides learners with multiple entry points to the content, giving them greater opportunity to explore concepts and assess their understanding as they progress through the course. *WileyPLUS* is a key component of the Wiley Visualizing learning and problem-solving experience. This sets Wiley Visualizing apart from other textbooks whose online component are mere drill-and-practice.

Visualizing Nutrition and *WileyPLUS* are designed to be a natural extension of how we learn

To understand why the Visualizing approach is effective, it is first helpful to understand how we learn.

1. Our brain processes information using two main channels: visual and verbal. Our *working memory* holds information that our minds process as we learn. This "mental workbench" helps us with decisions, problem-solving, and making sense of words and pictures by building verbal and visual models of the information.
2. When the verbal and visual models of corresponding information are integrated in working memory, we form more comprehensive, lasting, mental models.
3. When we link these integrated mental models to our prior knowledge, stored in our *long-term memory*, we build even stronger mental models. When an integrated (visual plus verbal) mental model is formed and stored in long-term memory, real learning begins.

The effort our brains put forth to make sense of instructional information is called *cognitive load*. There are two kinds of cognitive load: productive cognitive load, such as when we're engaged in learning or exert positive effort to create mental models; and unproductive cognitive load, which occurs when the brain is trying to make sense of needlessly complex content or when information is not presented well. The learning process can be impaired when the information to be processed exceeds the capacity of working memory. Well-designed visuals and text with effective pedagogical guidance can reduce the unproductive cognitive load in our working memory.

[1] Mayer, R.E. (Ed) (2005). *The Cambridge Handbook of Multimedia Learning.* Cambridge University Press.

[2] Donovan, M.S., & Bransford, J. (Eds.) (2005). *How Students Learn: Science in the Classroom.* The National Academy Press. Available at http://www.nap.edu/openbook.php?record_id=11102&page=1

New To This Edition

As the science of nutrition evolves, *Visualizing Nutrition: Everyday Choices* continues to evolve with it. This fourth edition includes the most up-to-date nutrition topics and recommendations along with many new photographs, new and improved illustrations, and enhanced critical thinking pedagogy.

- **Updated information:** The entire text has been updated and re-referenced to reflect the most recent nutrition science and guidelines. Topics at the forefront of today's nutrition landscape such as the impact of our food environment on diet, the role of the gut microbiome, newly recognized gluten sensitivities, and the protein needs of athletes have been added or expanded. New feature topics, reflecting the most current issues, have replaced older ones. For example, a new *Debate* in Chapter 4 addresses the impact of sugar on health and new *What a Scientist Sees* features in Chapters 5, 8, 13, and 14 discuss how eggs fit into a healthy diet, hidden sources of dietary sodium, the impact of cured meat on cancer risk, and growing concerns about food waste, respectively.
- **Organization of Micronutrients:** The presentation of the vitamins in Chapter 7 and the minerals in Chapter 8 has been reorganized into functional groupings. Although vitamins and minerals are still discussed in separate chapters, vitamins have been grouped based on their role in energy metabolism, blood health, antioxidant function, and gene expression and minerals have been grouped based on their roles as electrolytes, in bone health, as antioxidants, in blood health, and in energy metabolism. This organization makes it easier for students to identify, understand, and recall nutrient functions.
- **New Guidelines for Nutrition and Athletic Performance:** Recently published guidelines on nutrition and athletic performance have replaced older recommendations in Chapter 10. Students are guided through recommendations on the type, amount, and timing of intake of food, fluids, and supplements to support health and optimize exercise performance in casual and competitive sport.
- **New Food Label Legislation:** The Food Labeling Modernization Act of 2013 has been passed by Congress but has not yet been fully implemented. Therefore, both the current and the planned food labeling information are presented. Coverage of this topic in Chapter 2 compares the current Nutrition Facts label with the planned labels; they are compared and contrasted in discussions of specific nutrients in subsequent chapters.
- **Improved Thinking it Through Exercises:** These critical thinking case study exercises have been updated to be more effective in promoting critical thinking. The questions have been refined to make them more specific and to better emphasize current nutrition goals and the cases have been modified to help students more effectively navigate the obstacles in our unhealthy food environment.
- **Enhanced Visual Leaning:** To optimize the use of visuals that stimulate and enhance learning, many photos have been replaced and illustrations replaced or revised. Students see the most up-to-date information in new and updated graphs, charts, and maps. New photos in the *What Is Happening in This Picture* features in Chapters 1 and 12 focus on our food environment. In Chapter 3 new art helps students better understand the intestinal microbiota and how it affects health. In Chapter 5 a *Nutrition Insight* about fatty acid structures has been reorganized to more effectively show the relationship between different categories of fatty acids, in Chapter 6 a new illustrated table helps students visually distinguish different types of vegetarian diets, and in Chapter 10 a new figure illustrates relative energy deficiency in sport and its relationship to the female athlete triad.
- **Online Features:** Each chapter is supported by a variety of online features. *Food for Thought* videos by Laura Christoph accompany each chapter; these include chapter opening clips and summaries, as well as chapter-based topics, which help students to *Understand the Science* behind nutrition and how *Everyday Choices* impact their health. The *Video Bites* series, developed in collaboration with the authors, features student-focused sketches that explore the impact of day-to-day nutrition choices using real-life scenarios. Each video examines a topic germane to one or more chapters and blends up-to-date information with humor to pique student interest, address misconceptions, and spark discussion. Animations, Games, Interactivities, Audio clips and iProfile with accompanying Case Studies support each chapter and enhance the visual learning aspect of this title. End of chapter student support materials, such as the Critical and Creative Thinking Questions, Self-Tests, Appendices and links to Additional Resources have also been moved to an online format. Gradable Concept Check questions are a new online feature for this edition. Concept Questions apply to each learning objective and provide students with instant feedback on their understanding of the content.
- **Nutrition and Disease Presentation:** Nutrition-related disease topics, such as diabetes and heart disease, have always been integrated throughout the *Visualizing Nutrition* texts. For those who require slightly more in-depth coverage of disease topics, want to cover it as a single topic, or who want help integrating the role of nutrition in promoting health and preventing disease, a new separate chapter called *Focus on Nutrition and Disease* is available online. As with Metabolism (see online chapter *Metabolism: Energy for Life)*, material presented in the text has been consolidated and topics such as nutrition and the immune response and the pathophysiology of various non-communicable diseases have been expanded.

How Does Wiley Visualizing Support Instructors?

Wiley Visualizing Site

Wiley Visualizing The Wiley Visualizing site hosts a wealth of information for instructors using Wiley Visualizing, including ways to maximize the visual approach in the classroom and a white paper titled "How Visuals Can Help Students Learn," by Matt Leavitt, instructional design consultant. Visit Wiley Visualizing at www.wiley.com/college/visualizing.

Wiley Custom Select

Wiley Custom Select Wiley Custom Select gives you the freedom to build your course materials exactly the way you want them, offering your students a cost-efficient alternative to traditional texts. In a simple three-step process create a solution containing the content you want, in the sequence you want, delivered how you want. Visit Wiley Custom Select at http://customselect.wiley.com.

PowerPoint Presentations

(available in *WileyPLUS* and on the book companion site)

A complete set of highly visual PowerPoint presentations—one per chapter—by Stephanie Colavita, Montclair State University, is available online and in WileyPLUS *Learning Space* to enhance classroom presentations. Tailored to the text's topical coverage and learning objectives, these presentations are designed to convey key text concepts, illustrated by embedded text art.

Test Bank

(available in *WileyPLUS* and on the book companion site)

The visuals from the textbook are also included in the Test Bank by Jennifer Zimmerman, Tallahassee Community College. The Test Bank has approximately 80 questions per chapter, many of which incorporate visuals from the book. The test items include multiple-choice and essay questions testing a variety of comprehension levels. The test bank is available online in MS Word files, as a Respondus Test Bank, and within *WileyPLUS*. The easy-to-use test-generation program fully supports graphics, print tests, student answer sheets, and answer keys. The software's advanced features allow you to produce an exam to your exact specifications.

Instructor's Manual

(available in *WileyPLUS* and on the book companion site)

The Instructor's Manual includes in class activities, an outline of WileyPLUS resources to utilize for each chapter, and discussion questions.

Nutrition Bytes Blog

(available in *WileyPLUS* and on the book companion site)

The Nutrition Bytes Blog provides an ongoing dialogue of trending topics and controversies in nutrition that spark discussion, highlight the relevance of nutrition in our lives, and encourage critical thinking. Nutrition Bytes is accessible on mobile devices and available from both the student and instructor companion sites, as well as within *WileyPLUS*. The blog is written by Katie Ferraro, University of California, San Francisco, and updated on a weekly basis, ensuring that discussions focus on the most current and relevant issues in nutrition. Blogs are searchable for topics of interest and students and instructors can join the discussion by posting their own comments. Users can subscribe to the newsfeed, which will automatically add it to their Favorites Center and be kept up to date.

Book Companion Site

All instructor resources (the Test Bank, Instructor's Manual, PowerPoint presentations, and all textbook illustrations and photos in jpeg format) are housed on the book companion site (www.wiley.com/college/grosvenor). Student resources include self-quizzes, glossary and flashcards, Nutrition Bytes Blog, and reference materials.

How Does *WileyPLUS* Support Instructors and Students?

WileyPLUS is designed for personalized, active learning. Several resources are available for instructors and students within *WileyPLUS*.

Hear This Illustration Audio Tutorials

Select figures in each chapter are accompanied by audio that narrates and discusses the important elements of that particular illustration. All audio files are accompanied by downloadable scripts of the narration.

Nutrition Interactivities

The fourth edition of *Visualizing Nutrition* includes nutrition activities for student practice. Each activity is embedded within the e-book so that students can practice as they are learning the content. Activities include food source identification drag-n-drop exercises for the macro- and micro-nutrient chapters and calculating and critical thinking activities that ask students to compute caloric intake and percent RDA. These types of exercises include informative feedback about the health consequences of specific nutrient toxicities or deficiencies.

Create-a-Plate and Revise-a-Recipe Activities

Each chapter includes an activity that asks students to create a balanced meal or snack to meet specific nutrient recommendations, incorporating MyPlate guidelines. Students can also practice altering meals by substituting foods with healthier choices.

Videos

Visualizing Nutrition contains multiple libraries of videos (such as the *Video Bites, Food for Thought,* and CBS/BBC video series), which focus on topics that pique student interest. Videos address current topics and discussions in nutrition, such as gluten-related disorders and our obesogenic environment. Many of these videos can be used as discussion tools, or can be assigned through *WileyPLUS* with gradable accompanying assessments. All videos have closed captioning for the hearing-impaired.

iProfile Mobile

The iProfile dietary analysis program now contains a database of over 50,000 foods and is available as a mobile-enabled website. Students can enter their food intakes and activities into their journal on the go via their smartphones and tablets. iProfile is also available, with additional functionality, fully integrated with *WileyPLUS*. *WileyPLUS* includes a few types of assessments around iProfile, including computer graded iProfile Dietary Analysis Exercises in Chapters 4 through 9, written by Lori A. Smolin and Mary B. Grosvenor. These exercises ask students to analyze and modify a diet in relation to the specific nutrients discussed in the chapter. iProfile Case Study Assignments are also available in every chapter, which have students focus on a specific nutritional concept related to that chapter's content. Students can analyze the impact of different food and activity choices using iProfile reports.

Personalized Practice

ORION adaptive practice exercises meet students at just above their level in order to keep them challenged, but not frustrated. ORION adaptive practice assesses student understanding at the objective level. All students begin with a unique, short diagnostic quiz that establishes a baseline from which each student develops his own unique path. Adaptive practice includes extensive actionable reports that focus student study in key areas individual to each learner. Our rich question database contains nearly 6000 questions at every level of difficulty and all Bloom's levels.

Mobile Enabled Assets

All of the key resources students need to succeed in their nutrition course are now accessible on mobile devices. These include the How It Works, Estimating Portion Sizes, and MyPlate animations. Also mobile are the Nutrition Interactivities, Create-a-Plate and Revise-a-Recipe activities, and Interactive Process Diagrams.

How Has Wiley Visualizing Been Shaped by Contributors?

Instructor Contributions

Throughout the process of developing this edition, we benefited from the comments and constructive criticism provided by the instructors and colleagues listed below. We offer our sincere appreciation to these individuals for their helpful reviews, invaluable contributions to the online resources, and continued involvement with the Wiley nutrition program:

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- Special thanks to John Ambrose for providing a fresh eye to the material through the *Video Bites* series and updated chapter introductions for this new edition. We appreciate his "non-nutritionist" view of the science we know too well.
- We are extremely grateful to the many members of the editorial and production staff at John Wiley & Sons who guided us through the challenging steps of developing this text. Their tireless enthusiasm, professional assistance, and endless patience smoothed the path as we found our way. We thank in particular Senior Editor, Alan Halfen, for his support and for developing new ways to ensure this edition's success; and Trish McFadden, Senior Production Editor, who guided the production process. Our sincere thanks also go to Petra Recter, Vice President and Director, who oversaw the entire project; Kristine Ruff, Market Development Manager, who adeptly represents the Visualizing imprint; and Lauren Elfers for her continued support in the many roles she has played throughout this project. We appreciate the expertise of Mary Ann Price, Senior Photo Editor, in managing and researching our photo program. We are grateful to MaryAlice Skidmore, Editorial Assistant for helping to bring this project to fruition. And thanks to Development Editor, Melissa Edwards Whelan, for guiding us through the development of this text and its ancillary materials and to Jeanine Furino for keeping us on schedule through the perils of production.

About the Authors

MARY B. GROSVENOR holds a bachelor of arts in English and a master of science in Nutrition Science, affording her an ideal background for nutrition writing. She is a Registered Dietitian and has worked in clinical as well as research nutrition, in hospitals and communities large and small in the western United States. She has taught at the community college level and has published articles in peer-reviewed journals in nutritional assessment and nutrition and cancer. Her training and experience provide practical insights into the application and presentation of the science in this text.

LORI A. SMOLIN received a bachelor of science degree from Cornell University, where she studied human nutrition and food science. She received a doctorate from the University of Wisconsin at Madison, where her doctoral research focused on B vitamins, homocysteine accumulation, and genetic defects in homocysteine metabolism. She completed postdoctoral training both at the Harbor–UCLA Medical Center, where she studied human obesity, and at the University of California—San Diego, where she studied genetic defects in amino acid metabolism. She has published articles in these areas in peer-reviewed journals. Dr. Smolin is currently at the University of Connecticut, where she has taught both in the Department of Nutritional Science and in the Department of Molecular and Cell Biology. Courses she has taught include introductory nutrition, life cycle nutrition, food preparation, nutritional biochemistry, general biochemistry, and introductory biology.

Dedication

To my sons, David and John, and my husband, Peter. In the beginning, their contribution was support and patience with my long hours but over the years it has grown to include editing and writing as well. Thanks for helping me keep balance in my life.

(from Mary Grosvenor)

To my sons, Zachary and Max, who have grown up along with my textbooks, helping me to keep a healthy perspective on the important things in life. To my husband, David, who has continuously provided his love and support and is always there to assist with computer, technological, and life issues that arise.

(from Lori Smolin)

Letter to Students

Dear Students,

Everybody eats. So, we all have some basic understanding of nutrition: We need food to survive. We see that different foods affect our bodies in different ways and that not everybody responds to the same diet in the same way. And we see nutrition information all around us.

Never has the discussion of nutrition been more present in our own lives. It seems like we have access to an endless well of stirring documentaries about food, major news stories focus on nutrition, and advertisements about food and nutrition litter all forms of media. More and more young people are making conscious choices about their diets, whether it's to boycott GMOs or choose an atypical diet like veganism. Regardless of your personal choices one thing is clear: People are asking more questions than ever before. This is where we step in.

Our goal in writing *Visualizing Nutrition: Everyday Choices* is to provide you with a context to understand nutrition science as well as the sociocultural impact of food and nutrition. We are not here to provide simple answers to complex questions. We want to be part of the conversation. Our approach, which uses understandable explanations, debates, critical thinking exercises, visuals, videos, and online assessment tools, supports all learning styles. The clear, concise writing style —reinforced with colorful, engaging illustrations and photographs—makes the science user-friendly. And our critical thinking approach avoids vague hypotheticals and invites you to engage with the text by placing discussed topics into real-world situations.

Visualizing Nutrition: Everyday Choices helps you not only learn about how certain foods affect your health, but also gain an understanding of how your body processes the foods you choose to consume and how those choices present themselves in your day-to-day life. By helping you understand the "whys" and "hows," we hope we can satisfy and encourage your growing curiosity about nutrition in whatever direction it takes you, whether that means making more informed choices about your own diet and lifestyle, helping others do the same, or even pursuing a career within the field.

Brief Contents

Contents