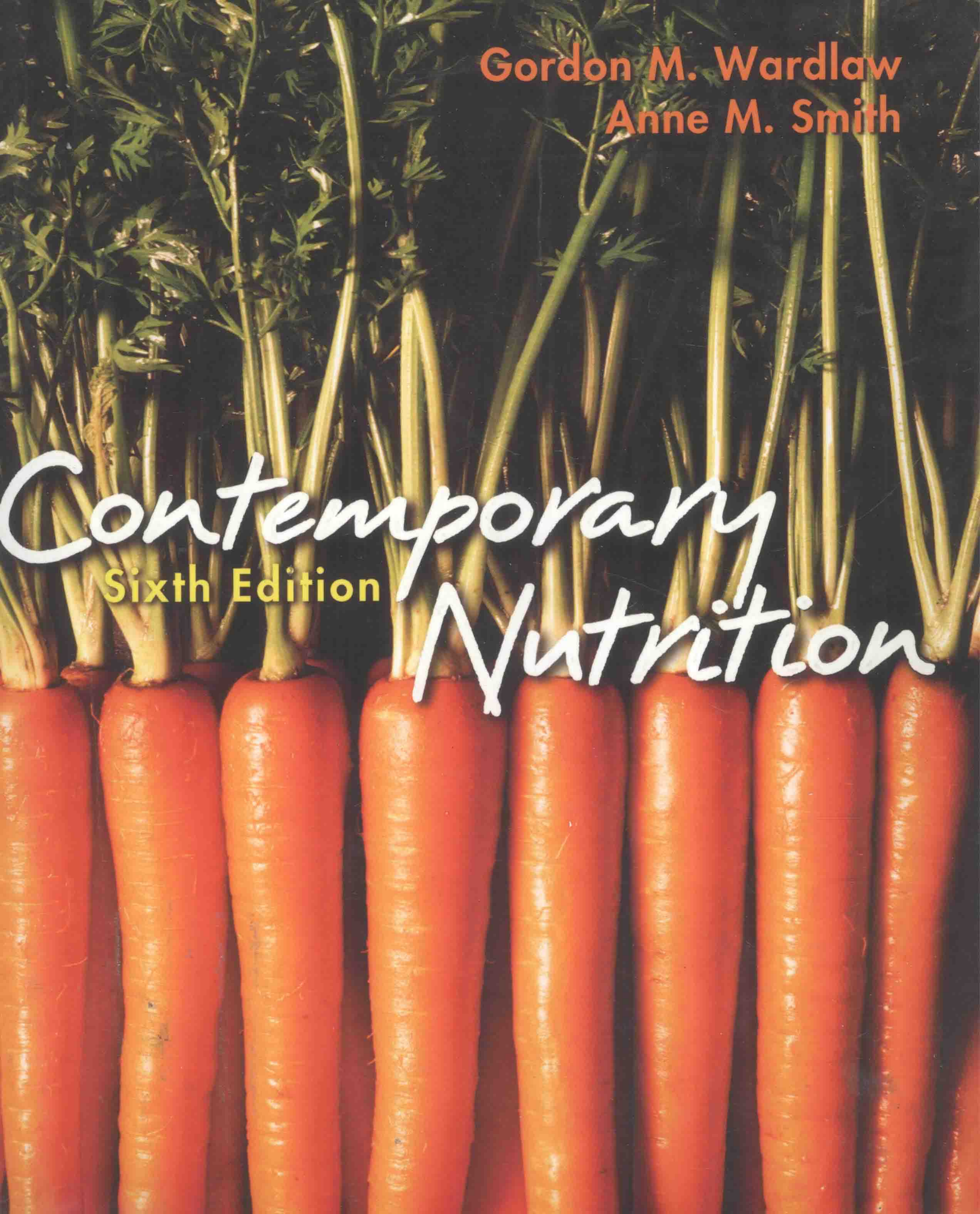
Gordon M. Wardlaw
Anne M. Smith
Contemporary Nutrition
Sixth Edition

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Gordon M. Wardlaw
PH.D., R.D.
Department of Human Nutrition,
College of Human Ecology
The Ohio State University

Anne M. Smith
PH.D., R.D., L.D.
Department of Human Nutrition,
College of Human Ecology
The Ohio State University

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Dietary Reference Intakes (DRIs): Tolerable Upper Intake Levels (UL[a]), Elements and Electrolytes[b,c]
Food and Nutrition Board, Institute of Medicine, National Academies

Life Stage Group	Arsenic[b]	Boron (mg/d)	Calcium (g/d)	Copper (µg/d)	Fluoride (mg/d)	Iodine (µg/d)	Iron (mg/d)	Magnesium (mg/d)[d]	Manganese (mg/d)	Molybdenum (µg/d)	Nickel (mg/d)	Phosphorus (g/d)	Selenium (µg/d)	Vanadium (mg/d)[e]	Zinc (mg/d)	Sodium (mg/d)	Chloride (mg/d)
Infants																	
0–6 mo	ND[f]	ND	ND	ND	0.7	ND	40	ND	ND	ND	ND	ND	45	ND	4	ND	ND
7–12 mo	ND	ND	ND	ND	0.9	ND	40	ND	ND	ND	ND	ND	60	ND	5	ND	ND
Children																	
1–3 y	ND	3	2.5	1,000	1.3	200	40	65	2	300	0.2	3	90	ND	7	1,500	2,300
4–8 y	ND	6	2.5	3,000	2.2	300	40	110	3	600	0.3	3	150	ND	12	1,900	2,900
Males, Females																	
9–13 y	ND	11	2.5	5,000	10	600	40	350	6	1,100	0.6	4	280	ND	23	2,200	3,400
14–18 y	ND	17	2.5	8,000	10	900	45	350	9	1,700	1.0	4	400	ND	34	2,300	3,600
19–70 y	ND	20	2.5	10,000	10	1,100	45	350	11	2,000	1.0	4	400	1.8	40	2,300	3,600
>70 y	ND	20	2.5	10,000	10	1,100	45	350	11	2,000	1.0	3	400	1.8	40	2,300	3,600
Pregnancy																	
≤18 y	ND	17	2.5	8,000	10	900	45	350	9	1,700	1.0	3.5	400	ND	34	2,300	3,600
19–50 y	ND	20	2.5	10,000	10	1,100	45	350	11	2,000	1.0	3.5	400	ND	40	2,300	3,600
Lactation																	
≤18 y	ND	17	2.5	8,000	10	900	45	350	9	1,700	1.0	4	400	ND	34	2,300	3,600
19–50 y	ND	20	2.5	10,000	10	1,100	45	350	11	2,000	1.0	4	400	ND	40	2,300	3,600

[a]UL = The maximum level of daily nutrient intake that is likely to pose no risk of adverse effects. Unless otherwise specified, the UL represents total intake from food, water, and supplements. Due to lack of suitable data, ULs could not be established for arsenic, chromium, and silicon. In the absence of ULs, extra caution may be warranted in consuming levels above recommended intakes.

[b]Although a UL was not determined for arsenic, there is no justification for adding arsenic to food or supplements.

[c]Although silicon has not been shown to cause adverse effects in humans, there is no justification for adding silicon to supplements.

[d]The ULs for magnesium represent intake from a pharmacological agent only and do not include intake from food and water.

[e]Although vanadium in food has not been shown to cause adverse effects in humans, there is no justification for adding vanadium to food and vanadium supplements should be used with caution. The UL is based on adverse effects in laboratory animals and this data could be used to set a UL for adults but not children and adolescents.

[f]ND = Not determinable due to lack of data of adverse effects in this age group and concern with regard to lack of ability to handle excess amounts. Source of intake should be from food only to prevent high levels of intake.

SOURCES: Dietary Reference Intakes for Calcium, Phosphorus, Magnesium, Vitamin D, and Fluoride (1997); Dietary Reference Intakes for Thiamin, Riboflavin, Niacin, Vitamin B-6, Folate, Vitamin B-12, Pantothenic Acid, Biotin, and Choline (1998); Dietary Reference Intakes for Vitamin C, Vitamin E, Selenium, and Carotenoids (2000); Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc (2001); and *Dietary Reference Intakes for Water, Potassium, Sodium, Chloride, and Sulfate* (2004). These reports may be accessed via www.nap.edu.

Dietary Reference Intakes (DRIs): Recommended Intakes for Individuals, Electrolytes and Water

Food and Nutrition Board, Institute of Medicine, National Academies

Life Stage Group	Sodium (mg/d)	Potassium (mg/d)	Chloride (mg/d)	Water (L/d)
Infants				
0–6 mo	120*	400*	180*	0.7*
7–12 mo	370*	700*	570*	0.8*
Children				
1–3 y	1,000*	3,000*	1,500*	1.3*
4–8 y	1,200*	3,800*	1,900*	1.7*
Males				
9–13 y	1,500*	4,500*	2,300*	2.4*
14–18 y	1,500*	4,700*	2,300*	3.3*
19–30 y	1,500*	4,700*	2,300*	3.7*
31–50 y	1,500*	4,700*	2,300*	3.7*
51–70 y	1,300*	4,700*	2,000*	3.7*
> 70 y	1,200*	4,700*	1,800*	3.7*
Females				
9–13 y	1,500*	4,500*	2,300*	2.1*
14–18 y	1,500*	4,700*	2,300*	2.3*
19–30 y	1,500*	4,700*	2,300*	2.7*
31–50 y	1,500*	4,700*	2,300*	2.7*
51–70 y	1,300*	4,700*	2,000*	2.7*
> 70 y	1,200*	4,700*	1,800*	2.7*
Pregnancy				
14–18 y	1,500*	4,700*	2,300*	3.0*
19–50 y	1,500*	4,700*	2,300*	3.0*
Lactation				
14–18 y	1,500*	5,100*	2,300*	3.8*
19–50 y	1,500*	5,100*	2,300*	3.8*

NOTE: The table is adapted from the DRI reports. See www.nap.edu. Adequate Intakes (AIs) are followed by an asterisk(*). These may be used as a goal for individual intake. For healthy breastfed infants, the AI is the average intake. The AI for other life stage and gender groups is believed to cover the needs of all individuals in the group, but lack of data prevent being able to specify with confidence the percentage of individuals covered by this intake; therefore, no Recommended Dietary Allowance (RDA) was set.

SOURCE: *Dietary Reference Intakes for Water, Potassium, Sodium, Chloride, and Sulfate.* This report may be accessed via www.nap.edu.

Acceptable Macronutrient Distribution Ranges

Macronutrient	Range (percent of energy) Children, 1–3 y	Children, 4–18 y	Adults
Fat	30–40	25–35	20–35
omega-6 polyunsaturated fats (linoleic acid)	5–10	5–10	5–10
omega-3 polyunsaturated fats[a] (α-linolenic acid)	0.6–1.2	0.6–1.2	0.6–1.2
Carbohydrate	45–65	45–65	45–65
Protein	5–20	10–30	10–35

[a]Approximately 10% of the total can come from longer-chain n-3 fatty acids.

SOURCE: *Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids* (2002). The report may be accessed via www.nar.edu.

Dietary Reference Intakes (DRIs): Tolerable Upper Intake Levels (UL[a]) , Vitamins
Food and Nutrition Board, Institute of Medicine, National Academies

Life Stage Group	Vitamin A (μg/d)[b]	Vitamin C (mg/d)	Vitamin D (μg/d)	Vitamin E (mg/d)[c,d]	Vitamin K	Thiamin	Riboflavin	Niacin (mg/d)[d]	Vitamin B-6 (mg/d)	Folate (μg/d)[d]	Vitamin B-12	Pantothenic Acid	Biotin	Choline (g/d)	Carotenoids[e]
Infants															
0–6 mo	600	ND[f]	25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
7–12 mo	600	ND	25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Children															
1–3 y	600	400	50	200	ND	ND	ND	10	30	300	ND	ND	ND	1.0	ND
4–8 y	900	650	50	300	ND	ND	ND	15	40	400	ND	ND	ND	1.0	ND
Males, Females															
9–13 y	1,700	1,200	50	600	ND	ND	ND	20	60	600	ND	ND	ND	2.0	ND
14–18 y	2,800	1,800	50	800	ND	ND	ND	30	80	800	ND	ND	ND	3.0	ND
19–70 y	3,000	2,000	50	1,000	ND	ND	ND	35	100	1,000	ND	ND	ND	3.5	ND
>70 y	3,000	2,000	50	1,000	ND	ND	ND	35	100	1,000	ND	ND	ND	3.5	ND
Pregnancy															
≤18 y	2,800	1,800	50	800	ND	ND	ND	30	80	800	ND	ND	ND	3.0	ND
19–50 y	3,000	2,000	50	1,000	ND	ND	ND	35	100	1,000	ND	ND	ND	3.5	ND
Lactation															
≤18 y	2,800	1,800	50	800	ND	ND	ND	30	80	800	ND	ND	ND	3.0	ND
19–50 y	3,000	2,000	50	1,000	ND	ND	ND	35	100	1,000	ND	ND	ND	3.5	ND

[a]UL = The maximum level of daily nutrient intake that is likely to pose no risk of adverse effects. Unless otherwise specified, the UL represents total intake from food, water, and supplements. Due to lack of suitable data, ULs could not be established for vitamin K, thiamin, riboflavin, vitamin B-12, pantothenic acid, biotin, or carotenoids. In the absence of ULs, extra caution may be warranted in consuming levels above recommended intakes.

[b]As preformed vitamin A only.

[c]As α-tocopherol; applies to any form of supplemental α-tocopherol.

[d]The ULs for vitamin E, niacin, and folate apply to synthetic forms obtained from supplements, fortified foods, or a combination of the two.

[e]β-Carotene supplements are advised only to serve as a provitamin A source for individuals at risk of vitamin A deficiency.

[f]ND = Not determinable due to lack of data of adverse effects in this age group and concern with regard to lack of ability to handle excess amounts. Source of intake should be from food only to prevent high levels of intake.

SOURCES: Dietary Reference Intakes for Calcium, Phosphorus, Magnesium, Vitamin D, and Fluoride (1997); Dietary Reference Intakes for Thiamin, Riboflavin, Niacin, Vitamin B-6, Folate, Vitamin B-12, Pantothenic Acid, Biotin, and Choline (1998); Dietary Reference Intakes for Vitamin C, Vitamin E, Selenium, and Carotenoids (2000); and Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc (2001). These reports may be accessed via www.nap.edu.

Preface

Welcome to New Co-Author

Before discussing the features of the sixth edition of *Contemporary Nutrition*, I am excited to have the opportunity to introduce my new co-author Dr. Anne Smith. A colleague at The Ohio State University, she has been an invaluable addition to this project. Anne has taught nutrition to nutrition majors and non-majors for many years. She is a dynamic teacher and is tremendously insightful about how best to present nutrition information to a diverse group of students. Her knack for expressing scientific concepts in an interesting, yet simple and concise manner has contributed greatly to the readability of the text. As you examine the sixth edition, you will benefit from Anne's keen eye for detail and clarity.

Our Approach to Teaching Nutrition

If you teach nutrition, you undoubtedly already find it a fascinating subject. Nutrition, however, can also be a frustrating subject to teach, for a variety of reasons. New research studies seem to emerge at an almost dizzying pace. Claims and counterclaims abound regarding the need for certain constituents in our diets. How does an instructor adequately convey changing and seemingly conflicting messages to introductory students? Our students also commonly bring to class many misconceptions about nutrition, and many have not had a college-level biology or chemistry course. How do we convey complex scientific concepts at a level appropriate for undergraduate students? And finally, how do we help our students meaningfully apply the material we cover in class to their own lives?

Keeping Current

The vast amount of research underway is constantly reshaping our knowledge of nutritional science. As authors and teachers, we constantly scour the literature to ensure that students' first exposure to the study of nutrition is reliable, accurate, and as up-to-date as this rapidly changing field allows. We are also aware of conflicting opinions in our field and thus draw on as many reputable sources as possible to create a balanced resource for nutrition information. We strive to present an objective approach to newly emerging or controversial topics so that students learn to carefully scrutinize the nutritional information they read and hear about.

Understanding Our Audience

We have written *Contemporary Nutrition* assuming that our students have a limited background in college-level biology, chemistry, or physiology. We have been careful to include the essential science foundation needed to adequately comprehend certain topics in nutrition, such as a basic discussion of protein synthesis in Chapter 6. Scientific discussions have been written in a simple, straightforward manner.

We have also taken into consideration the fact that students enrolled in introductory nutrition often come from a broad range of majors and interests. We have addressed this by incorporating a thorough system of pedagogical tools, such as critical thinking questions and concept checks, to help them master the material. A variety of applications and real-life examples have been interspersed throughout to appeal to students whose majors range from business to education.

Personalizing Nutrition

A prominent theme in nutrition today is *individuality.* Not all of us, for example, find that saturated fat in our diets raises our blood cholesterol values above recommended standards. Each person responds differently to nutrients, and we try to reinforce this point throughout the book.

Moreover even at this basic level, the text's discussions do not assume that all nutrition students are alike. Chapter content and features, such as Rate Your Plate, repeatedly ask students to learn more about themselves and their health status and to use their new knowledge to improve their health. After reading this textbook, students will be better equipped to understand how the nutrition information coming from all directions—whether on the evening news, on ready-to-eat cereal boxes, in popular magazines, or from government agencies—applies to them. Our goal is for students to understand that their knowledge of nutrition will allow them to evaluate and personalize nutrition information, rather than to

follow every guideline issued for an entire population. After all, a population consists of individuals with varying genetic and cultural backgrounds, and these individuals will have varying responses to diet.

As a final note on bringing nutrition down to a personal level, the book covers important questions students often bring to class, concerning topics such as eating disorders, dietary supplements, vegetarianism, popular weight-loss diets, and diets for athletes. Regardless of topic, the overall emphasis remains the same—the importance of understanding one's food choices and modifying one's diet to best meet personal needs.

Organization

This book is organized into six parts that reflect the major topics typically covered in an introductory nutrition course:

Part One	Nutrition: A Key to Health
Part Two	The Energy-Yielding Nutrients and Alcohol
Part Three	Vitamins and Minerals
Part Four	Energy: Balance and Imbalance
Part Five	Nutrition: A Focus on Life Stages
Part Six	Nutrition: Beyond the Nutrients

The Table of Contents also reflects the inclusion of two chapters not typically found in introductory textbooks: Chapter 7, Alcohol and Chapter 12, Eating Disorders. The expanded discussion of these topics is the result of feedback from instructors who felt it was important to provide their students with a thorough, balanced discussion of these relevant topics.

Although most frequently used in semester-long courses, the text's organization allows instructors to omit Parts or Chapters to fit the needs of quarter-length courses. We have also tried as much as possible to make each chapter function independently so that instructors can cover the material in the order that best fits their particular course needs.

New to This Edition

Streamlined Chapter Features

In addition to thoroughly updating the content to reflect latest guidelines and research findings, we have made some changes to the composition of the chapter features. With the help of colleagues, reviewers, symposium participants, and our own students, we have determined that the number and length of boxed readings should be reduced. We also learned that most people prefer that the end-of-chapter boxed readings should instead fall within the main body of the chapter (before the summary, study questions, and the readings). We have therefore condensed some of the material previously covered in the boxed readings to focus on essential content. Other boxed reading content has been moved into the main body of the text, such as the discussion of dietary fiber in Chapter 4 on carbohydrates. The sixth edition chapters typically contain only one or two boxed readings, which are now entitled "Looking Further." We hope that you will agree that this arrangement better suits the needs of introductory students.

New Art and Design

Two important enhancements have been made to the visual appeal and pedagogical function of this edition. First, the design layout has been streamlined and the colors are more vivid to better capture students' attention; and, more importantly, the sixth edition features dramatically improved illustrations. Per feedback and suggestions from professors, we have made the figures more colorful and simplified the labeling within the figures. One by one, each diagram and photo was scrutinized with an eye toward improving its visual appeal and ability to convey nutrition concepts.

Chapter-by-Chapter Revisions

In response to feedback from instructors using this text, we have reduced the complexity and refined the content to better meet the needs of today's students. The following list highlights just some of the changes and updates you will find in the sixth edition of *Contemporary Nutrition*. Please refer to this list to help your transition from the previous edition to the sixth edition.

Chapter 1: What You Eat and Why

- The number of nutrition glossary terms in Table 1-1 has been decreased.
- You will find an additional Another Bite section to briefly introduce *trans* fatty acids, since they will now be listed on the Nutrition Facts panel. All the Nutrition Facts panels in the book have been revised to reflect the addition of *trans* fatty acids.
- Household units have been added to the Looking Further box, "Math Tools for Nutrition."
- New Figure 1-4 showing the location of the hypothalamus has been added to the discussion of satiety.

Chapter 2: Tools for Designing a Healthy Diet

- The summary of the Food Guide Pyramid in Table 2-5 has been simplified.
- Looking Further box, "The Alphabet Soup of Nutrient Needs" contains a new figure comparing nutrient standards, such as RDA and UL, as well as a discussion of the Estimated Energy Requirements recently set by the Food and Nutrition Board.

- Figure 2-5 shows an updated and simplified example of the Nutrition Facts panel on a macaroni & cheese box.
- Another Bite (p. 63) discusses the new types of preliminary health claims allowed by the FDA.

Chapter 3: The Human Body: A Nutrition Perspective

- New Figure 3-5, illustrating blood circulation, has been enlarged and the corresponding labels simplified.
- New Figure 3-6 shows a more detailed depiction of capillary flow.
- A brief mention of the Heimlich maneuver and a website address for further details has been added.
- Elements in Figure 3-13 and the legend have been color-coded to make it easier to identify the specific method for nutrient absorption.
- A figure on enterohepatic circulation has been added.

Chapter 4: Carbohydrates

- Chapter 4 has been updated throughout to reflect the latest guidance for carbohydrate intake provided by the Food and Nutrition Board.
- The Carbohydrate Food Guide Pyramid is accompanied by a table of 15 common food sources of carbohydrate and the amount provided in a typical serving.
- Fiber is discussed in the body of the text (rather than in a box) and includes the differentiation of *dietary fiber* and *functional fiber*.
- The Looking Further box on diabetes and hypoglycemia includes a table that compares and contrasts type 1 and type 2 diabetes.
- Figure 4-7 has been simplified to illustrate the key hormones that regulate blood glucose.
- Table 4-5 provides diet plans containing 25 grams and 38 grams of fiber per the latest recommendations of the Food and Nutrition Board.
- Discussion of glycemic index now includes a discussion of glycemic load.

Chapter 5: Lipids

- The Lipid Food Guide Pyramid is now accompanied by a table of 15 common food sources of lipids and the amount provided in a typical serving.
- The discussion of atherosclerosis has been moved to the Looking Further box on cardiovascular disease to simplify the main content of Chapter 5.
- The text has been updated to reflect the inclusion of *trans* fatty acids on Nutrition Facts panels, which will be required on the labels of all U.S. foods by 2006.
- New Figure 5-3 more clearly compares the common food sources for saturated, monounsaturated, and polyunsaturated fats, and *trans* fatty acids.
- New Figure 5-9 depicts lipoprotein interactions in the body.

Chapter 6: Proteins

- The Protein Food Guide Pyramid is accompanied by a table of 15 common food sources of proteins and the amount provided in a typical serving.
- New Figure 6-1 presents a more visually appealing and realistic view of a cell to help students better understand the process of protein synthesis.
- The discussion of soy protein in the Looking Further box has been expanded to include plant proteins in general.
- Other improved illustrations include the following: Figure 6-8 contains more realistic presentations of organs involved in amino acid metabolism; Figure 6-10 has been redrawn to better convey the concept of protein balance; Figure 6-11 uses photos to illustrate protein balance in practical terms; and Figure 6-13 includes photos of children afflicted with kwashiorkor and marasmus.
- In Looking Further, "Vegetarian Diets," the discussion of vegan diets has been expanded to include infants and children. Updates include a reference to the vegetarian pyramid from the June 2003 issue of the *Journal of the American Dietetic Association*.

Chapter 7: Alcohol

- Content regarding problems associated with alcohol abuse (other than cirrhosis) has been reduced.
- New illustration on the effects of alcohol abuse (Fig. 7-2) has been redrawn with a more realistic-looking person, and the content of the labeling has been simplified.
- New Table 7-4 summarizes the negative effects of binge drinking on society.

Chapter 8: Vitamins

- Coverage throughout Chapter 8 has been thoroughly updated to reflect latest vitamin intake recommendations.
- New margin note comparing the whole-grain advantage of bread versus rice has been added.
- New Figure 8-14 applies a pyramid approach to evaluating nutrient supplement use.
- The Looking Further box examines the debate on need for daily multivitamin and mineral supplements by including the latest advice from the U.S. Preventive Services Task Force, as well as opposing advice provided by recent articles in the *Journal of the American Medical Association*.
- The previous coverage of nutrition and cancer has been moved to Chapter 15.

Chapter 9: Water and Minerals

- The latest nutrient standards for sodium, potassium, chloride, and water have been incorporated.
- Discussion of the possible health benefits of calcium has been updated to reflect latest findings.
- A new Another Bite box explains how to calculate the calcium content of supplements.
- The Looking Further box on osteoporosis has been thoroughly updated and revised.
- New figures include improved presentation of fluid compartments in the body (Fig. 9-1), a summary of how minerals contribute to body functions (Fig. 9-11), and a chart relating peak bone mass and risk of osteoporosis (Fig. 9-15).

Chapter 10: Energy Balance and Weight Control

- The latest statistics on weight status of North Americans are provided.
- A brief discussion of resting metabolic rate (this term is used in available diet analysis software programs) has been added.
- Formulas provided by the Food and Nutrition Board for estimating the energy needs of adults are included.
- New figures of a BodPod and dual energy X-ray absorbtiometry have been added to the discussion of diagnosing obesity and determining body composition.
- New Figure 10-15 illustrates a typical surgical procedure to treat severe cases of obesity.

Chapter 11: Nutrition: Fitness and Sports

- New Figure 11-1 summarizes the health benefits of physical activity.
- Improved Figure 11-2 provides easy-to-follow diagram tracing the flow of energy-yielding nutrients into metabolism.
- The discussion of carbohydrate needs of athletes based on the latest guidance from the American Dietetic Association and the American College of Sports Medicine has been updated.
- Current recommendations for protein intake for athletes have also been updated.
- New Table 11-6 summarizes the nutrient content of popular energy bars.

Chapter 12: Eating Disorders: Anorexia Nervosa, Bulimia Nervosa, and Other Conditions

- A second Looking Further box, "Thoughts of an Anorexic Woman," has been added as a counterpoint to Looking Further, "Thoughts of a Bulimic Woman."
- Chapter 12 has been reorganized so that binge-eating disorder is introduced before the female athlete triad.

Chapter 13: Pregnancy and Breastfeeding

- There is greater emphasis on the discussion of the importance of adequate folic acid intake prior to pregnancy to reduce the risk of neural tube defects.
- Chapter 13 includes the updated increase in calorie, carbohydrate, and protein needs of pregnant and lactating women recently issued by the Food and Nutrition Board.
- The food plan for pregnant women and lactating women has been updated to reflect the latest guidance provided by the American Dietetic Association.
- New Figure 13-5 better illustrates the processes of the letdown reflex.
- Chapter 13 presents the latest American Academy of Pediatrics recommendation that breastfeeding infants be given 200 IU per day of vitamin D.

Chapter 14: Nutrition from Infancy Through Adolescence

- The latest estimates for calorie, carbohydrate, fat, and protein needs for the appropriate infant age groups recommended by the Food and Nutrition Board are included.
- Chapter 14 simplifies the discussion of snacks for children.
- Discussion of the causes and treatment of childhood obesity has been updated.

Chapter 15: Nutrition During Adulthood

- The discussion on nutrition and cancer in the Looking Further box (previously located in Chapter 8) has been simplified and updated. (This content was previously in Chapter 8.)
- The discussion of alternative medicines and herbal supplements has been incorporated within the main body of the text. Table 15-4 now lists the benefits and risks of the ten most popular herbal remedies.

Chapter 16: Food Safety

- Table 16-2, which lists the U.S. agencies responsible for monitoring the food supply, has been moved to an earlier section of Chapter 16 for greater emphasis.
- Table 16-3 now focuses on the most important microorganisms involved in foodborne illnesses.

- New Figure 16-1 shows the minimum internal temperatures for cooking or reheating foods.
- New Table 16-4 lists the caffeine content of common beverages.

Chapter 17: Undernutrition Throughout the World

- The discussion of hunger in the United States has been simplified to emphasize the concept of food insecurity.
- Statistics related to North American and world hunger and health issues have been updated to reflect latest data.
- New Figure 17-4 promotes some possible approaches to solving the problem of undernutrition, in part to give a more hopeful tone to Chapter 17.

Special Acknowledgments

We would like to especially thank Angela Collene, M.S., R.D., for all her help with this edition, including proofreading. Many of the text's improvements are the result of her suggestions. Michelle Asp, M.S., R.D., also helped proofread and edit the manuscript. Our editor, Lynne Meyers, supported and assisted us through every step of the revision and facilitated the many decisions required to accomplish the enhancements of this edition. Jodi Rhomberg and the rest of the McGraw-Hill production staff carefully oversaw the myriad of tasks needed to create a beautiful and precise textbook.

Thank You to Reviewers and Contributors

As with earlier editions, our goal remains to provide students with the most accurate, up-to-date, and useful textbook possible. These ambitious goals would not be possible without the meticulous, professional assistance of colleagues who have aided us in so many ways. Their advice and suggestions helped us formulate the vision that makes this sixth edition a more effective and efficient learning tool. Whether it was reviewing the fifth edition or evaluating materials for this edition, participating in an instructional symposium, or responding to a survey, we owe our sincere thanks to each of these individuals. Along with our editors, we would like to acknowledge these dedicated educators whose contributions did so much to guide the direction of the sixth edition of *Contemporary Nutrition.*

A Request to Professors Who Use Contemporary Nutrition: Issues and Insights

The first edition of this text began with a dream. Each new edition is fostered by the excitement that improvements bring, and ends with the satisfaction of knowing that we have produced a dependable tool that will guide students as they begin their study of nutrition. As you might imagine, it is difficult to thoroughly address the vast range of nutrition science, keeping pace with countless new developments and controversies. We try our best but realize that sometimes we miss a side of an argument that deserves attention. As you read this book, if you find content that you question or believe warrants further attention, feel free to contact either of us:

Gordon M. Wardlaw, Ph.D., R.D.
Department of Nutrition
The Ohio State University
325 Campbell Hall
1783 Neil Avenue, Columbus, OH 43210
Phone: (614) 688-8656 Fax: (614) 292-8880
Email: wardlaw.1@osu.edu
Website: www. hec.osu.edu/people/gwardlaw

Anne M. Smith, Ph.D., R.D., L.D.
Department of Nutrition
The Ohio State University
325 Campbell Hall
1783 Neil Avenue, Columbus, OH 43210
Phone: (614) 292-0715 Fax: (614) 292-8880
Email: smith.23@osu.edu
Website: www.hec.ohio-state.edu/hn/faculty/smith.html

Reviewers

Liz Applegate
University of California, Davis

Mokhtar Atallah
University of Massachusetts at Amherst

Georgina M. Awipi
The University of Tennessee at Martin

James W. Bailey
University of Tennessee

Beverly A. Benes
University of Nebraska—Lincoln

Ethan A. Bergman
Central Washington University—Ellensburg

Darlene E. Berryman
Ohio University

Debra Boardley
University of Toledo

Brenda Breeding
Oklahoma City Community College

Nancy Brenowitz
University of Maryland

Anne Bridges
University of Alaska, Anchorage

Amy Brown
University of Hawaii at Manoa

Lora Beth Brown
Brigham Young University

Martha S. Brown
Eastern Illinois University

Pat Brown
Cuesta College

Melanie Tracy Burns
Eastern Illinois University

Kathleen Cahill
San Jose State University

Patricia Chisamore
SUNY Orange Community College

Anne C. Cioffi
Hudson Valley Community College

Paula K. Cochrane
Albuquerque TVI

Janet Colson
Middle Tennessee State University

Margaret C. Craig-Schmidt
Auburn University

Robert T. Davidson
Brigham Young University

Earlene Davis
Bakersfield College

Judy A. Driskell
University of Nebraska

Vicki Erdmann
Normandale Community College

Michelle C. Fisher
Camden County College

Pam Fletcher
Albuquerque TVI—Community College

Bernard Frye
University of Texas at Arlington

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Joanne Gould
Kean University

Vivian Haley-Zitlin
Clemson University

Peter Horvath
SUNY University at Buffalo

Beckee Hobson
College of the Sequoias

Thunder Jalili
University of Utah

Molly A. Hoffman Jalufka
The Victoria College School of Vocational Nursing

Judy Kaufman
Monroe Community College

Mary L. Kelso
Antelope Valley College

Laura J. Kruskall
University of Nevada, Las Vegas

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Mission College

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Michigan State University

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Linda Kautz Osterkamp
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Brescia University College

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Southwest Tennessee Community College

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Barbara Reynolds
College of Sequoias

Jennifer Ricketts
University of Arizona

Nidia Romer
Miami Dade Community College—South

Janet Rouslin
Johnson and Wales University

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Raritan Valley Community College

Tammy Sakanashi
Santa Rosa Junior College

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Orange Community College

Kevin Schalinske
Iowa State University

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Cosumnes River College

Ingrid A. Skoog
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Sara W. Sutton
Eastern Kentucky University

Sandra L. Thomas
Coconino Community College

Nancy Vandenberg
Everett Community College

Ruth D. Verhegge
East Tennessee State University

Jennifer Weddig
Metropolitan State College of Denver

Fred H. Wolfe
University of Arizona, Tucson

Cynthia B. Wright
Southern Utah University

Daniel L. Wulff
University at Albany, SUNY

Donna L. Zoss
Purdue University

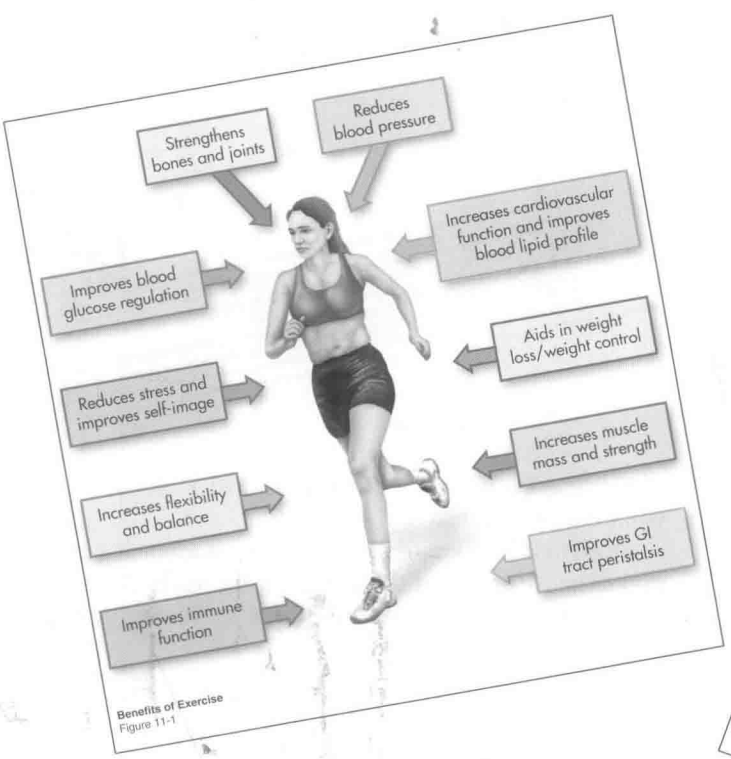
Supplements

Overhead Transparencies • Instructor's Testing and Resource CD-ROM

Nutrition science is constantly evolving. The classroom and students of today place new expectations on instructors. To help you meet these challenges, McGraw-Hill has created a suite of supplements tailored to *Contemporary Nutrition* that are intended to help you maximize your time in and out of the classroom.

Overhead Transparencies

More than 225 illustrations and tables from *Contemporary Nutrition,* as well as other McGraw-Hill nutrition texts, are available to support your classroom presentations. Artwork and labels have been enlarged to aid in classroom viewing.



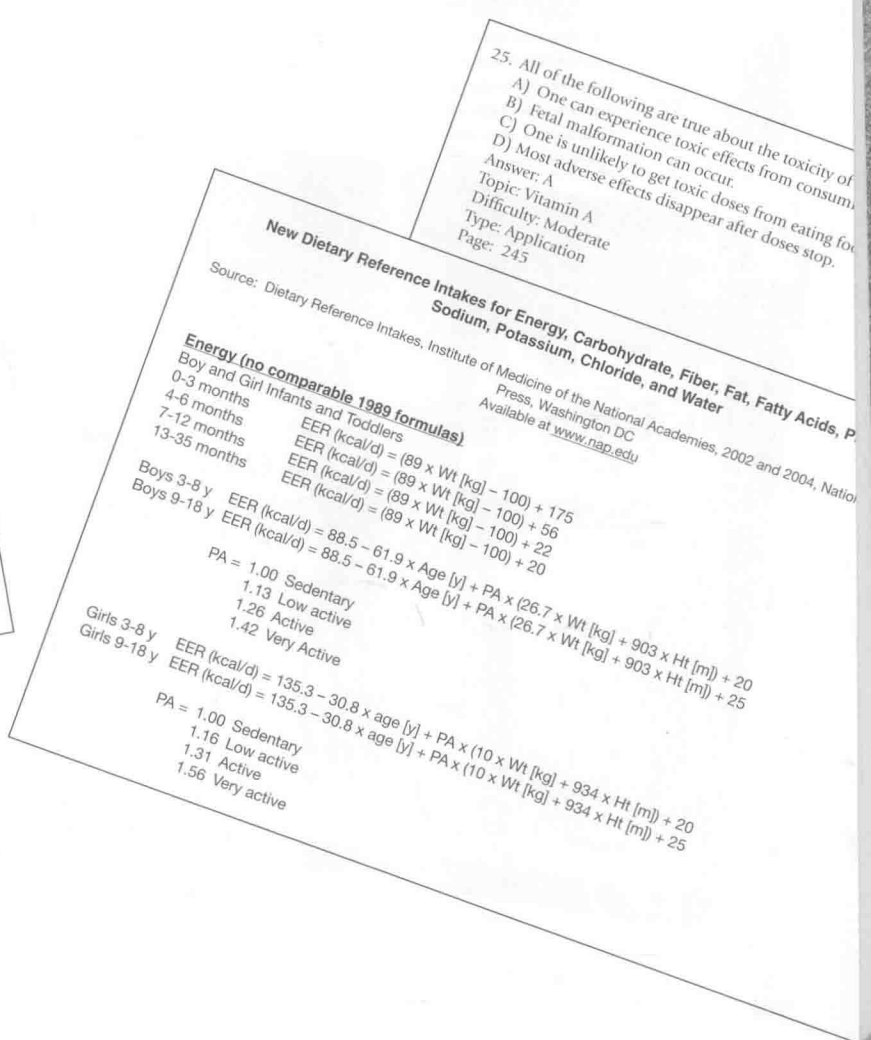
Benefits of Exercise
Figure 11-1

If you have questions about *Contemporary Nutrition* supplements, please contact your local McGraw-Hill representative. To find your local representative, check out www.mhhe.com.

Instructor's Testing and Resource CD-ROM

This cross-platform CD-ROM provides a wealth of resources for the instructor. Supplements featured on this CD-ROM include a computerized test bank utilizing McGraw-Hill's EZ Test testing software to quickly create customized exams. This user-friendly program allows instructors to search for questions by topic, format, or difficulty level; edit existing questions or add new ones; and scramble questions and answer keys for multiple versions of the same test. Word files of the text bank are included for those instructors who prefer to work outside of the test-generator software.

Other assets on the Instructor's Testing and Resource CD-ROM, such as User's Guides for the diet analysis software, are grouped within easy-to-use folders.


25. All of the following are true about the toxicity of
A) One can experience toxic effects from consum
B) Fetal malformation can occur.
C) One is unlikely to get toxic doses from eating fo
D) Most adverse effects disappear after doses stop.
Answer: A
Topic: Vitamin A
Difficulty: Moderate
Type: Application
Page: 245

New Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, P
Sodium, Potassium, Chloride, and Water

Source: Dietary Reference Intakes. Institute of Medicine of the National Academies, 2002 and 2004, Natio
Press, Washington DC
Available at www.nap.edu

Energy (no comparable 1989 formulas)

Boy and Girl Infants and Toddlers
0-3 months EER (kcal/d) = (89 x Wt [kg] – 100) + 175
4-6 months EER (kcal/d) = (89 x Wt [kg] – 100) + 56
7-12 months EER (kcal/d) = (89 x Wt [kg] – 100) + 22
13-35 months EER (kcal/d) = (89 x Wt [kg] – 100) + 20

Boys 3-8 y EER (kcal/d) = 88.5 – 61.9 x Age [y] + PA x (26.7 x Wt [kg] + 903 x Ht [m]) + 20
Boys 9-18 y EER (kcal/d) = 88.5 – 61.9 x Age [y] + PA x (26.7 x Wt [kg] + 903 x Ht [m]) + 25

PA = 1.00 Sedentary
1.13 Low active
1.26 Active
1.42 Very Active

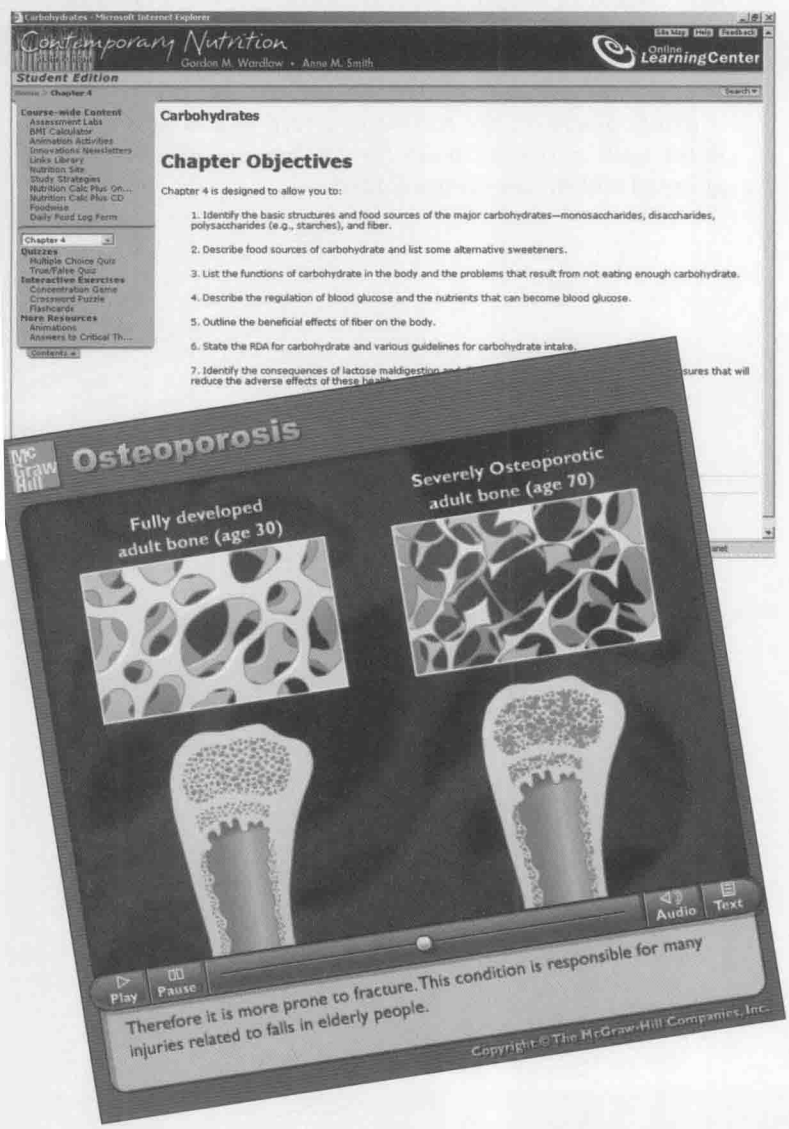
Girls 3-8 y EER (kcal/d) = 135.3 – 30.8 x age [y] + PA x (10 x Wt [kg] + 934 x Ht [m]) + 20
Girls 9-18 y EER (kcal/d) = 135.3 – 30.8 x age [y] + PA x (10 x Wt [kg] + 934 x Ht [m]) + 25

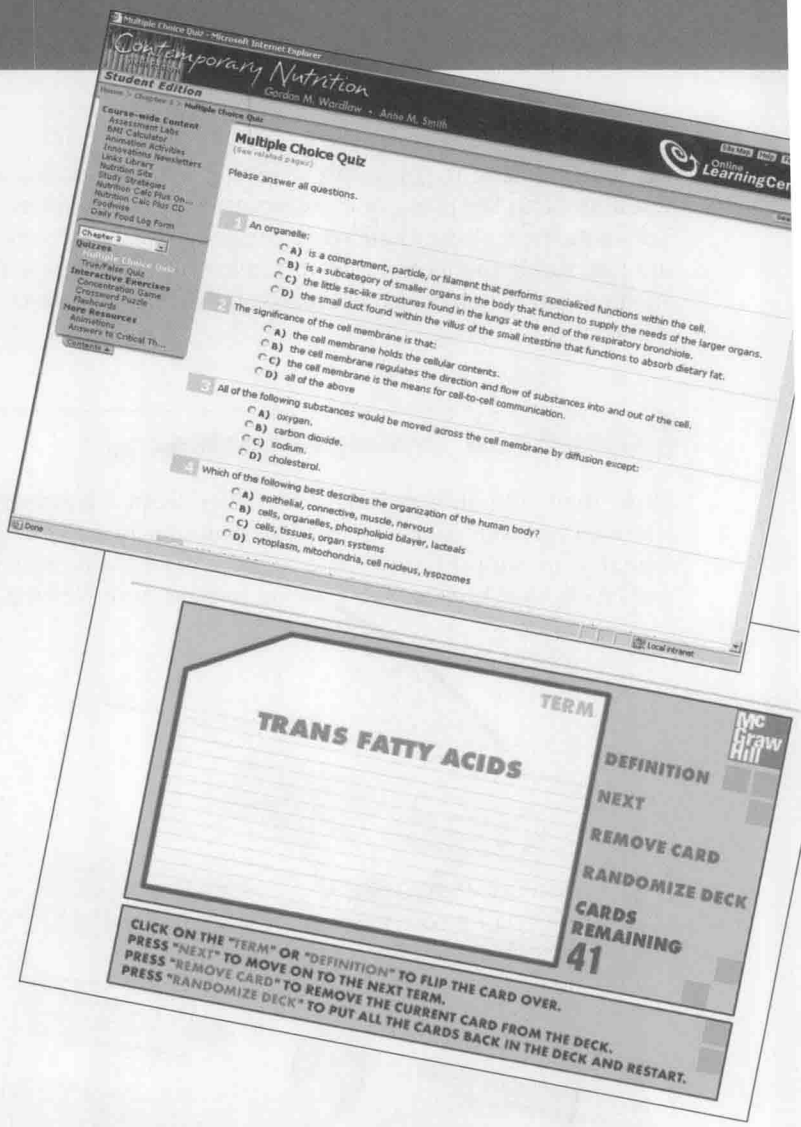
PA = 1.00 Sedentary
1.16 Low active
1.31 Active
1.56 Very active

Online Learning Center (www.mhhe.com/wardlawcont6)

The Online Learning Center for *Contemporary Nutrition* offers instructors an array of useful online teaching aids, such as chapter objectives, best teaching practices, as well as links to important nutrition sites organized by chapter.

Combine these resources with animations and interactivities and you have a powerful suite of tools to assist you in a traditional classroom or an online course.



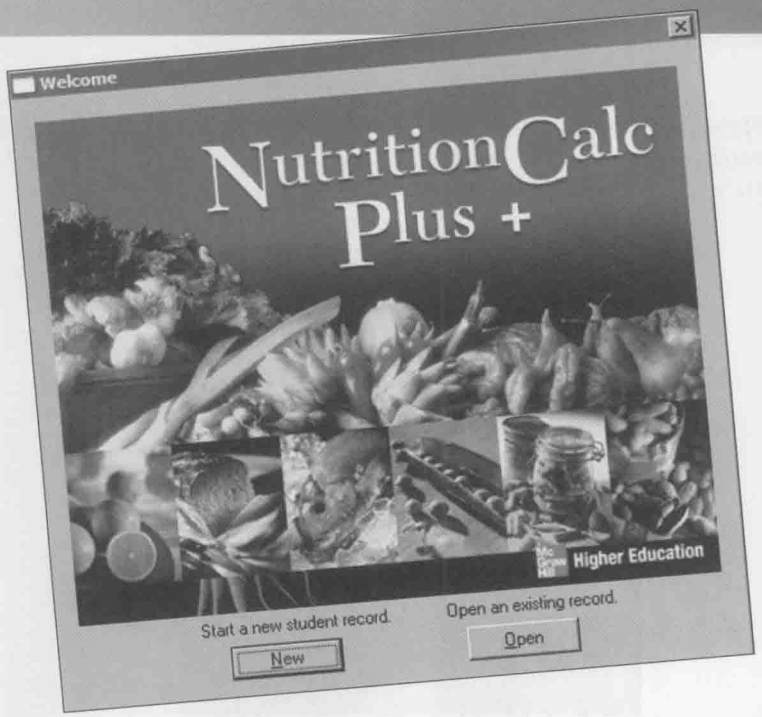


Getting better grades—and healthier nutrition—are what it's all about!

Students also benefit from a variety of tools designed to make the most out of their study time, such as multiple-choice and true/false quizzes, links to current nutrition articles, and animations.

Diet Analysis Software

CD-ROMs • Online

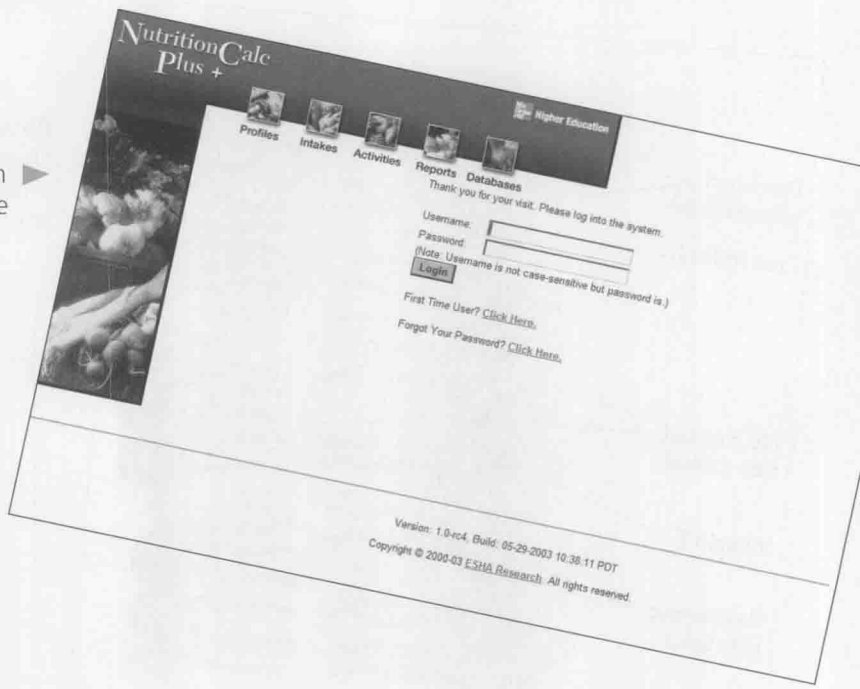


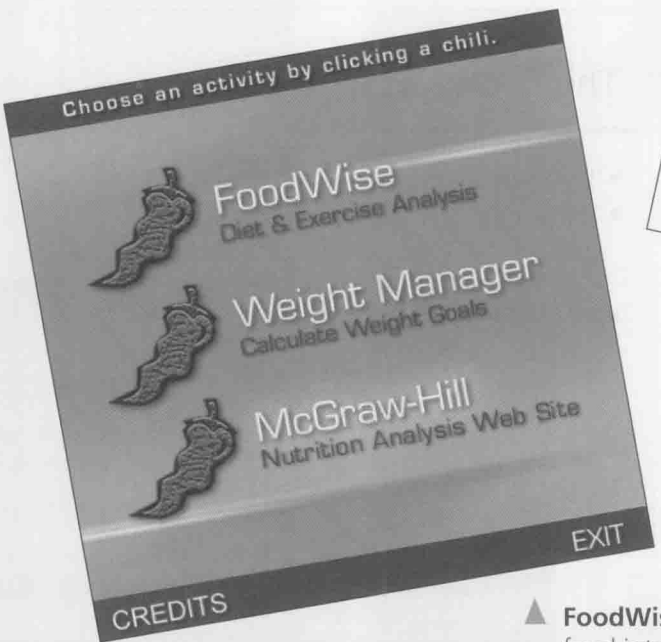
Diet Analysis Software

McGraw-Hill offers you the choice of three software programs. These programs can be packaged with *Contemporary Nutrition* at money-saving discounts.

◀ **NutritionCalc Plus CD-ROM (Windows)** is a powerful tool to help students learn to analyze and monitor their diets. It features the reliability of the ESHA food database and a wide variety of reports to match your course assignments.

NutritionCalc Plus Online offers all of the above with the addition of a colorful, easy-to-use interface and the ability to email reports to the professor. ▶





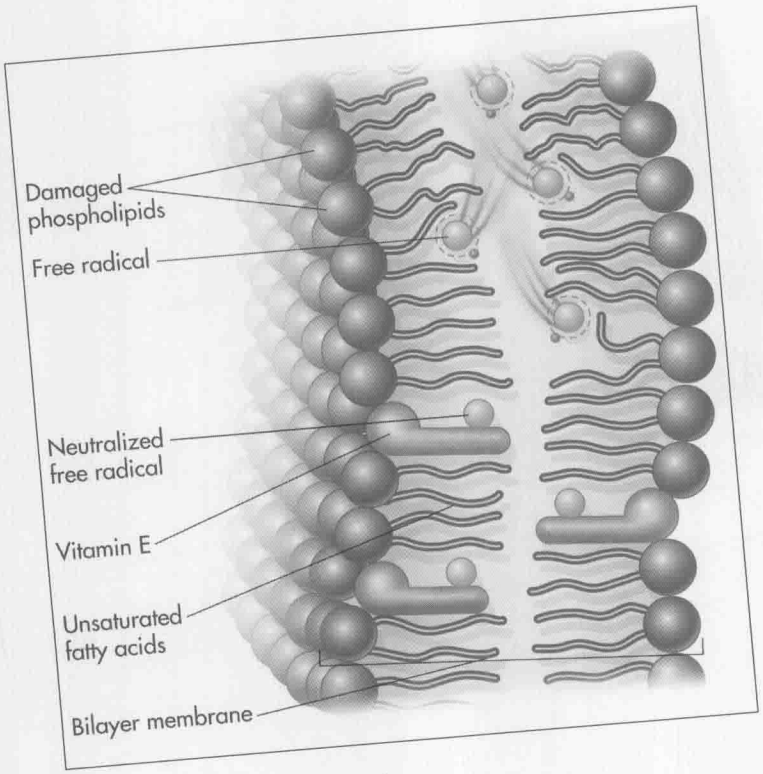
▲ **FoodWise CD-ROM** also allows students to track their food intake, daily exercise, and weight management.

Digital Content Manager CD-ROM

Illustrations • Photos • Tables • Animations •

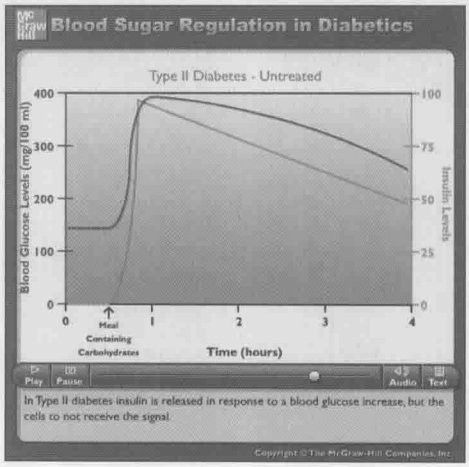
Digital Content Manager CD-ROM

Imagine everything you need to create powerful, compelling lectures in one easy-to-use resource. Imagine animations that capture dynamic scientific processes in action. Imagine having the ability to modify the size, labels, and colors of illustrations with a click of your mouse. The Digital Content Manager for *Contemporary Nutrition* gives you the power of all this and more. This practical tool also includes hundreds of illustrations, photographs, tables, and animations to incorporate into your lecture presentations, handouts, or quizzes. With digital assets from *Contemporary Nutrition* and other McGraw-Hill nutrition texts, you simply click on the chapter folder, select an asset and you're ready to import that asset into the application of your choice. *It's that simple!*

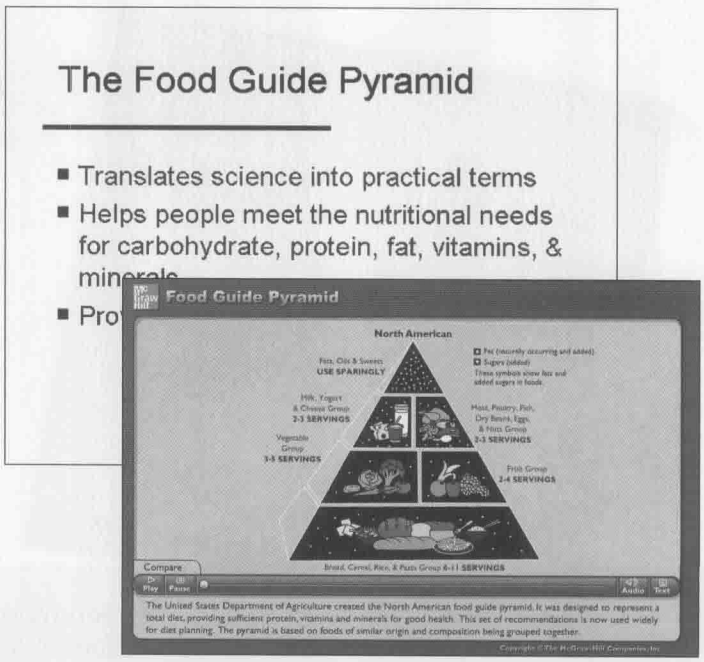


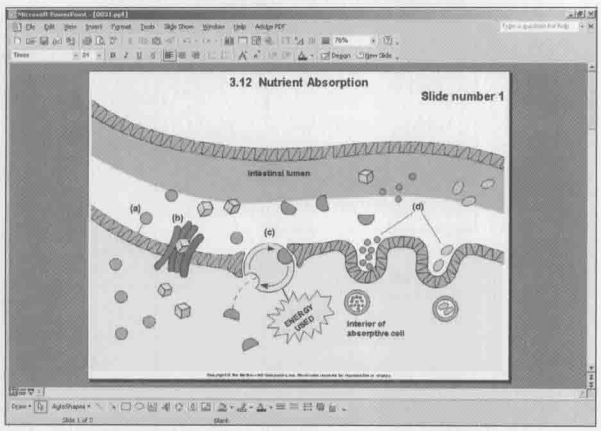
Full-color digital files of **Illustrations, Photos,** and **Tables** from *Contemporary Nutrition* allow you to easily customize your classroom materials.

New Animations cover an even broader range of nutrition topics. Approximately 30 dynamic new animations allow you to harness the visual impact of nutrition processes in motion.



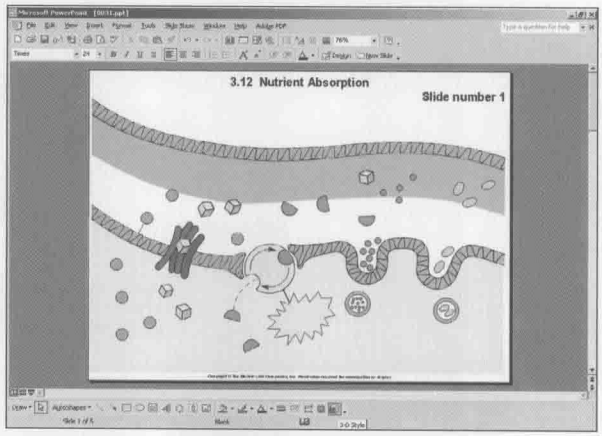
PowerPoint Lecture Outlines have been prepared for each chapter and already contain illustrations and animations to enliven any lecture. Use the outline as is or modify to suit your specific course needs.



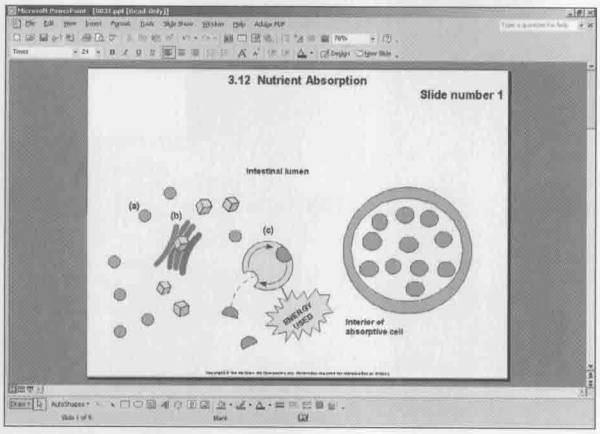


Active Art

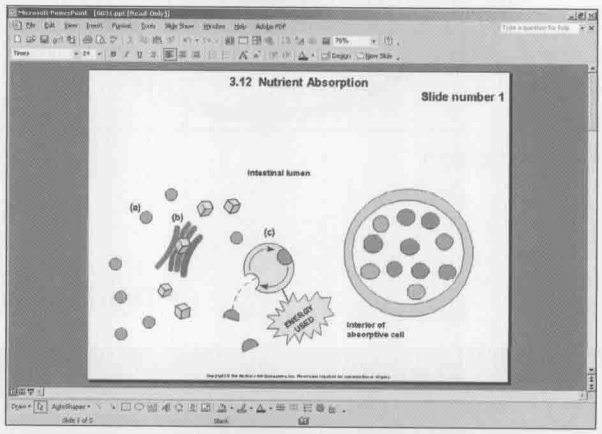
Active Art allows you to customize key figures from the text to complement your lecture! Figures have been broken into smaller digestable parts so each piece can be used in whatever order or format chosen. Using Microsoft PowerPoint's ungroupable art feature, instructors can also move, resize, or change the color of any or all objects in a piece of art.



Remove Labels Labels and leader lines can be easily repositioned, edited, or removed. Your customized images can then be used for course assignments or additional quizzing for your students.



Resize Objects The entire image or parts of the image can be made larger or smaller depending on what you choose to emphasize.



Change Colors Colors can be removed and/or changed from any Active Art slide or object.