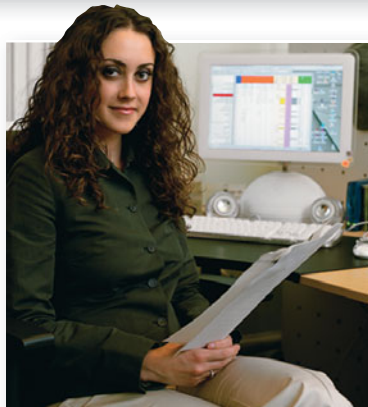


Connecting Students to Today's Nutrition



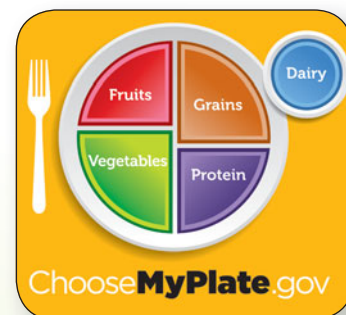
Our Intended Audience

This textbook was developed for students pursuing nutrition and health science careers as well as those wanting a better understanding of how nutrition affects their lives. Because this course often attracts students from a broad range of majors, we have been careful to include examples and explanations that are relevant to them and to include sufficient scientific background to make the science accessible to them. The appendices help students who wish to learn more or need assistance with the science involved in human physiology, chemistry, and metabolism.

To better bridge the span of differing science backgrounds and to enhance student interest and achievement of course objectives, we organized the presentation of the material within chapters to flow seamlessly from concrete to abstract learning. In chapters focusing on nutrients, for example, concrete concepts, such as food sources of the nutrients and recommended intakes, are introduced early in the chapter to create a framework for more abstract concepts, such as digestion and absorption.

Accurate, Current Science that Engages Students

A key goal of this text is to present scientific content that is reliable, accurate, and up-to-date. This text incorporates coverage of recent nutrition research, as well as the recent updates to consumer guidelines—Dietary Guidelines for Americans 2010, MyPlate, and *Healthy People 2020*. It also provides the in-depth coverage students need to fully understand and appreciate the role of nutrition in overall health and to build the scientific knowledge base needed to pursue health-related careers or simply live healthier lives. To enhance these strengths and promote greater comprehension, current research findings and peer-reviewed references are incorporated along with artwork that complements the discussions. The presentation of complex concepts was scrutinized to ensure that they are presented using clear, streamlined, precise, and student-friendly language. Timely and intriguing examples, illustrative analogies, clinical insights, historical notes, and thought-provoking photos make the text enjoyable and interesting to students and instructors alike.



Up-to-date Guidelines

HISTORICAL PERSPECTIVE

The Vitamin Alphabet

Diet greatly affects health—but scientific knowledge supporting this fact began emerging just 100 years ago. Elmer McCollum played a key role in establishing the link between diet and health. His work, starting in the early 1900s, led to the discovery of the first known fat-soluble vitamin, later called vitamin A. By varying the diets of small animals, he discovered “vitamin B” and then demonstrated that it is really several different B vitamins, such as thiamin, riboflavin, and niacin. He also discovered vitamin D and the role of sodium, potassium, calcium, and many other minerals in nutrition. McCollum and colleagues established the first experimental rat colony for nutrition research and proposed the alphabetical naming of vitamins still in use today. Learn more about this biochemist at www.jbc.org/content/277/19/e8.full

Expert Perspective from the Field

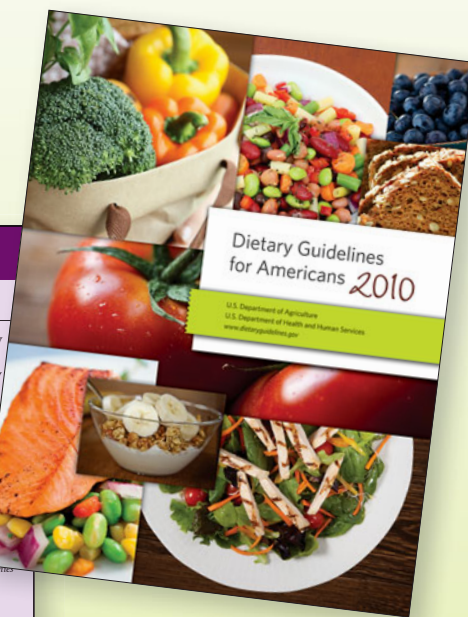
Omega-6 Fatty Acids: Harmful or Healthful?

Omega-6 fatty acids are essential fatty acids used to produce a wide array of eicosanoids. Linoleic acid is the main omega-6 fatty acid in the diet, accounting for about 90% of total polyunsaturated fat intake. For some time, it was thought that linoleic acid played a key role in the production of eicosanoids that cause inflammation and, as a result, promoted the onset and progression of heart disease. However, new evidence indicates that omega-6 intake has little effect on the production of these inflammatory eicosanoids. Additionally, the eicosanoids that are produced from omega-6s can be converted into a variety of anti-inflammatory or pro-inflammatory compounds. According to Dr. Penny Kris-Etherton,* all metabolites derived from omega-6 fatty acids need to be considered when evaluating their health benefits.¹⁵

Dr. Kris-Etherton also points out that several studies have reported that low omega-6 intakes were associated with an increased risk of heart disease and that replacing saturated fat with

omega-6 fatty acids reduced that risk. She stated, “Omega-6 fatty acids have independent cholesterol-lowering properties beyond the simple removal of saturated fats.” Omega-6 fatty acids clearly provide health benefits. For instance, replacing saturated fatty acids with omega-6s reduces heart disease risk.³⁰ For optimal heart health, the American Heart Association recommends that omega-6 fatty acid intake account for at least 5 to 10% of caloric intake. Reducing omega-6 intake below this level likely would increase the risk of heart disease.³¹

*Penny Kris-Etherton, PhD, RD is Distinguished Professor of Nutrition in the Department of Nutritional Sciences at Pennsylvania State University and a Fellow of the American Heart Association. She is the recipient of the Lederle Award for Human Nutrition Research from the American Society for Nutritional Sciences and the Foundation Award for Excellence in Research and the Marjorie Balitzer Gopher Award from the American Dietetic Association (now called Academy of Nutrition and Dietetics). She has served on the National Academies Panel on Macronutrients, American Heart Association Nutrition Committee, National Cholesterol Education Program Second Adult Treatment Panel, and the 2005 Dietary Guidelines for Americans Advisory Committee.



Current Research


Connecting with a Personal Focus

Applying Nutrition on a Personal Level

A key objective in nearly all introductory courses is for students to apply their new knowledge of nutrition to their own lives. Practical applications clearly linked to nutritional science concepts are woven throughout each chapter to help students apply their knowledge to improving and maintaining their own health and that of others for whom they are responsible, such as future patients or offspring.

- **Take Action** features in each chapter allow students to examine their own diets and health issues.
- **Case studies** showcase realistic scenarios and thought-provoking questions.
- Discussion of the Nutritional Care Process (Ch. 1) outlines for students the benefits of working with a nutrition professional to improve their health and diet.

CHAPTER 5 Carbohydrates 167

Take Action

Estimate Your Fiber Intake

To roughly estimate your daily fiber consumption, determine the number of servings that you ate yesterday from each food category listed here. Multiply the serving amount by the value listed and then add up the total amount of fiber.

Food	Servings	Grams
Vegetables (Serving size: 1 cup raw leafy greens or ½ cup cooked)		
Fruits (Serving size: 1 whole fruit; ½ grapefruit, or cubed fruit; ¼ cup dried fruit)		
Beans, lentils, split peas (Serving size: ½ cup cooked)		


CASE STUDY



Charles, a college student, has noticed that his pants are getting hard to button. A quick check on the scale in the gym confirms a 7-pound weight gain over the last 12 weeks. The main change in Charles's diet is his alcohol intake—he now typically drinks 5 or 6 12-ounce beers on Friday and Saturday nights and drinks another 3 or 4 beers during the week. How many extra calories per week is Charles consuming? If each pound of weight gain results from a surplus of 3500 kcal, can Charles's weight gain be explained by his beer consumption?

Applying Nutrition to Career and More

- **Expert Perspectives from the Field** features examine cutting-edge topics and demonstrate how emerging, and sometimes controversial, research results affect nutrition knowledge and practice.
- **Medical Perspective** features highlight the role of nutrition in the prevention and treatment of disease. These topics will be especially interesting to students planning careers in dietetics or health-related fields.
- **Global Perspective** features discuss concepts related to critical health and nutrition issues around the world. These timely features also aim to engage students with thought-provoking challenges.
- **Historical Perspective** features heighten awareness of critical discoveries and events that have affected our understanding of nutritional science.
- Each major heading in the chapters is numbered and cross-referenced to the end-of-chapter summary and study questions to make it easy to locate and prioritize important concepts.



Expert Perspective from the Field

Taxing Sugar-Sweetened Beverages

Many nutrition and health experts are concerned about the increase in consumption of sugar-sweetened beverages over the last few decades. For example, the intake of these beverages doubled between 1990 and 2000, and this increase added an extra 175 calories to our diet each day. Sugar-sweetened beverages are associated with an increased risk of obesity, diabetes, and heart disease. To reduce intake and raise money for nutrition programs, researchers, such as Dr. Kelly Brownell, are proposing to tax these beverages.³⁸ Dr. Brownell estimates that a tax of 1 cent per ounce of sugar-sweetened beverages could generate about \$15 million annually for each state.




MEDICAL PERSPECTIVE

Foodborne Illness Can Be Deadly

Foodborne illness often means a few hours or even a few days of discomfort on its own. In some cases, however, illness causes more serious complications that can have lifelong effects. For example, infants and young children who are born with immune systems that are weakened by their mothers' use of antibiotics during pregnancy are at a higher risk of developing foodborne illness. Listeriosis, *Listeria monocytogenes* bacteria cause foodborne illness, is a particularly serious foodborne illness. Recovery can take several weeks.

HISTORICAL PERSPECTIVE

A Treasure Chest Full of Vitamin C



Vitamin C, the substance that prevents scurvy, eluded us until about 80 years ago, when chemist Albert Szent-Györgyi was studying oxidation. He found a compound that loses and regains hydrogen atoms and later established that it prevents scurvy. To continue his work, he searched for vitamin C-rich foods that could be easily purified. One evening when he was living in Hungary, the paprika capital of the world, Szent-Györgyi didn't feel hungry, so he took the fresh paprika he was served for dinner to his lab and within hours knew he had found "a treasure chest full of vitamin C." He also identified the proteins responsible for muscle contraction and demonstrated that ATP is the immediate source of energy for muscle contraction. Learn more about this Nobel Prize winner at www.nobelprize.org/nobel_prizes/medicine/laureates/1937/szent-gyorgyi-bio.html.



GLOBAL PERSPECTIVE

How big is your footprint?

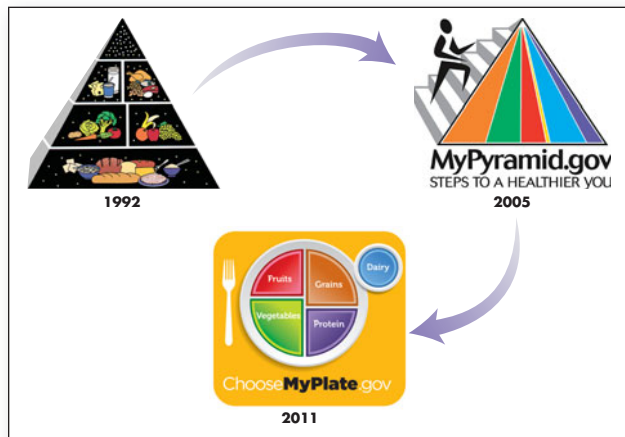
Growing evidence indicates that what we eat may affect not only our personal health but also that of the environment. Many scientists believe that meat-rich diets and the agricultural practices that support the production of food for these diets negatively affect the environment. For instance, producing food for nonvegetarian diets (especially beef-based diets) uses more water, fossil fuel energy, fertilizer, pesticides, and acres of farmland than vegetarian diets.²⁹ Meat-rich diets also cause greater emissions of greenhouse gases, such as carbon dioxide, methane, and nitrous oxide, which are associated with global warming.³⁰ Scientists are concerned that continued global warming may, in turn, decrease agricultural productivity, reduce farmers' incomes, and increase global food insecurity.³¹

Not all scientists agree with these findings and concerns, however. Some believe that consuming a small amount of dairy and/or meat may actually increase land use efficiency, thereby protecting environmental resources and promoting food security.³² They point out that high-quality farmland is required to grow fruits, vegetables, and grains, whereas meat and dairy products can be produced on the more widely available, lower-quality land. Even though diets containing meat use more land, they also produce a greater amount of high-quality protein per acre. It is important to note that the different methods of producing food have different environmental impacts.

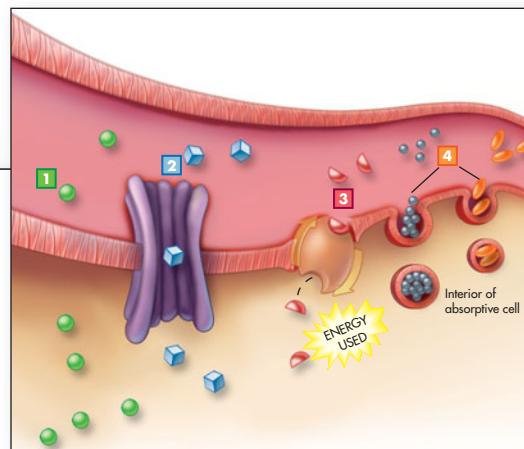
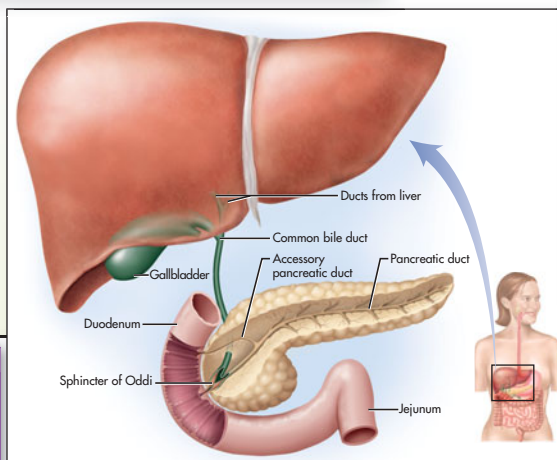
Making Visual Connections

Dynamic, Accurate Artwork

More than 1000 drawings, photographs, and tables in the text were created and critically analyzed to identify how each could be enhanced and refined to help students more easily master complex scientific concepts.



- Many illustrations were designed to inspire student inquiry and comprehension and to promote interest and retention of information.
- Illustrations use bright colors and an attractive, contemporary style. Throughout the development process, illustrations were fine-tuned to make them clear and easy to follow. Navigational aids show where a function occurs and put it in perspective of the whole body.



Balancing calories to manage weight

- Prevent and/or reduce overweight and obesity through improved eating and physical activity behaviors.
- Control total calorie intake to manage body weight. For people who are overweight or obese, this will mean consuming fewer calories from foods and beverages.
- Increase physical activity and reduce time spent in sedentary behaviors.
- Maintain appropriate calorie balance during each stage of life—childhood, adolescence, adulthood, pregnancy and breastfeeding, and older age.

- Consume less than 10% of calories from saturated fatty acids by replacing them with monounsaturated and polyunsaturated fatty acids.
- Consume less than 300 mg per day of dietary cholesterol.
- Keep trans fatty acid consumption as low as possible by limiting foods that contain synthetic sources of trans fats, such as partially hydrogenated oils, and by limiting other solid fats.
- Reduce the intake of calories from solid fats and added sugars.
- Limit the consumption of foods that contain refined grains, especially refined grain foods that contain solid fats, added sugars, and sodium.
- If alcohol is consumed, it should be consumed in moderation—up to 1 drink per day for women and 2 drinks per day for men—and only by adults of legal drinking age. There are many circumstances in which people should not drink alcohol:
 - Individuals who cannot restrict their drinking to moderate levels.
 - Anyone younger than the legal drinking age. Besides being illegal, alcohol consumption increases the risk of drowning, car accidents, and traumatic injury, which are common causes of death in children and adolescents.
 - Women who are pregnant or who may be pregnant. Drinking during pregnancy, especially in the first few months of pregnancy, may result in negative behavioral or neurological consequences in the offspring. No safe level of alcohol consumption during pregnancy has been established.
 - Individuals taking prescription or over-the-counter medications that can interact with alcohol.
 - Individuals with certain specific medical conditions (e.g., liver disease, hypertirglycemia, pancreatitis).
 - Individuals who plan to drive, operate machinery, or take part in other activities that require attention, skill, or coordination or in situations where impaired judgment could cause injury or death (e.g., swimming).

Foods and food components to increase

Individuals should meet the following recommendations in healthy eating pattern while staying within needs.

- Increase intake of vegetables, especially dark-green and red and orange vegetables and beans and peas.
- Consume at least half of all grains as whole grains. Increase whole-grain intake by replacing refined grains with whole grains.
- Increase intake of fat-free or low-fat milk and milk products, such as milk, yogurt, cheese, or fortified soy beverages.
- Choose a variety of protein foods, which include seafood, lean meat and poultry, eggs, beans and peas, soy products, and unsalted nuts and seeds.
- Increase the amount and variety of seafood consumed by choosing seafood in place of some meat and poultry.
- Replace protein foods that are higher in solid fats with choices that are lower in solid fats and calories and/or are sources of oils.
- Use oils to replace solid fats where possible.
- Choose foods that provide more potassium, dietary fiber, calcium, and vitamin D, which are nutrients of concern in American diets. These foods include vegetables, fruit, whole grains, and milk products.

Recommendations for specific population groups

Women capable of becoming pregnant

- Choose a foods that supply heme iron, which is more readily absorbed by the body, additional iron sources, and enhancers of iron absorption such as vitamin C-rich foods.
- Consume 400 micrograms (µg) per day of synthetic folic acid (from fortified foods and/or supplements) in addition to food forms of folate from a varied diet.

Women who are pregnant or breastfeeding

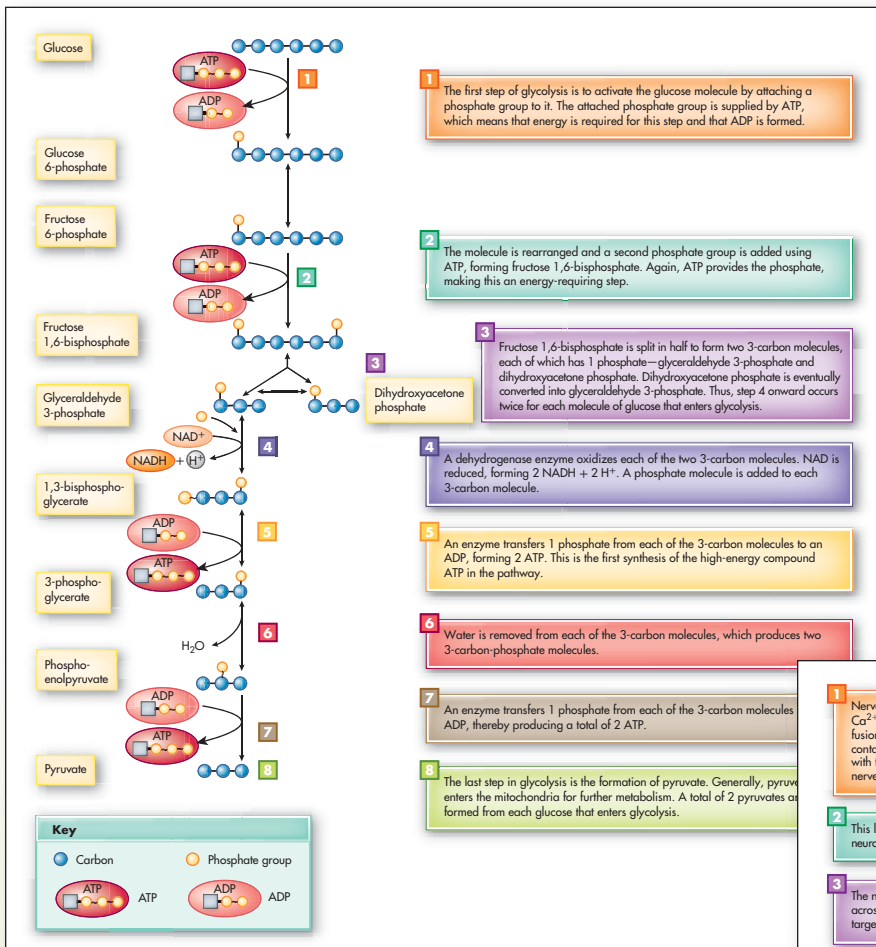
- Consume 8 to 12 ounces of seafood per week from a variety of seafood types.
- Due to their high methyl mercury content, limit white (albacore) tuna to 6 ounces per week and do not eat the following 4 types of fish: tilefish, shark, swordfish, and king mackerel.
- If pregnant, take an iron supplement, as recommended by an obstetrician or other health-care provider.

Individuals ages 50 years and older

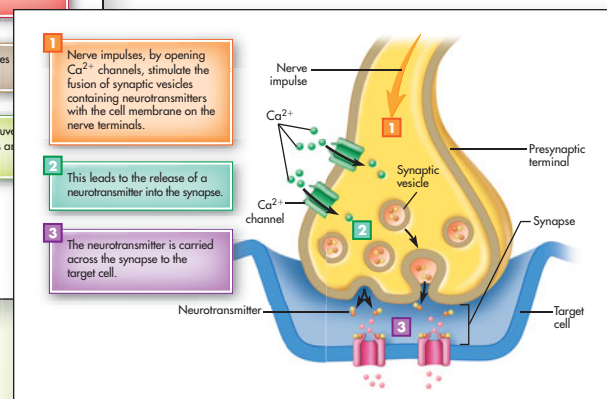
- Consume foods fortified with vitamin B-12, such as fortified cereals, or dietary supplements.

Building healthy eating patterns

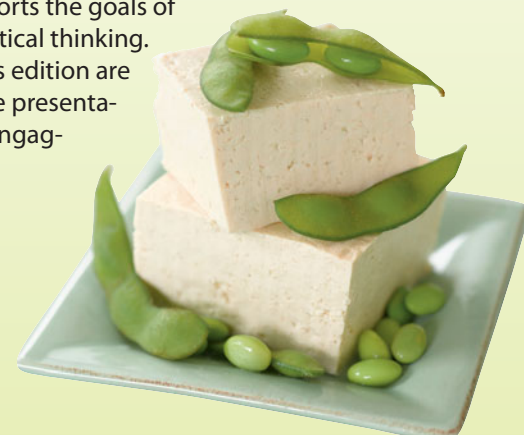
- Select an eating pattern that meets nutrient needs over time at an appropriate calorie level.
- Account for all foods and beverages consumed and assess how they fit within a total healthy eating pattern.
- Follow food safety recommendations when preparing and eating foods to reduce the risk of foodborne illnesses.



- Coordinated color schemes and drawing styles keep presentations consistent and strengthen the educational value of the artwork. Color-coding and directional arrows in figures make it easier to follow events and reinforce interrelationships.
- In many figures, process descriptions appear in the body of the figure. This pairing of the action and an explanation walks students step-by-step through the process and increases the teaching effectiveness of these figures.
- Intriguing chapter opening photos pique students' curiosity by featuring seemingly unrelated topics that draw connections between the photo and nutrition.



Finally, a careful comparison of artwork with its corresponding text was done to ensure that they are completely coordinated and consistent. The final result is a striking visual program that holds readers' attention and supports the goals of clarity, ease of comprehension, and critical thinking. The attractive layout and design of this edition are clean, bright, and inviting. This creative presentation of the material is geared toward engaging today's visually oriented students.



Connections that Suit Your Needs

Logical Organization, Flexible Sequencing

This new text, with a functional organization of the vitamins and minerals, is an alternate version of the highly successful *Wardlaw's Perspectives in Nutrition*. Vitamins and minerals can often be a challenge for students, and they end up simply memorizing each vitamin and mineral and their characteristics. This functional approach presents vitamins and minerals organized by their function so that students can make the connections to their effects on the body.

This text addresses the curricular realities of today's college coursework by organizing and consolidating the content into 5 main parts and 18 chapters. This organization presents the core content in a thorough yet manageable fashion. To give instructors even greater flexibility in tailoring reading assignments to course requirements and cross-referencing lectures to the book, each major section in the chapters is numbered. If, for example, an instructor plans to address only part of a chapter on a certain day, he or she can direct students to focus on just those sections.

Assessment and Evaluation of Learning

One of our primary goals as nutrition educators is to ensure that students leave our courses with a meaningful understanding of the nutrition principles and concepts they need to advance their education and improve their diets and health. Determining how well we have met this goal requires assessment, on both the student and instructor levels. To this end, we have built in assessment tools that allow both students and instructors to measure their success:

- Student Learning Outcomes at the beginning of each chapter
- Online test bank questions correlated to individual student learning outcomes
- Knowledge Check questions after each major section
- Study Questions at the end of each chapter
- Critical Thinking questions in the margins

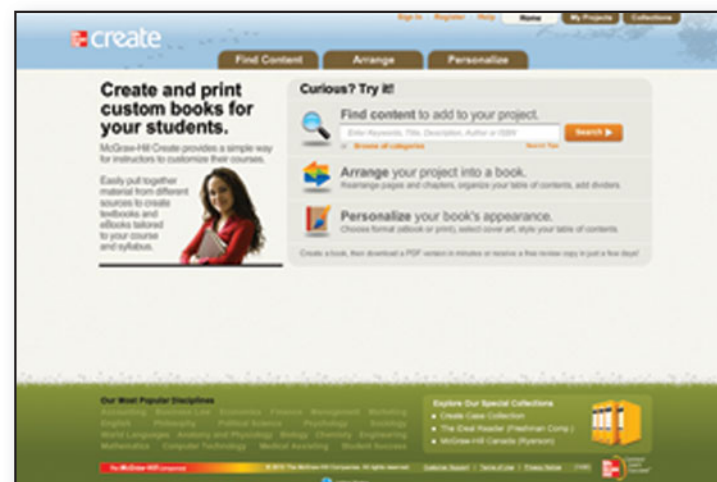
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Acknowledgments

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