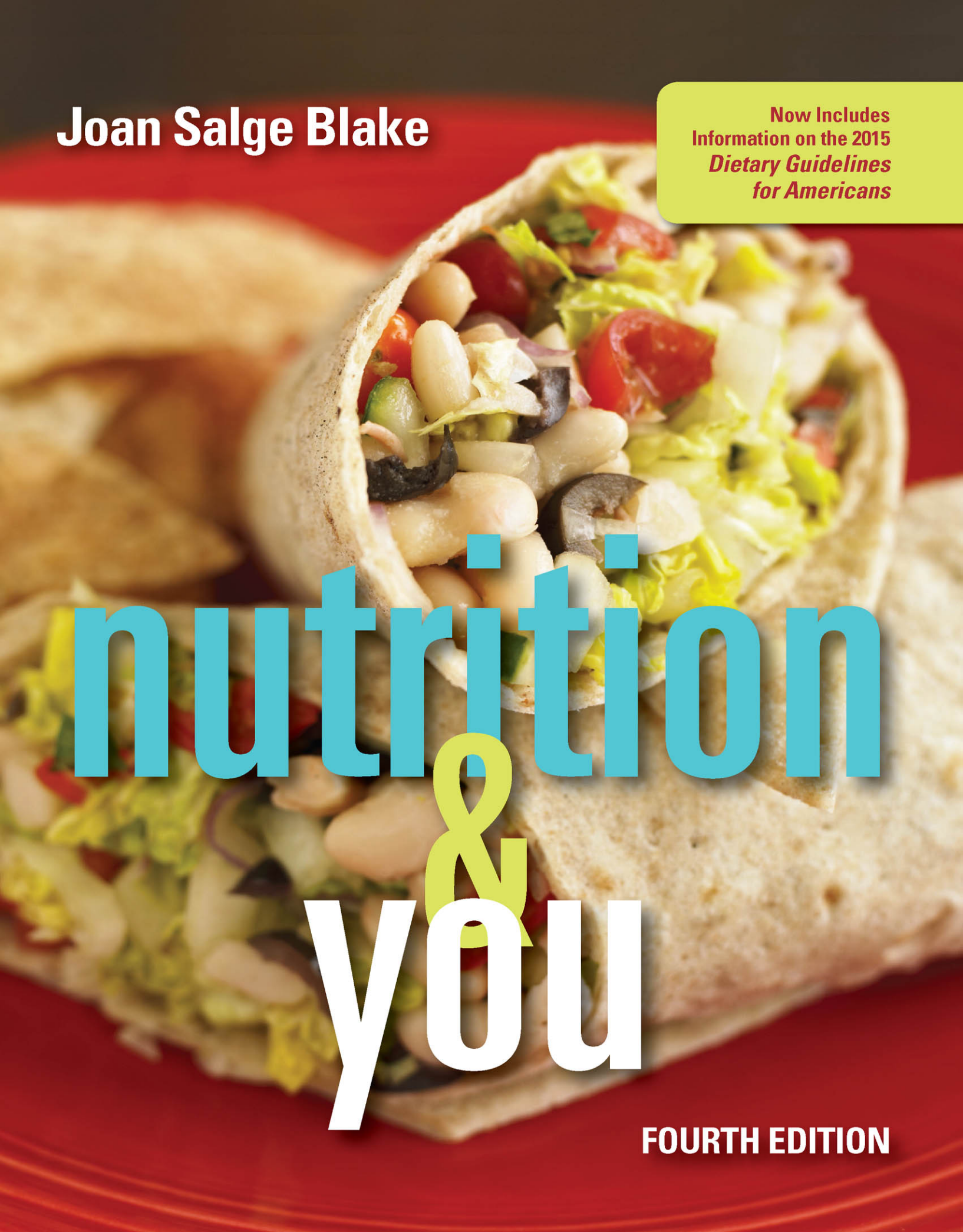


Joan Salge Blake

Now Includes Information on the 2015 *Dietary Guidelines for Americans*

nutrition & you

FOURTH EDITION

Dietary Reference Intakes: RDA, AI*

Life Stage Group	Total Water[a] (L/d)	Carbohydrate (g/d)	Total Fiber (g/d)	Fat (g/d)	Linoleic Acid (g/d)	α-Linolenic Acid (g/d)	Protein[b] (g/d)
	Total Water and Macronutrients						
Infants							
0–6 mo	0.7*	60*	ND[c]	31*	4.4*	0.5*	9.1*
6–12 mo	0.8*	95*	ND	30*	4.6*	0.5*	**11.0**
Children							
1–3 y	1.3*	**130**	19*	ND	7*	0.7*	**13**
4–8 y	1.7*	**130**	25*	ND	10*	0.9*	**19**
Males							
9–13 y	2.4*	**130**	31*	ND	12*	1.2*	**34**
14–18 y	3.3*	**130**	38*	ND	16*	1.6*	**52**
19–30 y	3.7*	**130**	38*	ND	17*	1.6*	**56**
31–50 y	3.7*	**130**	38*	ND	17*	1.6*	**56**
51–70 y	3.7*	**130**	30*	ND	14*	1.6*	**56**
>70 y	3.7*	**130**	30*	ND	14*	1.6*	**56**
Females							
9–13 y	2.1*	**130**	26*	ND	10*	1.0*	**34**
14–18 y	2.3*	**130**	26*	ND	11*	1.1*	**46**
19–30 y	2.7*	**130**	25*	ND	12*	1.1*	**46**
31–50 y	2.7*	**130**	25*	ND	12*	1.1*	**46**
51–70 y	2.7*	**130**	21*	ND	11*	1.1*	**46**
>70 y	2.7*	**130**	21*	ND	11*	1.1*	**46**
Pregnancy							
14–18 y	3.0*	**175**	28*	ND	13*	1.4*	**71**
19–30 y	3.0*	**175**	28*	ND	13*	1.4*	**71**
31–50 y	3.0*	**175**	28*	ND	13*	1.4*	**71**
Lactation							
14–18 y	3.8*	**210**	29*	ND	13*	1.3*	**71**
19–30 y	3.8*	**210**	29*	ND	13*	1.3*	**71**
31–50 y	3.8*	**210**	29*	ND	13*	1.3*	**71**

Note: This table (taken from the DRI reports, see www.nap.edu) presents Recommended Dietary Allowances (RDA) in bold type and Adequate Intakes (AI) in ordinary type followed by an asterisk (*). An RDA is the average daily dietary intake level sufficient to meet the nutrient requirements of nearly all (97–98 percent) healthy individuals in a group. It is calculated from an Estimated Average Requirement (EAR). If sufficient scientific evidence is not available to establish an EAR, and thus calculate an RDA, an AI is usually developed. For healthy breast-fed infants, an AI is the mean intake. The AI for other life stage and gender groups is believed to cover the needs of all healthy individuals in the groups, but lack of data or uncertainty in the data prevent being able to specify with confidence the percentage of individuals covered by this intake.

[a] Total water includes all water contained in food, beverages, and drinking water.

[b] Based on g protein per kg of body weight for the reference body weight, e.g., for adults 0.8 g/kg body weight for the reference body weight.

[c] Not determined.

Dietary Reference Intakes: RDA, AI*

Life Stage Group	Elements														
	Calcium (mg/d)	Chromium (µg/d)	Copper (µg/d)	Fluoride (mg/d)	Iodine (µg/d)	Iron (mg/d)	Magnesium (mg/d)	Manganese (mg/d)	Molybdenum (µg/d)	Phosphorus (mg/d)	Selenium (µg/d)	Zinc (mg/d)	Potassium (g/d)	Sodium (g/d)	Chloride (g/d)
Infants															
0–6 mo	200*	0.2*	200*	0.01*	110*	0.27*	30*	0.003*	2*	100*	15*	2*	0.4*	0.12*	0.18*
6–12 mo	260*	5.5*	220*	0.5*	130*	11	75*	0.6*	3*	275*	20*	3	0.7*	0.37*	0.57*
Children															
1–3 y	700	11*	340	0.7*	90	7	80	1.2*	17	460	20	3	3.0*	1.0*	1.5*
4–8 y	1,000	15*	440	1*	90	10	130	1.5*	22	500	30	5	3.8*	1.2*	1.9*
Males															
9–13 y	1,300	25*	700	2*	120	8	240	1.9*	34	1,250	40	8	4.5*	1.5*	2.3*
14–18 y	1,300	35*	890	3*	150	11	410	2.2*	43	1,250	55	11	4.7*	1.5*	2.3*
19–30 y	1,000	35*	900	4*	150	8	400	2.3*	45	700	55	11	4.7*	1.5*	2.3*
31–50 y	1,000	35*	900	4*	150	8	420	2.3*	45	700	55	11	4.7*	1.5*	2.3*
51–70 y	1,000	30*	900	4*	150	8	420	2.3*	45	700	55	11	4.7*	1.3*	2.0*
>70 y	1,200	30*	900	4*	150	8	420	2.3*	45	700	55	11	4.7*	1.2*	1.8*
Females															
9–13 y	1,300	21*	700	2*	120	8	240	1.6*	34	1,250	40	8	4.5*	1.5*	2.3*
14–18 y	1,300	24*	890	3*	150	15	360	1.6*	43	1,250	55	9	4.7*	1.5*	2.3*
19–30 y	1,000	25*	900	3*	150	18	310	1.8*	45	700	55	8	4.7*	1.5*	2.3*
31–50 y	1,000	25*	900	3*	150	18	320	1.8*	45	700	55	8	4.7*	1.5*	2.3*
51–70 y	1,200	20*	900	3*	150	8	320	1.8*	45	700	55	8	4.7*	1.3*	2.0*
>70 y	1,200	20*	900	3*	150	8	320	1.8*	45	700	55	8	4.7*	1.2*	1.8*
Pregnancy															
14–18 y	1,300	29*	1,000	3*	220	27	400	2.0*	50	1,250	60	12	4.7*	1.5*	2.3*
19–30 y	1,000	30*	1,000	3*	220	27	350	2.0*	50	700	60	11	4.7*	1.5*	2.3*
31–50 y	1,000	30*	1,000	3*	220	27	360	2.0*	50	700	60	11	4.7*	1.5*	2.3*
Lactation															
14–18 y	1,300	44*	1,300	3*	290	10	360	2.6*	50	1,250	70	13	5.1*	1.5*	2.3*
19–30 y	1,000	45*	1,300	3*	290	9	310	2.6*	50	700	70	12	5.1*	1.5*	2.3*
31–50 y	1,000	45*	1,300	3*	290	9	320	2.6*	50	700	70	12	5.1*	1.5*	2.3*

Note: This table (taken from the DRI reports, see www.nap.edu) presents Recommended Dietary Allowances (RDAs) in bold type and Adequate Intakes (AIs) in ordinary type followed by an asterisk (*). An RDA is the average daily dietary intake level sufficient to meet the nutrient requirements of nearly all (97–98 percent) healthy individuals in a group. It is calculated from an Estimated Average Requirement (EAR). If sufficient scientific evidence is not available to establish an EAR, and thus calculate an RDA, an AI is usually developed. For healthy breast-fed infants, an AI is the mean intake. The AI for other life stage and gender groups is believed to cover the needs of all healthy individuals in the groups, but lack of data or uncertainty in the data prevent being able to specify with confidence the percentage of individuals covered by this intake.

Dietary Reference Intakes: RDA, AI*

Life Stage Group	Vitamins													
	Vitamin A (µg/d)[a]	Vitamin C (mg/d)	Vitamin D (µg/d)[b,c]	Vitamin E (mg/d)[d]	Vitamin K (µg/d)	Thiamin (mg/d)	Riboflavin (mg/d)	Niacin (mg/d)[e]	Vitamin B6 (mg/d)	Folate (µg/d)[f]	Vitamin B12 (µg/d)	Pantothenic Acid (mg/d)	Biotin (µg/d)	Choline (mg/d)[g]
Infants														
0–6 mo	400*	40*	10*	4*	2.0*	0.2*	0.3*	2*	0.1*	65*	0.4*	1.7*	5*	125*
6–12 mo	500*	50*	10*	5*	2.5*	0.3*	0.4*	4*	0.3*	80*	0.5*	1.8*	6*	150*
Children														
1–3 y	300	15	15	6	30*	0.5	0.5	6	0.5	150	0.9	2*	8*	200*
4–8 y	400	25	15	7	55*	0.6	0.6	8	0.6	200	1.2	3*	12*	250*
Males														
9–13 y	600	45	15	11	60*	0.9	0.9	12	1.0	300	1.8	4*	20*	375*
14–18 y	900	75	15	15	75*	1.2	1.3	16	1.3	400	2.4	5*	25*	550*
19–30 y	900	90	15	15	120*	1.2	1.3	16	1.3	400	2.4	5*	30*	550*
31–50 y	900	90	15	15	120*	1.2	1.3	16	1.3	400	2.4	5*	30*	550*
51–70 y	900	90	15	15	120*	1.2	1.3	16	1.7	400	2.4[h]	5*	30*	550*
>70 y	900	90	20	15	120*	1.2	1.3	16	1.7	400	2.4[h]	5*	30*	550*
Females														
9–13 y	600	45	15	11	60*	0.9	0.9	12	1.0	300	1.8	4*	20*	375*
14–18 y	700	65	15	15	75*	1.0	1.0	14	1.2	400[i]	2.4	5*	25*	400*
19–30 y	700	75	15	15	90*	1.1	1.1	14	1.3	400[i]	2.4	5*	30*	425*
31–50 y	700	75	15	15	90*	1.1	1.1	14	1.3	400[i]	2.4	5*	30*	425*
51–70 y	700	75	15	15	90*	1.1	1.1	14	1.5	400	2.4[h]	5*	30*	425*
>70 y	700	75	20	15	90*	1.1	1.1	14	1.5	400	2.4[h]	5*	30*	425*
Pregnancy														
14–18 y	750	80	15	15	75*	1.4	1.4	18	1.9	600[j]	2.6	6*	30*	450*
19–30 y	770	85	15	15	90*	1.4	1.4	18	1.9	600[j]	2.6	6*	30*	450*
31–50 y	770	85	15	15	90*	1.4	1.4	18	1.9	600[j]	2.6	6*	30*	450*
Lactation														
14–18 y	1,200	115	15	19	75*	1.4	1.6	17	2.0	500	2.8	7*	35*	550*
19–30 y	1,300	120	15	19	90*	1.4	1.6	17	2.0	500	2.8	7*	35*	550*
31–50 y	1,300	120	15	19	90*	1.4	1.6	17	2.0	500	2.8	7*	35*	550*

Note: This table (taken from the DRI reports, see www.nap.edu) presents Recommended Dietary Allowances (RDAs) in **bold type** and Adequate Intakes (AIs) in ordinary type followed by an asterisk (*). An RDA is the average daily dietary intake level sufficient to meet the nutrient requirements of nearly all (97–98 percent) healthy individuals in a group. It is calculated from an Estimated Average Requirement (EAR). If sufficient scientific evidence is not available to establish an EAR, and thus calculate an RDA, an AI is usually developed. For healthy breast-fed infants, an AI is the mean intake. The AI for other life stage and gender groups is believed to cover the needs of all healthy individuals in the groups, but lack of data or uncertainty in the data prevent being able to specify with confidence the percentage of individuals covered by this intake.

[a] As retinol activity equivalents (RAEs). 1 RAE = 1 µg retinol, 12 µg β-carotene, 24 µg α-carotene, or 24 µg β-cryptoxanthin. The RAE for dietary provitamin A carotenoids is two-fold greater than retinol equivalents (RE), whereas the RAE for preformed vitamin A is the same as RE.

[b] As cholecalciferol. 1 µg cholecalciferol = 40 IU vitamin D.

[c] Under the assumption of minimal sunlight.

[d] As α-tocopherol. α-Tocopherol includes *RRR*-α-tocopherol, the only form of α-tocopherol that occurs naturally in foods, and the *2R*-stereoisomeric forms of α-tocopherol (*RRR*-, *RSR*-, *RRS*-, and *RSS*-α-tocopherol) that occur in fortified foods and supplements. It does not include the *2S*-stereoisomeric forms of α-tocopherol (*SRR*-, *SSR*-, *SRS*-, and *SSS*-α-tocopherol), also found in fortified foods and supplements.

[e] As niacin equivalents (NE). 1 mg of niacin = 60 mg of tryptophan; 0–6 months = preformed niacin (not NE).

[f] As dietary folate equivalents (DFE). 1 DFE = 1 µg food folate = 0.6 µg of folic acid from fortified food or as a supplement consumed with food = 0.5 µg of a supplement taken on an empty stomach.

[g] Although AIs have been set for choline, there are few data to assess whether a dietary supply of choline is needed at all stages of the life cycle, and it may be that the choline requirement can be met by endogenous synthesis at some of these stages.

[h] Because 10 to 30 percent of older people may malabsorb food-bound B_{12}, it is advisable for those older than 50 years to meet their RDA mainly by consuming foods fortified with B_{12} or a supplement containing B_{12}.

[i] In view of evidence linking folate intake with neural tube defects in the fetus, it is recommended that all women capable of becoming pregnant consume 400 µg from supplements or fortified foods in addition to intake of food folate from a varied diet.

[j] It is assumed that women will continue consuming 400 µg from supplements or fortified food until their pregnancy is confirmed and they enter prenatal care, which ordinarily occurs after the end of the periconceptional period—the critical time for formation of the neural tube.

nutrition & you

GUIDE STUDENTS TO A

DEEPER UNDERSTANDING OF NUTRITION

GETTING TO **THE CORE** OF WHAT STUDENTS WANT TO LEARN ABOUT NUTRITION

VISUAL Chapter Summary

LO 5.1 Describe the three classifications of lipids and explain the differences in the structure of triglycerides, phospholipids, and cholesterol.

Lipids refer to a category of carbon, oxygen, and hydrogen compounds that do not dissolve in water. There are three types of lipids: triglycerides, phospholipids, and sterols. A triglyceride, also known as a fat, contains three fatty acids joined to a glycerol backbone and is the most abundant type of lipid in your body and in foods. A fatty acid without any double bonds is called a saturated fatty acid. If one or more double bonds is present, it is called an unsaturated fatty acid. A saturated fat contains mostly saturated fatty acids and tends to be solid at room temperature. An unsaturated fat has mostly unsaturated fatty acids, is liquid at room temperature, and is also known as an oil.

Phospholipids contain two fatty acids at their tail end and have a phosphate-containing head. Their polar heads and nonpolar tails cause them to be attracted to both water and fat. Lecithin is the major phospholipid in your cell membranes. Lecithin is often used as an emulsifier in foods. Cholesterol is the major sterol in your body and in foods. Cholesterol is the precursor of vitamin D, bile acids, and sex hormones. Your body makes all the cholesterol it needs.

LO 5.2 Describe how fat is digested, absorbed, and transported in the body.

The majority of fat in your diet is digested and absorbed in your small intestine with the help of bile acids and pancreatic lipase. The digested fat is predominantly packaged in protein- and phosphorus-containing lipoproteins called chylomicrons, which travel in your lymph to your bloodstream.

Other lipoproteins include the "bad" LDL cholesterol carrier and the "good" HDL cholesterol carrier. LDL deposits cholesterol along your artery walls and contributes to atherosclerosis. HDL removes cholesterol from arteries and brings it to the liver to be used or excreted from your body.

LO 5.3 Describe the functions of fat in the body.

In your body, fat is used as a protective cushion for your bones, organs, and nerves, in your cell membranes, and as insulation to maintain your body temperature. In food, fat provides texture and flavor, and contributes to satiety. Fat in food also aids in the absorption of fat-soluble vitamins.

LO 5.4 Define the dietary recommendations for total fat, the essential fatty acids, saturated fat, cholesterol, and *trans* fat.

Your diet should contain 20 to 35 percent of calories coming from fat, with no more than 10 percent from saturated fat, and minimal amounts of *trans* fats. Because fat provides the essential fatty acids, linoleic acid and alpha-linolenic acid, a minimum of 5 percent and up to 10 percent of your total calories should be from linoleic acid, and 0.6 percent to 1.2 percent of total calories should be from alpha-linolenic acid.

LO 5.5 Identify the major food sources of the different types of fats, including the essential fatty acids, saturated fats, and *trans* fats.

Plant-based unsaturated fats are the best sources of fat and are abundant in vegetable oils, such as soybean, corn, and canola oils, as well as in soybeans, walnuts, peanut butter, and flaxseeds. Vegetables oils, nuts, and flaxseeds are good sources of essential fatty acids. A limited amount of alpha-linolenic acid can be converted to the omega-3 fatty acids, eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), which have been shown to reduce the risk of heart disease and stroke. Because fish, especially fatty fish, are good sources of EPA and DHA, you should consume at least two servings of fish weekly. Most saturated fat in the diet comes from animal foods, including whole-milk dairy products such as cheese, butter, and ice cream, fatty cuts of meat, and the skin on poultry. The majority of *trans* fats in foods are created by food manufacturers through the process of hydrogenation. Reading food labels can help you lower your intake of both saturated and *trans* fats.

LO 5.6 Compare the different fat substitutes currently used in food products.

Fat substitutes are designed to provide all the creamy properties of fat for fewer calories and total fat grams. Because fat has more than double the calories per gram of carbohydrates or protein, fat substitutes have the potential to reduce calories from fat.

LO 5.7 Describe the development of atherosclerosis, including its role in the risk of heart disease.

Heart disease develops when the coronary arteries, the large blood vessels that supply oxygen and other nutrients to the heart, accumulate a buildup of LDLs and other substances along their walls. As the artery gets narrower, blood flow is impeded and less oxygen and nutrients are delivered to the heart; a blood clot could also block the narrowed artery, leading to a heart attack or stroke.

Heart disease is the leading cause of death in the United States. Risk factors that you can't control are your age, gender, family history of heart disease, and type 1 diabetes. Risk factors that you can control include preventing and controlling type 2 diabetes, high blood pressure, smoking, physical inactivity, excess weight, a low HDL cholesterol level, and an elevated LDL cholesterol level.

UPDATED **Visual Chapter Summaries tied to Learning Outcomes**

Students now have a clear learning path through each chapter, organized by learning outcomes. Each chapter starts with numbered outcomes, which then are repeated at the beginning of the associated chapter section. The end-of-chapter Visual Chapter Summary is organized by outcome as well, reinforcing the student's review. The summaries include important art and photos from the chapter and serve as concise study and review tools, with accompanying activities in Mastering Nutrition. In addition, Check Your Understanding questions encourage student review and indicate by learning outcome those sections that need further study.

A CASE STUDY

health CONNECTION

Destined for Diabetes?

Joaquin is a 54-year-old math professor who weighs 50 pounds more than he did when he graduated from college. His annual physical at the campus health center uncovered that his blood glucose level classified him as having prediabetes. His level is higher than ideal but not high enough for a diagnosis of full-fledged diabetes. His father and grandfather both developed diabetes later in their lives. Joaquin's physical activity consists of walking less than one block from the faculty parking lot to his office. Because he doesn't like to cook, he eats breakfast at the donut shop and lunch at the hamburger fast-food joint on campus, and picks up takeout for dinner.

There are about 80 million individuals who, like Joaquin, have prediabetes and are at higher risk of developing not only diabetes, but also other health issues. A chronically higher level of glucose in the blood can cause damage to the heart, kidneys, eyes, and nerves. Factors that increase the risk of developing prediabetes include being 45 years of age and older; being overweight or obese; having a family history of diabetes; being of African-American, Hispanic/Latino, Native American, Asian-American, or Pacific Islander racial or ethnic background; having developed diabetes during a pregnancy (known as gestational diabetes) or having given birth to a baby weighing nine pounds or more; and being physically active less than three times a week.

Joaquin has one factor in his favor, which is that he now knows he is prediabetic; unfortunately, the majority of people with prediabetes don't even know that they have it. If people with this condition don't make any changes in their diet and lifestyle to improve their health, it is estimated that up to 30 percent of them will develop full-fledged type 2 diabetes within 5 years.[1] Joaquin now has the opportunity to try to reverse his prediabetic condition and so possibly avoid developing diabetes.

Think About It

What are three of Joaquin's risk factors for prediabetes? Which ones can he change and which ones can't he?

leak out into the urine, and at the same time, cause a backup of wastes in the blood. Kidney failure could result.

Diabetes is a risk factor for heart disease. The excess amount of fat often seen in the blood in poorly managed diabetes is most probably an important factor in the increased risk of heart disease in those with diabetes. Fortunately, good nutrition habits play a key role in both the prevention and management of diabetes.

Whereas a high level of glucose in your blood on a regular basis isn't healthy, a blood glucose level that is too low, or **hypoglycemia**, can be unpleasant for many of us and downright dangerous for some with diabetes. Individuals who experience hypoglycemia may feel hungry, nervous, dizzy, light-headed, confused, weak, or shaky, and even begin to sweat. Eating or drinking carbohydrate-rich foods, such as hard candies, juice, or soda, can relieve these symptoms quickly and raise the blood glucose level to a normal range.

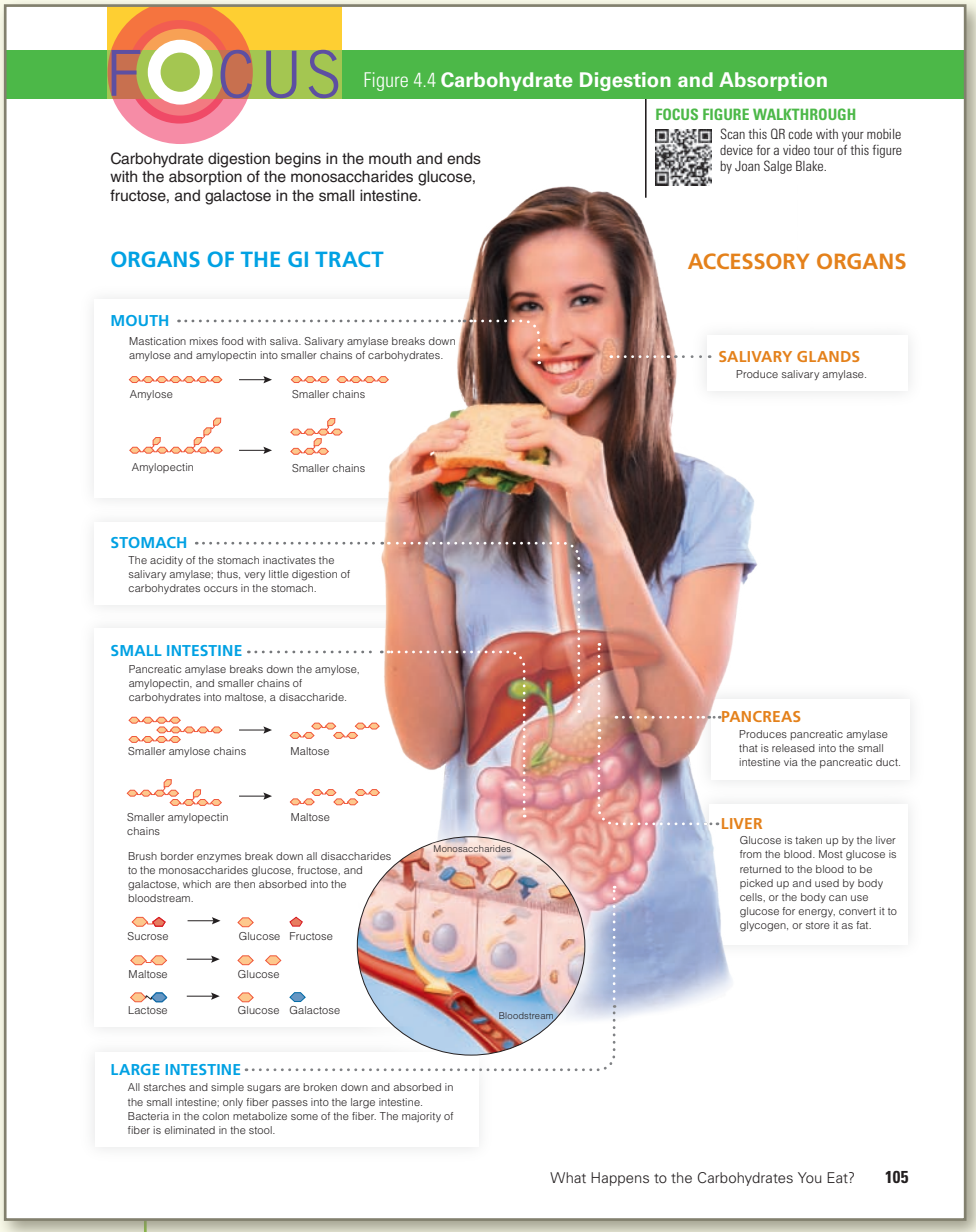
Those with diabetes who need to use insulin and/or blood glucose–lowering medications daily are at risk of hypoglycemia if they skip meals and snacks or if they don't eat enough to cover the effects of the medication. If these individuals ignore their symptoms, their blood glucose level can drop so low that they could faint, or slip into a coma.[2] Those with diabetes need to eat regularly to maintain blood glucose levels that coincide with their medication. A change in their activities or exercise level can also lower the blood glucose level. Diabetics need to check their blood glucose level before they exercise to determine if a snack is needed.

hypoglycemia A blood glucose level that drops to lower than 70 mg/dl. Hunger, shakiness, dizziness, perspiration, and light-headedness are some signs of hypoglycemia.

NEW

Health Connection: A Case Study

The connections between nutrition and health are explored in new case studies written for every chapter. Students are introduced to a person experiencing a health problem and explore the interplay between nutrition and health, with follow-up critical thinking questions.



NEW

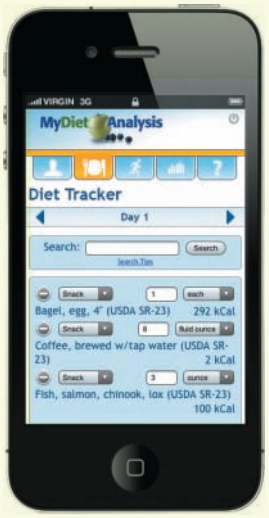
Focus Figure Walkthroughs

Author Joan Salge Blake narrates a video tour of full-page Focus Figures. These colorful figures, designed to teach key concepts in nutrition through bold, clear and detailed visual presentations, are now enhanced with dynamic media. When students scan the QR code, they see the figure come to life, accompanied by the author's detailed walkthrough of each part of the figure, as if she were breaking it down for a student in person. Already designed to guide students through complex processes using text and stepped-out art, these figures now make tough topics even clearer and easier to understand.

CONTINUOUS LEARNING
BEFORE, **DURING**, and **AFTER** CLASS with MasteringNutrition™ with MyDietAnalysis

Mastering is the most effective and widely used online homework, tutorial, and assessment system for the sciences. MasteringNutrition with MyDietAnalysis includes content specific to introductory nutrition courses, delivering self-paced tutorials that focus on your course objectives, provides individualized coaching, and responds to each student's progress.

MyDietAnalysis is now available as single sign on to MasteringNutrition. For smartphone users, a new mobile website version of MyDietAnalysis is available. Students can track their diet and activity intake accurately, anytime and anywhere, from their mobile devices.



BEFORE CLASS

Dynamic Study Modules provide students with a preview of what's to come

Dynamic Study Modules enable students to study effectively on their own in an adaptive format. Students receive an initial set of questions with a unique answer format asking them to indicate their confidence.

Once completed, Dynamic Study Modules include explanations using material taken directly from the text.

DURING CLASS

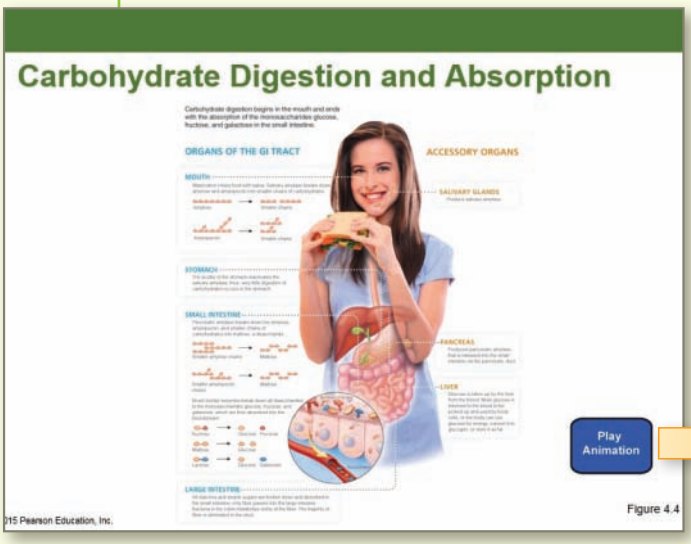
Learning Catalytics engage students during lecture

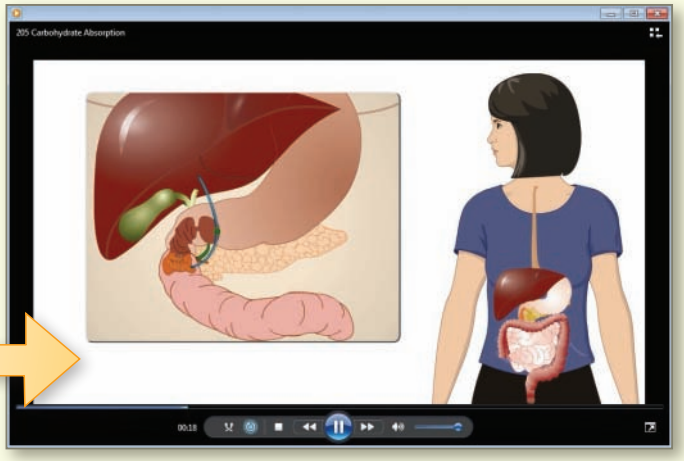
Learning Catalytics, a "bring your own device" student engagement, assessment, and classroom intelligence system, allows students to use their smartphone, tablet, or laptop to respond to questions in class.

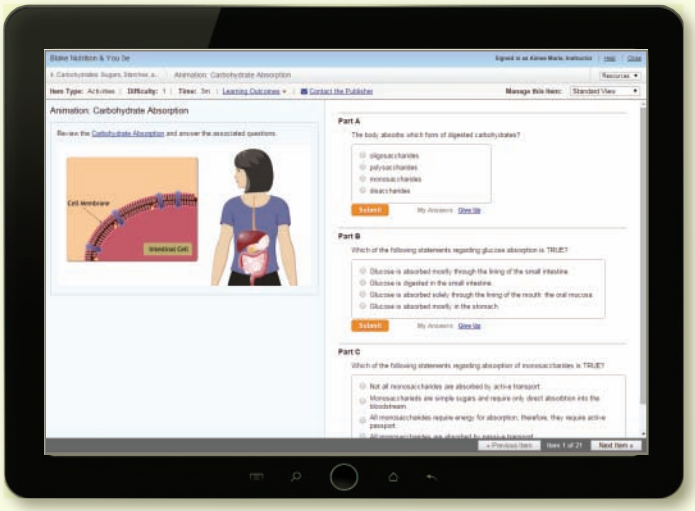
UPDATED

Nutrition Animations explain tough topics during class

34 Nutrition Animations explain big picture concepts that help students learn the hardest topics in nutrition. These animations are provided as embedded media within your PowerPoint deck for easy play and review during class.







The updated animations are also mobile-ready and available with assessment within MasteringNutrition. These animations address tough topics and common misconceptions and feature a more contemporary look to appeal to today's students.

Topics include:

- DRI Determination
- Reading Labels
- Carbohydrate Digestion
- Lipid Digestion
- Basic Absorption Mechanisms
- Carbohydrate Absorption
- Protein Absorption
- Vitamin A and the Visual Cycle and much more

Additional Engaging In-Class Media

Instructors can also incorporate dynamic media from the Teaching Toolkit DVD into lecture and build class discussions and activities around Nutrition Animations, *ABC News* Lecture Launchers, and more. For more information, please see the last page of this walkthrough.

MasteringNutrition™

AFTER CLASS

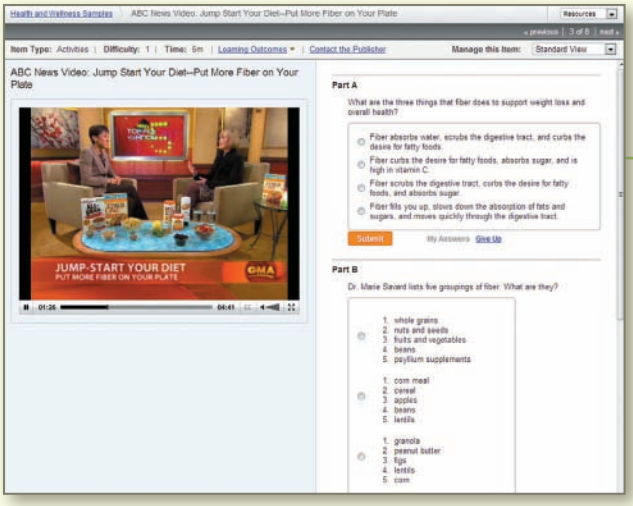
Easy-to-Assign, Customize, and Automatically Graded Assignments

The breadth and depth of content available to you to assign in Mastering is unparalleled, allowing you to quickly and easily assign homework to reinforce key concepts.

NEW

Visual Chapter Summary Coaching Activities

These MasteringNutrition activities complement each Visual Chapter Summary with hints and feedback that help students with their understanding. Each covers one or more learning outcome and references each learning outcome within the activity.



NEW

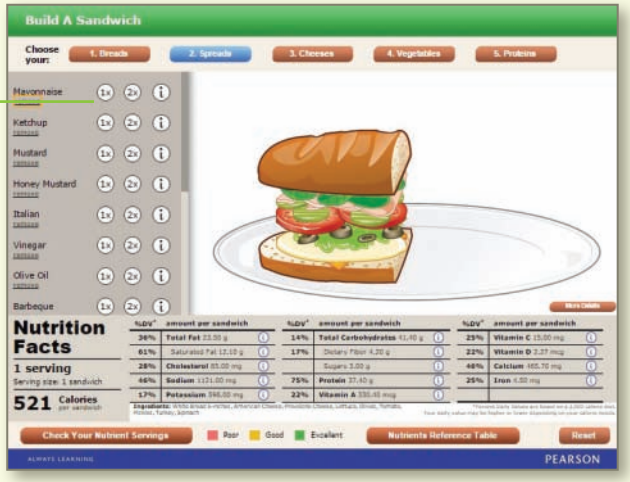
ABC News Lecture Launcher videos

Current videos cover up-to-date hot topics in the nutrition field, bringing nutrition to life and sparking discussion. These are accompanied by multiple-choice questions with wrong-answer feedback.

UPDATED

18 NutriTools Build-A-Meal Activities

Dynamic coaching activities allow students to apply nutrition concepts to improve their health through interactive mini-lessons that provide hints and feedback. The Build a Meal, Build a Pizza, Build A Salad, and Build A Sandwich tools have been carefully rethought to improve the user experience, making them easier to use. They are now HTML5 compatible.



YOUR COMPLETE INTERACTIVE eTEXT

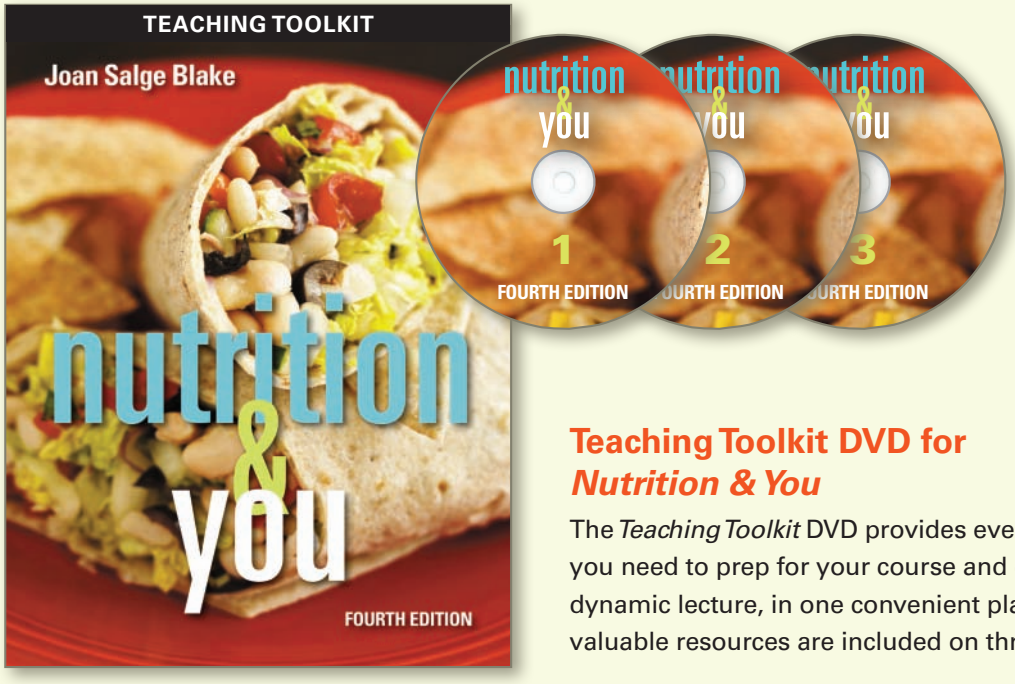
NEW

Enhanced Interactive eText 2.0

This enhanced, interactive eText is complete with embedded videos, animations, author-narrated Focus Figure Video Walkthroughs, multiple choice questions, and drag and drop activities designed for students to interact with the material, not just read it. eText 2.0 is mobile friendly and ADA accessible.

- Now available on smartphones and tablets.
- Seamlessly integrated videos and other rich media.
- Accessible (screen-reader ready).
- Configurable reading settings, including resizable type and night reading mode.
- Instructor and student note-taking, highlighting, bookmarking, and search.

EVERYTHING YOU NEED
TO TEACH IN ONE PLACE



Teaching Toolkit DVD for *Nutrition & You*

The *Teaching Toolkit* DVD provides everything that you need to prep for your course and deliver a dynamic lecture, in one convenient place. These valuable resources are included on three disks:

DISK 1

Robust Media Assets for Each Chapter

- *ABC News* Lecture Launcher videos
- Practical Nutrition Tips videos
- Nutrition Animations
- PowerPoint Lecture Outlines
- Media-Only PowerPoint® slides for easy importing of videos and animations
- PowerPoint clicker questions and Jeopardy-style quiz show questions
- Files for all illustrations and tables and selected photos from the text

DISK 2

Comprehensive Test Bank

- Test Bank in Microsoft Word, PDF, and RTF formats
- Computerized Test Bank, which includes all the questions from the printed test bank in a format that allows you to easily and intuitively build exams and quizzes

DISK 3

Additional Innovative Supplements for Instructors and Students

For Instructors

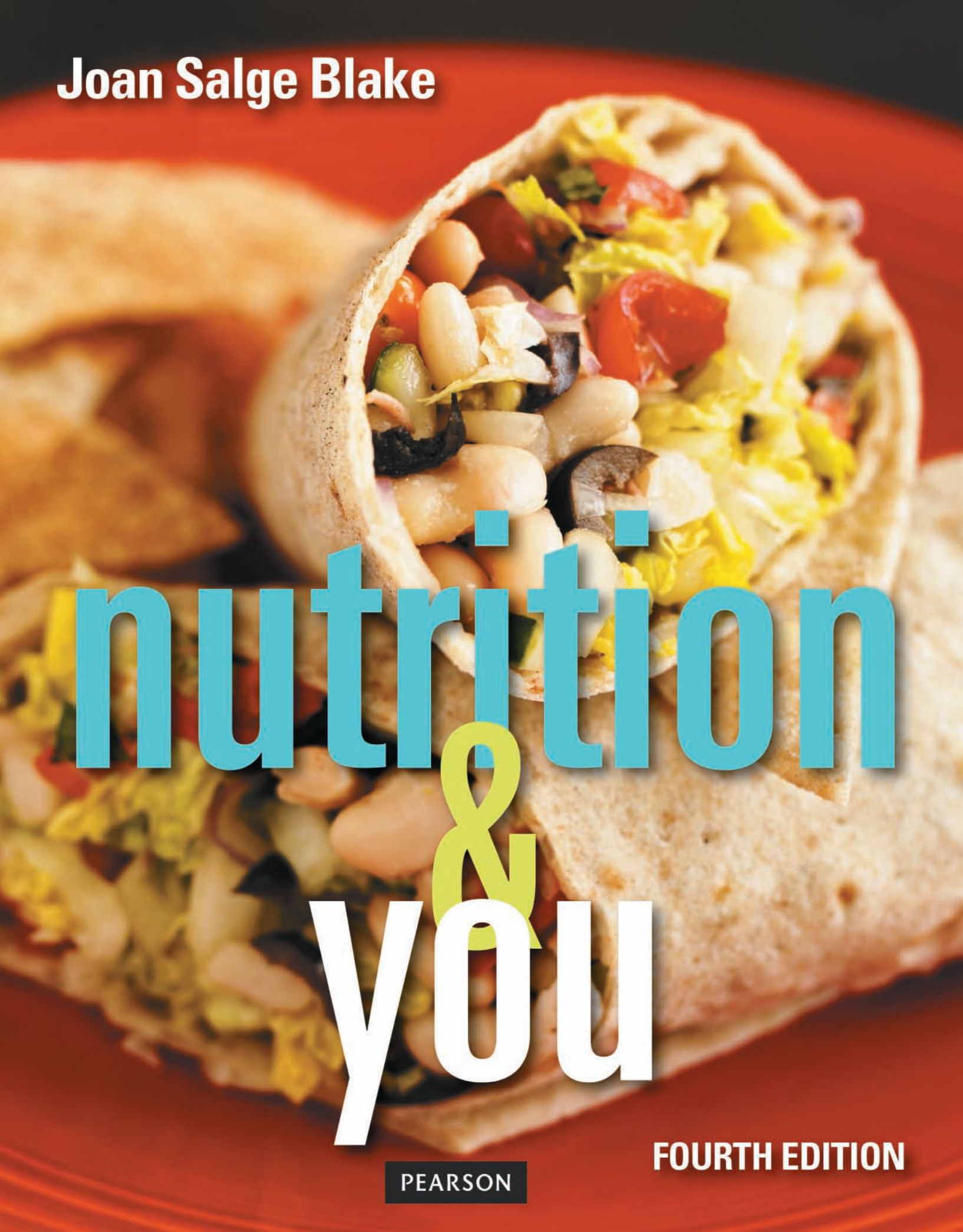
- Instructor Resource and Support Manual in Microsoft Word and PDF formats
- Step-by-step MasteringNutrition tutorials
- Video introduction to Learning Catalytics™
- *Great Ideas in Teaching Nutrition*

For Students

- *Eat Right! Healthy Eating in College and Beyond*
- Food Composition Table

User's Quick Guide for Nutrition & You

This easy-to-use printed supplement accompanies the Teaching Toolkit and offers easy instructions for both experienced and new faculty members to get started with the rich Toolkit content and MasteringNutrition.


Joan Salge Blake
nutrition & you
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nutrition IN THE Real World

self-ASSESSMENT

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MADE over MADE better

POINTS OF VIEW

About the Author

Joan Salge Blake is a clinical associate professor and dietetics internship director at Boston University's Sargent College of Health and Rehabilitation Sciences. She teaches both graduate and undergraduate nutrition courses and has been a guest lecturer at both the Boston University Goldman School of Dental Medicine and the Boston University School of Medicine. She received the Whitney Powers Excellence in Teaching Award from Boston University. Joan completed her MS at Boston University and is currently working toward her doctorate.

Joan is a member of the Academy of Nutrition and Dietetics (AND) and the Massachusetts Dietetic Association (MDA). She has been a presenter and presiding officer at both the AND Annual Meeting and the MDA Annual Convention, and she was previously named the MDA's "Young Dietitian of the Year," Outstanding Dietitian (2009), and Outstanding Dietetic Educator (2007). Joan has served on the MDA board for more than a decade in many roles, including past MDA Director of Education and Nominating Committee Chairperson.

In addition to teaching and writing, Joan is also a national media spokesperson and is often asked to translate complex nutritional issues in understandable terms. She has conducted more than 1,000 media interviews. Joan is also a nutrition blogger for the *U.S. News & World Report*'s Eat + Run website.

Why I Wrote *Nutrition & You*

"You'll probably finish this class with a whole new outlook on diet and exercise . . . and you'll probably be a lot healthier!"

"Professor Salge Blake makes the material seem like the most interesting material in the universe."

—Excerpts from student comments about my nutrition class at Boston University, courtesy of ratemyprofessor.com

I wrote *Nutrition & You* for you. It is all about you. For more than a decade, I have taught an Introduction to Nutrition course to a packed classroom of almost 200 students, at the unseemly hour of 8 a.m. The students keep coming year after year because I not only deliver accurate nutrition science and information in an easy-to-understand, entertaining format, but more importantly, I personalize the information for them so that they can immediately apply it to their own lifestyles.

As a college student, you are exposed to a steady stream of nutrition and health information from the media, your family and friends, and the Internet. While you may think Google has the answer to your nutrition questions, I have seen students frequently fall victim to misinformation found via a quick Web search and a few glitzy websites. So I designed *Nutrition & You* to be as user friendly as possible, packed exclusively with sound nutrition information. The text goes beyond basic nutrition science and provides realistic advice and strategies to help you easily incorporate what you learn into your busy life. The text is written to meet *your* nutritional concerns and answer *your* questions.

As you read *Nutrition & You,* I want you to feel as though you are sitting in my class being entertained and informed. For this reason, I wrote the text in a conversational tone, and we designed it to visually communicate complex nutrition science and topics in an easy-to-understand way.

The information in this textbook is arranged in a deliberate **"What," Why,"** and **"How"** format. Each chapter will tell you:

- "**What**" the nutrition concept is;
- "**Why**" it is important and the role it plays in your body; and then, most importantly,
- "**How**" to easily adjust your lifestyle based on what you just learned.

Remember, nutrition matters to *you!* What you eat today and tomorrow will affect you and your body for years to come. Just as important, what you learn about nutrition today will enable you to make a positive effect on the lives of others from now on.

Joan Salge Blake

New to This Edition

Both nutrition research and personalized applications are continually expanding this dynamic science. To keep pace, we have reorganized the content, visually improved the figures and tables, and added new features to each chapter in the fourth edition of *Nutrition & You*. In addition, we have made these significant additions to the book and its digital accompaniments (for specific chapter-by-chapter updates, see the next section):

- **Interactive eText 2.0,** complete with embedded videos, animations, author-narrated Focus Figure Video Walkthroughs, multiple-choice questions, and drag-and-drop activities, is designed for students to interact with the material, not just read it. eText 2.0 is mobile friendly and ADA accessible.
  - Now available on smart phones and tablets
  - Seamlessly integrated videos and other rich media
  - Accessible (screen-reader ready)
  - Configurable reading settings, including resizable type and night reading mode
  - Instructor and student note-taking, highlighting, bookmarking, and search
- **Focus Figure video walkthroughs** feature a narration for students to listen to as they watch a video walkthrough of each Focus Figure, where narrator Joan Salge Blake guides students through each section of the figure, highlighting important concepts and making connections. Access these by scanning the QR code on each Focus Figure.
- The new **Health Connection: A Case Study** feature box in each chapter examines the links between nutrition and disease. This new presentation is intended to:
  - Take a more **case-study approach** to really engage students
  - Add **key concepts** back into the **main narrative**
  - Include new **Health Connection Case Study questions** in MasteringNutrition, making the feature assignable

Chapter-by-Chapter Updates

Chapter 1

- Updated information on added sugars and dietary fat, food and eating trends, leading causes of death among Americans, overweight and obesity rates among Americans, and key questions to ask when evaluating a nutrition- and health-related website
- Updated figure on nutrients and their functions in the body and added new obesity map
- Added a new Health Connection: A Case Study on weight gain called "Fast Food City"

Chapter 2

- Added new information about the Scientific Report of the 2015 *Dietary Guidelines for Americans* committee, the proposed new Nutrition Facts panel on the food label, functional foods, Health Claims, and circadian rhythms
- Added a new Health Connection: A Case Study on functional foods and cholesterol called "A Functionally Natural Approach"
- Updated Two Points of View feature box

Chapter 3

- Updated information regarding heartburn, foods that can contribute to acid reflux, celiac disease, and Alli
- Provided latest information regarding esophageal cancer, peptic ulcers, and irritable bowel syndrome
- Added a new Health Connection: A Case Study on celiac disease called "Tired of Gluten"

Chapter 4

- Updated lactose intolerance section, rates of per capita consumption of added sugars, per capita availability of grains among Americans, the glycemic index and diabetes, and the Examining the Evidence feature box about sugar-sweetened beverages
- Added new information regarding added sugars on the food label, advantame as a sugar substitute, and the dietary importance of whole grains among Americans
- Added a new Health Connection: A Case Study on prediabetes called "Destined for Diabetes?"

Chapter 5

- Updated the percentage of calories from fat consumed by Americans, information on the current consumption of dietary cholesterol by Americans and levels of cholesterol in foods, information about fat-free cookies, and research on nuts
- Added new information about *trans* fat labeling and the shopping habits of consumers
- Revised information on fish and pregnant women
- Incorporated information regarding heart disease into the text
- Added a new Health Connection: A Case Study on high cholesterol called "All Fats Are Not Created Equal"

Chapter 6

- Updated information about protein digestibility, soy and health, synthesis of new skin, and statistics about protein energy malnutrition
- Updated section on protein supplements and Bar Hopping chart
- Added new information about intake of fish
- Added a new Health Connection: A Case Study on vegetarian marathon runners called "Running on Empty"

Chapter 7

- Updated information on age-related macular degeneration and cataracts, vitamin losses in cooking, statistics on vitamin supplement usage, vitamin A and cell differentiation, daily intake of vitamin E by Americans, daily vitamin D needs, rickets and vitamin D deficiency, vitamin B_{12}, and vitamin C, echinacea, and zinc and the common cold
- Added new Figure 7.21 on food patterns and daily vitamin needs
- Changed Two Points of View feature box to address the new topic "Should vegetarians take vitamin B_{12} supplements?"

Chapter 8

- Updated information about bottled water, sodium recommendations in the *Dietary Guidelines for Americans* committee report, current intake of dairy foods among Americans, osteoporosis, current intake levels of all the minerals, and zinc and the common cold
- Updated figure showing fluoride map of the United States
- Added information regarding sustainability
- Changed Two Points of View feature box to address the new topic "Is there any nutritional benefit to consuming designer waters?"
- Added a new Health Connection: A Case Study on hypertension called "A High-Pressure Situation"

Chapter 9

- Updated statistics on the occurrence of cirrhosis in the U.S., drunk driving fatalities, and underage drinking
- Updated information on fetal alcohol spectrum disorders, and binge drinking
- Introduced new term, "heavy drinking"
- Updated criteria for alcoholism

Chapter 10

- Added Paleo Diet to coverage of popular diets and moved discussion of extreme measures to treat obesity to main text
- Updated trendy fad diet substances and statistics on weight loss and bariatric surgery
- Added new Focus Figure 10.7: Your Brain Controls Hunger and Satiation
- Added photo of realistic Lammily doll
- Added Health Connection: A Case Study on obesity called "Extreme Measures"

Chapter 11

- Updated calcium and creatine sections based on updated reference
- Updated Figure 11.3: What Fuels Our Activities?
- Developed a new Health Connection: A Case Study on the female athlete triad called "Sacrificing for Her Art"
- Changed Two Points of View feature box to address the new topic "Should energy drinks have caffeine limits similar to those for sodas?"

Chapter 12

- Modified chapter title, added new Learning Outcome, and created new text section to represent additional focus on sustainability
- Updated information in text and tables in section Where Does Your Food Come From? to reflect new agricultural census
- Added new figure showing a label of rBGH-free milk and updated Figure 12.3 map showing number of farms in America
- Updated text to reflect the focus on cost vs. benefits of using hormones, antibiotics, and pesticides
- Updated section on biotechnology, including information about the new USDA process of certification for GMO-free products

Chapter 13

- Added a new Health Connection: A Case Study about reducing risk of listeriosis in a pregnant woman called "Getting the Lowdown on *Listeria*"
- Added content in the food additives section discussing the risk/benefit ratio of using irradiation within the food supply
- Changed Two Points of View feature box to address the new topic "Is it safe to get your meal from a food truck?"

Chapter 14

- Updated content relating to fertility in men and women and regarding the benefits of breast-feeding
- Moved information on food allergies into the main text and added information about increased frequency of food allergies
- Added a new Health Connection: A Case Study called "The Stress of Infertility"

Chapter 15

- Updated calcium recommendations, statistics on eating frequency, physical activity, sedentary hours, obesity among children, and prevalence data for type 2 diabetes, and information on picky eating
- Added information about the School Breakfast Program and updated information on the National School Lunch Program to include policies from the Healthy Hunger-Free Kids Act
- Added a new Health Connection: A Case Study on breast cancer called "A Wake-Up Call"
- Changed Two Points of View feature box to address the new topic "Should school meals align with the *Dietary Guidelines for Americans*?"

Chapter 16

- Updated Figures 16.1 and 16.3 on food insecurity and updated information on U.S. and world food insecurity, illiteracy of women, AIDS orphans, worldwide childhood deaths resulting from malnutrition and diarrheal illnesses, and people served by Meals on Wheels
- Revised Health Connection: A Case Study called "Overweight and Undernourished"
- Added a new Self-Assessment, "Which Is Cheaper: Fast Food or a Homemade Lunch?"
- Updated Two Points of View feature box on "Food vs. Cash: Which Is More Effective for Alleviating Hunger?"

Other Key Features

- **Visual Chapter Summaries** are structured to mirror the organization of the chapter content and numbered to correspond with the chapter objectives. They contain important art and photos from the main chapter text and serve as concise study and review tools.
- **The learning outcomes, chapter headings, and summary sections** are linked together to provide a strong pedagogical structure that promotes comprehension and facilitates study and review.

- **Examining the Evidence** features look at the latest research on controversial or confusing "hot" topics in nutrition today and include critical-thinking questions. These features guide you to making better, informed choices in your personal nutrition, and becoming a critical media consumer of nutrition information.
- **MyDietAnalysis mobile website** is now available, so you can track your diet and activity accurately, anytime and anywhere, from your mobile device.
- **Exploring Micronutrients** within Chapters 7 and 8 are self-contained sections that incorporate photos, illustrations, and text to present each vitamin and mineral. Each micronutrient is discussed using the same categories (forms, functions, daily needs, food sources, toxicity and deficiency symptoms) for a consistent and easy-to-study format. These enable you to identify at a glance the key aspects of each nutrient.
- **Two Points of View** at the end of each chapter contains a summary of opposing viewpoints on a timely topic. This feature will encourage you to think critically about pro and con arguments on a given issue and decide for yourself which side you agree with. You will be applying the critical-thinking skills that you learned in the chapter as you think through each point of view presented.
- **True or False?** pretests open each chapter with 10 true/false statements that help you realize that the things you think you know about nutrition aren't always accurate. Answers are given at the end of the chapter, and a true/false icon emphasizes locations of answers within the chapter.
- **Nutrition in the Real World** features take a closer look at some of the ways nutritional information and issues affect daily life.
- **Practical Nutrition videos** show the dynamic and ever-interesting Joan Salge Blake walking you through making better eating choices in familiar environments, based on a choice related to the chapter topic. Examples include a pizza parlor, deli, coffee shop, breakfast choices on the go, fitness smoothies, and much more. QR codes appear throughout the text for direct links to the videos.
- **Table Tips** give practical ideas for incorporating adequate amounts of each nutrient into your diet using widely available foods.
- **Self-Assessments** throughout the book ask you to think about your own diet and behaviors and how well you are meeting your various nutrient needs.
- **Made Over, Made Better** food comparisons at the end of Chapters 4 through 11 can help you visually see how to make more nutritious decisions.
- **eLearn activities** within the chapters direct you to a website to complete an animated activity, assessment, or worksheet.

Digital Learning Products

MasteringNutrition™
www.masteringhealthandnutrition.com

MasteringNutrition is an online homework, tutorial, and assessment product designed to improve results by helping students quickly master concepts. Students benefit from self-paced tutorials that feature immediate wrong-answer feedback and hints that emulate the office-hour experience to help keep students on track. With a wide range of interactive, engaging, and assignable activities, students are encouraged to actively learn and retain tough course concepts.

Specific features include:

- **Interactive eText 2.0,** complete with embedded videos, animations, author-narrated Focus Figure Video Walkthroughs, multiple-choice questions, and drag-and-drop activities designed for students to interact with the material, not just read it. eText 2.0 is mobile friendly and ADA accessible.
- **Focus Figure video walkthroughs** feature Joan Salge Blake narrating a video walkthrough of each Focus Figure, guiding students through each section of the figure, highlighting important concepts and making connections.
- **Visual Chapter Summary coaching activities** complement each Visual Chapter Summary with hints and feedback that helps students with their understanding of one or more learning outcomes and reference each learning outcome within the activity.
- **Focus Figure coaching activities** guide students through key nutrition concepts with interactive mini-lessons that provide hints and feedback.
- **18 NutriTools Build-A-Meal coaching activities** allow students to apply nutrition concepts to improve their health through interactive mini-lessons that provide hints and feedback. The Build a Meal, Build a Pizza, Build a Salad, and Build a Sandwich tools have been carefully rethought to improve the user experience, making them easier to use. They are now HTML5 compatible.
- **Pre-lecture reading questions** ensure that students come prepared for lecture by answering multiple-choice questions related to the content in the text.
- ***ABC News* videos** cover up-to-date hot topics that occur in the nutrition field that bring nutrition to life and spark discussion. These are accompanied by multiple-choice questions with wrong-answer feedback.
- **34 nutrition animation activities** explain big-picture concepts that help students learn the hardest topics in nutrition. These animations include questions with wrong-answer feedback that address students' common misconceptions and have been refreshed and made compatible for MasteringNutrition and mobile devices.
- **Math activities** provide hands-on practice of important calculations with helpful wrong-answer feedback.
- **Scientific reporting lab activities** allow students to apply the principles of the scientific process to their own diet analysis project and determine if they are at risk for cardiovascular disease, diabetes, and more. These activities include short answer/essay questions.
- **Single sign-on for MyDietAnalysis,** a software system that allows students to complete a diet assignment. Students keep track of their food intake and exercise and enter the information to create a variety of reports (e.g., the balance between fats, carbohydrates, and proteins in their diet; how many calories they're eating vs. expending; whether they're meeting the RDAs for vitamins and minerals, etc.). A **MyDietAnalysis activity** has been added within MasteringNutrition for each text chapter that incorporates the use of MDA. A mobile version gives students 24/7 access via their smart phones to easily track food, drink, and activity on the go.
- **Chapter Summary MP3s** relate to chapter content and come with multiple-choice questions that provide wrong-answer feedback.
- **Get Ready for Nutrition** gives students extra help with math and chemistry skills.
- **Dynamic Study Modules** help students study effectively on their own by continuously assessing their activity and performance in real time. Here's how it works: Students complete a set of questions with a unique answer format that also asks them to indicate their confidence level. Questions repeat until the student can answer them all correctly and confidently. Once completed,

Dynamic Study Modules explain the concept using materials from the text. These are available as graded assignments prior to class, and accessible on smart phones, tablets, and computers.

- **Learning Catalytics™** is an interactive, student response tool that uses students' smart phones, tablets, or laptops to engage them in more sophisticated tasks and thinking. Now included with MyLab & Mastering with eText, Learning Catalytics enables you to generate classroom discussion, guide your lecture, and promote peer-to-peer learning with real-time analytics. Instructors, you can:
  - Pose a variety of openended questions that help your students develop critical thinking skills
  - Monitor responses to find out where students are struggling
  - Use real-time data to adjust your instructional strategy and try other ways of engaging your students during class
  - Manage student interactions by automatically grouping students for discussion, teamwork, and peer-to-peer learning
- **The Study Area** is broken down into learning areas and includes videos, animations, MP3s, and much more for student self-study.

www.mydietanalysis.com

MyDietAnalysis was developed by the nutrition database experts at ESHA Research, Inc. and is tailored for use in college nutrition courses. This software system allows students to complete a diet assignment by keeping a diary of food intake and exercise and then creating a variety of reports (for example, the balance between fats, carbohydrates, and proteins in the diet; how many calories eaten vs. expended; whether the student is meeting the RDAs for vitamins and minerals, and so on). It has been updated to include a **mobile version** so students can access it from their smart phones to easily track food, drink, and activity on the go, 24/7.

Teaching Toolkit DVD for *Nutrition & You* (for instructors)

The Electronic Teaching Toolkit DVD provides everything an instructor needs to prep for the course, and deliver a dynamic lecture, in one convenient place. Resources include:

- NEW! *ABC News* Lecture Launcher videos covering the most up-to-date nutrition topics
- Updated 34 Nutrition Animations
- Practical Nutrition Tips videos
- Clicker questions
- Quiz Show questions
- PowerPoint® Lecture Outlines (including Media-only PowerPoints)
- PowerPoint step-edit Image Presentations
- Files for all illustrations and tables and selected photos from the text
- Microsoft® Word and PDF files for the Instructor Resource and Support Manual
- Microsoft® Word, RTF, and PDF files for the Test Bank
- Computerized Test Bank, which includes all the questions from the test bank in a format that allows instructors to easily and intuitively build exams and quizzes

- Printed *User's Quick Guide* with easy instructions for both experienced and new faculty members to get started with the rich toolkit content

Additional digital instructor and student resources include PDFs of:

- *Step-by-step MasteringNutrition tutorials*
- *Great Ideas in Teaching Nutrition*
- *Eat Right! Healthy Eating in College and Beyond*
- *Food Composition Table*

Acknowledgments

It takes a village, and then some, when it comes to writing a dynamic textbook. *Nutrition & You* is no exception. I personally want to thank all of those who passionately shared their expertise and support to make *Nutrition & You* better than I could have envisioned.

Beginning with the dynamic staff at Pearson, I would like to thank Michelle Cadden, who helped make my vision for this textbook a reality. Revising a text of this nature takes a lot of coordination, and Project Manager Caroline Ayres managed to keep us on track while still applying her eagle eye to every aspect of the revision. Diligent Developmental Editors Suzanne Olivier, Alice Fugate, and Kari Hopperstead brought their careful attention to each chapter. Program Manager Susan Malloy was invaluable in lending an extra set of eyes and an additional pair of hands when needed. Crackerjack Content Producer Aimee Pavy, Project Manager Caroline Ayres, and Project Manager Kyle Doctor worked diligently to create the best supplements for *Nutrition & You*.

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Marketing takes energy, and that's exactly what Executive Product Marketing Manager Neena Bali and her team seem to generate nonstop. The many instructors who reviewed this book and supporting media, and who provided good insights and suggestions, are listed on the following pages; I am grateful to all of them for helping to inform the development of the fourth edition of *Nutrition & You*.

The village also included loyal contributors who lent their expertise to specific chapters. Courtney Robinson at East Carolina University revised the nutrition and fitness chapter as well as the disordered eating section of the weight-management chapter; E. Whitney Evans at Brown University revised the two "life cycle" chapters; Heidi Wengreen at Utah State University revised the food consumerism and sustainability chapter; Kellene A. Isom at Brigham and Women's Hospital revised the food safety and technology chapter; and Claire Alexander updated the hunger chapter as well as the Two Points of View features. Many thanks also to my accuracy reviewers, Keith Erikson of University of North Carolina at Greensboro and Ryan Paruch of Tulsa Community College.

Lastly, an endless thanks to my family, **A**dam, **B**rendan, and **C**raig, for their love and support when I was working more than I should have been.

Joan Salge Blake

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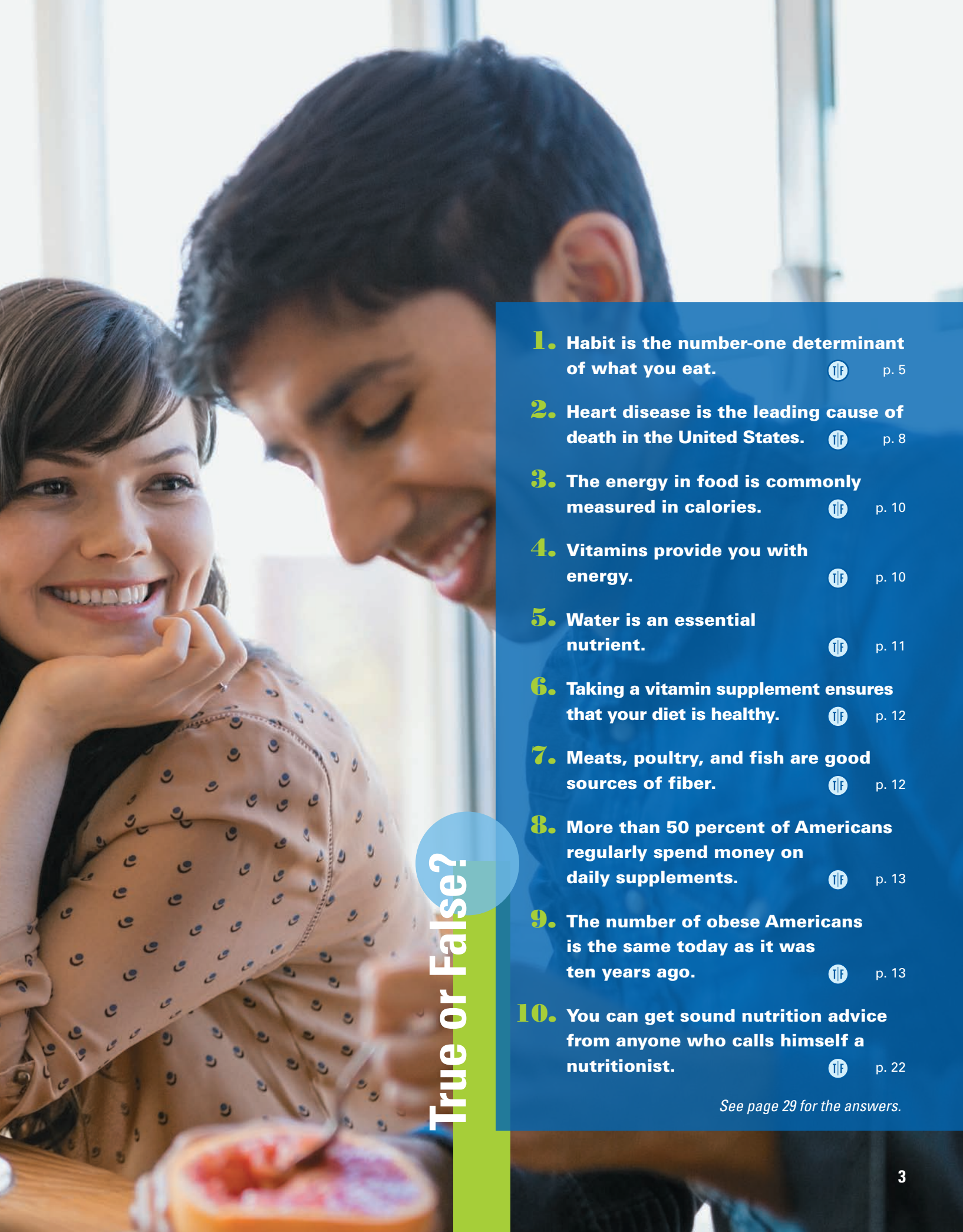
I am nothing without
my ABCs.

Thanks.

1 What Is Nutrition?



True or False?

1. **Habit is the number-one determinant of what you eat.** T/F p. 5
2. **Heart disease is the leading cause of death in the United States.** T/F p. 8
3. **The energy in food is commonly measured in calories.** T/F p. 10
4. **Vitamins provide you with energy.** T/F p. 10
5. **Water is an essential nutrient.** T/F p. 11
6. **Taking a vitamin supplement ensures that your diet is healthy.** T/F p. 12
7. **Meats, poultry, and fish are good sources of fiber.** T/F p. 12
8. **More than 50 percent of Americans regularly spend money on daily supplements.** T/F p. 13
9. **The number of obese Americans is the same today as it was ten years ago.** T/F p. 13
10. **You can get sound nutrition advice from anyone who calls himself a nutritionist.** T/F p. 22

See page 29 for the answers.

Learning Outcomes

After reading this chapter, you will be able to:

LO 1.1 Discuss the factors that influence your food choices.

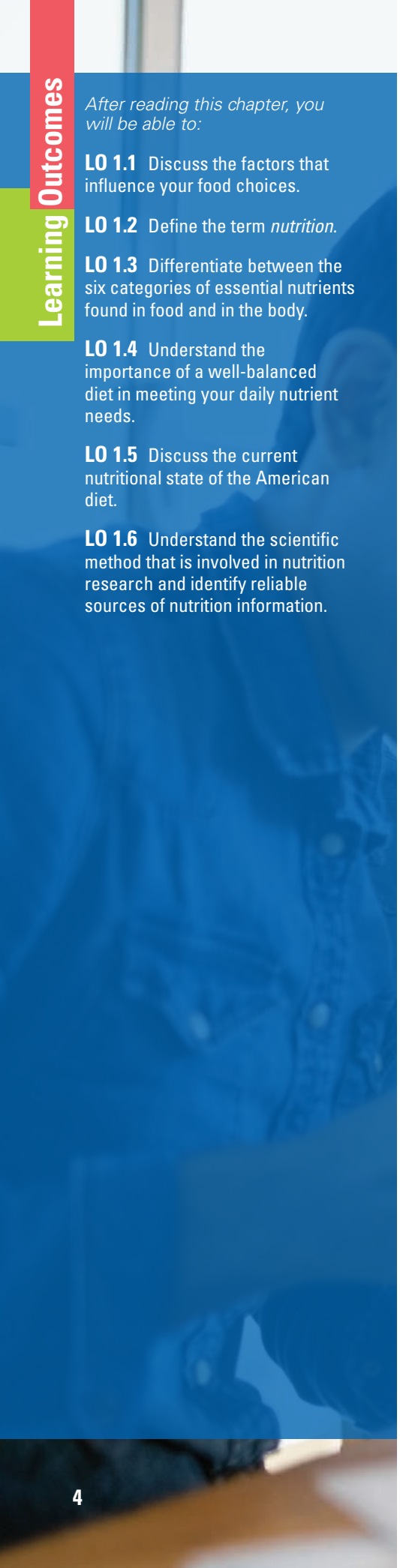
LO 1.2 Define the term *nutrition*.

LO 1.3 Differentiate between the six categories of essential nutrients found in food and in the body.

LO 1.4 Understand the importance of a well-balanced diet in meeting your daily nutrient needs.

LO 1.5 Discuss the current nutritional state of the American diet.

LO 1.6 Understand the scientific method that is involved in nutrition research and identify reliable sources of nutrition information.



From the minute you were born, you began performing three automatic behaviors: You slept, you ate, and you expelled your waste products, often while you were sleeping. You didn't need to think about these actions, and you didn't have to decide to do them. You also didn't need to make choices about where to sleep, what to eat, or when to go to the bathroom. Life was so easy back then.

Now that you're older, these actions, particularly the eating part, are anything but automatic. You make numerous decisions every day about what to eat, and you make these decisions for reasons that you may not even be aware of. If your dietary advice comes from media sound bites, you may get constantly conflicting information. Yesterday's news flash announced that eating more protein would help you fight a bulging waist. Last week's headline boldly announced you should minimize added sugars in your diet to avoid becoming overweight. This morning, the TV news lead was a health report advising you to eat more whole grains to live longer, but to hold the line on sodium, otherwise your blood pressure may go up.

You may find it frustrating that dietary advice seems to change with the daily news (though it actually doesn't), but this bombardment of nutrition news is a positive thing. You are lucky to live in an era when so much is known and being discovered about what you eat and how it affects you. Today's research validates what nutrition professionals have known for decades: Nutrition plays an invaluable role in your health. As with any science, nutrition is not stagnant. Exciting discoveries will continue to be made about the roles that diet and foods play in keeping you healthy.

Let's find out more about nutrition, why it's so important to your health, and how you can identify sound sources of nutrition information. We'll start with the basic concept of why you eat and how this affects your nutrition.

What Drives Our Food Choices?

LO 1.1 Discuss the factors that influence your food choices.

What did you have for dinner last night? Where did you eat it? Who were you with? How did you feel?

Do you ever think about what drives your food choices? Or are you on autopilot as you stand in line at the sub shop and squint at yet another menu board? Do you adore some foods and eat them often, while avoiding others with a vengeance? Perhaps you have a grandparent who encourages you to eat more (and more!) of her traditional home cooking. You obviously need food to survive, but beyond your basic instinct to eat, there are many other factors that affect what goes into your stomach. Let's discuss some of these now.

We Need to Eat and Drink to Live

All creatures need fuel in order to function, and humans are no exception. We get our fuel from food in the form of chemical compounds that are collectively known as **nutrients**. These nutrients work together to provide energy, growth, and maintenance, and to regulate numerous body processes. Three of the six classes of nutrients—carbohydrates, fats (part of the larger class of lipids), and

protein—provide energy in the form of **kilocalories**. Vitamins, minerals, and water help regulate many body processes, including **metabolism**. In fact, water is found in all foods and beverages and is so vital to life that you couldn't live more than a few days without it.

Foods also provide nonnutrient compounds that help maintain your body in order to keep it healthy. We will explore each of these nutrients in more depth later in this chapter, and in much more depth throughout the book.

Beyond the basic need to replenish our bodies with daily fuel are other factors that drive our food choices.

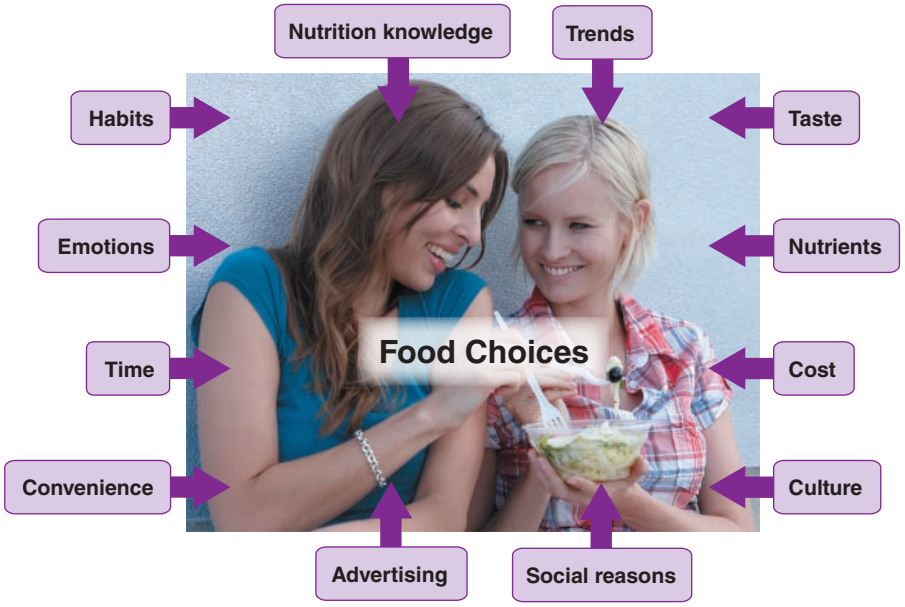


Figure 1.1 Many Factors Influence Your Food Choices

We Choose Foods for Many Other Reasons

Your favorite foods taste delicious—that's why they're your favorites. You also choose certain other foods because they're staples of your culture, or they've become an important aspect of your social life. Some of your food selections are determined by trends, influenced by media messages, or reflect the amount of time or money you have available (**Figure 1.1**). Sometimes, you choose a food just because it's there. Let's explore each of these factors more closely.

Taste and Culture

Research confirms that when it comes to making food choices, taste is the most important consideration.[1] This shouldn't be too much of a surprise, considering that there are at least 10,000 taste buds in your mouth, mainly on your tongue. Your taste buds tell you that chocolate cheesecake is sweet, fresh lemon juice is sour, and a pretzel is salty.

What you choose to put on your plate is often influenced by your culture. If you were a student in Mexico, you may be feasting on a dinner with corn tortillas and tamales, as maize (corn) is a staple of Mexican cuisine. In India, meals commonly include lentils and other legumes with rice and vegetables, whereas Native Americans often enjoy stews of mutton (sheep), corn, and other vegetables. In China, rice, a staple, would be front and center on your plate.

A culture's cuisine is greatly influenced by the environment. This includes not only the climate and soil conditions but also the native plants and animals, as well as the distance people live from rivers, lakes, or the sea. People tend to consume foods that are accessible and often have little experience eating foods that are scarce. For example, native Alaskans feast on fish because it is plentiful, but eat less fresh produce, which is difficult to grow locally. For most Americans, this is less of an issue today than in the past, due to global food distribution networks. However, it still rings true for some food items. People living in landlocked states may have less access to fresh fish, for example, while those outside the south may not see collard greens or beignets on local store shelves as often as their Gulf State counterparts do.

nutrients Compounds in foods that sustain your body processes. There are six classes of nutrients: carbohydrates, fats (lipids), proteins, vitamins, minerals, and water.

kilocalories The measurement of energy in foods. Commonly referred to as *calories*.

metabolism The numerous reactions that occur within the cell. The calories in foods are converted to energy in the cells of the body.

One in four Americans is of Hispanic, Native American, Asian, or African descent. Cultural food preferences often influence food choices.

Food, friends, and football . . . a way of life.

Social Reasons and Trends

Eating is an important way to bond with others. Every year, on the fourth Thursday in November, Americans gather with family and friends to consume close to 46 million turkeys as they celebrate Thanksgiving.[2] A person is likely to eat more on Thanksgiving than on any other Thursday, and this is partly because of all the other people eating with them. Eating dinner with others has been shown to increase the size of the meal by over 40 percent, and the more people present, the more you'll eat.[3]

For many people, activities like watching a football game with fellow fans or going to a movie with friends often involve particular foods. According to the National Restaurant Association, 48 million Americans will order take-out or delivery on Super Bowl Sunday, with chicken wings and pizza as their top foods to eat while watching the game.[4]

Your food choices are also affected by popular trends. For instance, home cooks in the 1950s bought bags of newfangled frozen vegetables in order to provide healthy meals in less time. A few decades later, vegetables went upscale and consumers bought them as part of ready-to-heat stir-fry mixes. Today, shoppers pay a premium price for bags of fresh veggies, like carrots, that have been prewashed and peeled, sliced, or diced. Similarly, decades ago, the only way to enjoy iced tea was to brew it and chill it yourself. Now most markets provide dozens of choices in flavored and enhanced bottled teas, a popular beverage for many college students. As food manufacturers pour more money into research and development, who knows what tomorrow's trendy food item will be?

Another trend is the number of men who are cooking meals for themselves and/or others. The proportion of men who are cooking has increased from 29 percent in the 1960s to 42 percent currently.[5]

Cost, Time, and Convenience

According to the United States Department of Agriculture, almost 15 percent of American households did not have access to enough healthy foods to satisfy their basic, daily food needs, often because of limited financial resources.[6] It's not surprising, then, that many people may be forced to base their food choices on cost. The large, store-brand bag of potato chips, on sale, may appear to be an economical way for a struggling family on a tight budget to fill a dinner plate, rather than with more nutritious fresh or frozen vegetables, which are assumed to be more expensive. The good news is that research has shown that many fruits and vegetables can actually be cheaper per serving than unhealthy junk foods that are high in fat, sugar, and sodium. Buying produce in season and using frozen varieties can actually be very economical ways to consume fruits and vegetables.[7]

For those with adequate food budgets, time is often at a premium. Because of this, the types of foods that many people choose have changed. Research shows that Americans, especially working women with families, want to spend less than 15 minutes preparing a meal.[8] Consequently, supermarkets have changed the types of foods they sell as well as how the food is presented.

If chicken is on the menu tonight, you can go to the poultry section in the store and buy it uncooked. Or you can go to the take-out section of the store and buy it hot off the rotisserie, precooked and stuffed with bread crumbs, or grilled with teriyaki sauce. You can also probably get the cooked vegetables and rice side dishes to take home and reheat with the chicken.

Convenience also influences food choices. Foods that are easily accessible to you are more likely to be eaten. Let's say you have a long walk back to your dorm

self-ASSESSMENT

Do Outside Factors Influence Your Food Choices?

Rate yourself to see!

1. Whenever I meet friends, we get something to eat or drink, no matter the time of day.
   Yes ☐ **No** ☐
2. I sometimes find myself walking past a coffee shop, fast-food restaurant, or convenience store and am compelled to buy something to eat.
   Yes ☐ **No** ☐
3. When I am bored, stressed, or sad, I snack.
   Yes ☐ **No** ☐
4. I always eat or drink something when I am studying, even if I am not hungry.
   Yes ☐ **No** ☐
5. I always eat when I go out to a movie in a movie theater.
   Yes ☐ **No** ☐

Answers

If you answered "yes" to most of these questions, then you are not alone. Many of our food choices are driven by influences that surround us every day!

building after your last class of the day. On the way, you pass a food stand selling slices of delicious-looking pizza. The wonderful smell reminds you that you are hungry, so you buy a slice, or two. Or consider coffee. Decades ago, the most convenient way to get a hot cup of coffee was to brew it yourself. Americans today are more likely to get their java from one of the 20,000 coffee shops across the United States.[9] Pizza and coffee are just two examples of a broad trend of Americans spending more of their household food budget on eating out.

Habits and Emotions

Many people start their day with a bowl of cereal and a glass of orange juice. In fact, ready-to-eat cereals are the number-one breakfast food choice among Americans, and citrus juice is the top juice choice for most people in the morning.[10] Why? For many, the only answer is habit.

Your daily routine and habits can dictate not only what you eat but also *when* you eat. When you get home from work or school, do you head straight for the refrigerator, whether or not you're hungry? Do you always snack when you watch television at night? Or when you're studying?

Emotions also influence your food choices. When the going gets tough, the tough often eat. For many, food is used as an emotional crutch during times of stress, sadness, or joy. Happiness can also trigger eating. Many people celebrate their end-of-term good grades or a promotion at work with a celebratory meal with friends or family. On vacation, you likely reward yourself with fun, relaxation, and, of course, good food. No matter your mood, food is often part of how you express your emotions.

LO 1.1 **The Take-Home Message** Food provides the nutrients that your body needs to function, and the foods that you choose are influenced by many factors. Taste is the primary reason why certain foods have become your favorites. The availability of certain foods has made them a part of your culture and a habitual part of your day. Food trends, cost, limits on your time, convenience, and your emotions all can influence your food choices.

While brown rice is a healthy whole-grain addition to any meal, it can take close to an hour to cook. For time-strapped consumers, food manufacturers have developed instant brown rice that cooks in 10 minutes, and a precooked, microwavable variety that reheats in under 2 minutes.

self-ASSESSMENT

What Does the Health of Your Family Tree Look Like?

Is there a history of heart disease, diabetes, or obesity in your family? What about other chronic diseases or conditions? Before you read this textbook and learn about the role that good nutrition plays in preventing chronic diseases and maintaining overall good health, ask your parents and grandparents about your family's health history. If there are certain diseases or conditions that run in your family, you'll want to pay particular attention to these as you read about them in this book.

An easy way to manage information about your family's health history is by visiting My Family Health Portrait at http://familyhistory.hhs.gov. When you input your family medical history, it provides a family tree report. Save a copy of this family health history for future reference.

Table 1.1

Leading Causes of Death in the United States

Disease/Cause of Death
Heart Disease T|F
Cancer
Respiratory Diseases
Accidents
Stroke
Alzheimer's Disease
Diabetes
Influenza/Pneumonia
Kidney Disease
Intentional Self-Harm

This isn't exactly what's meant by the phrase "You are what you eat," but it's close.

What Is Nutrition and Why Is Good Nutrition So Important?

LO 1.2 Define the term *nutrition*.

Whereas food is the source of nutrients that your body needs, **nutrition** is about more than just food. Nutrition is the science that studies how the nutrients and compounds in foods nourish you, help you function, and affect your health. In contrast, food science relates to the physical and chemical makeup of foods, and the culinary arts refers to the art of preparation of food for consumption.

Your body needs all the nutrients to function properly. An acute deficiency of even one nutrient will negatively affect your body's ability to function in the short term. Chronic deficiencies, excesses, and imbalances of many nutrients can also affect your long-term health.

Good nutrition plays a role in reducing the risk of four of the top ten leading causes of death in the United States—heart disease, cancer, stroke, and diabetes (listed in bold in **Table 1.1**).[11] Nutrition also plays an important role in preventing other diseases and conditions that can impede your lifestyle. A healthy diet can help keep your bones strong and reduce your risk of osteoporosis. Eating right will help you better manage your body weight, which in turn will reduce your risk of developing obesity, diabetes mellitus, and high blood pressure.

You are a product of what you eat, what you *don't* eat, or what you may eat *too much* of. You want to eat the best combination of a variety of foods to meet your nutritional needs and to be healthy. To do that, you need to understand the roles of the essential nutrients in your body and which foods to eat to get them.

LO 1.2 The Take-Home Message Nutrition is the scientific study of how the nutrients and compounds in foods nourish your body. Good nutrition plays a role in reducing the risk of many chronic diseases and conditions. Long-term imbalances of many nutrients will affect your health.

What Are the Essential Nutrients and Why Do You Need Them?

LO 1.3 Differentiate between the six categories of essential nutrients found in food and in the body.

The classes of nutrients that we introduced earlier are all *essential* because you must have them in order to function. (Alcohol, in contrast, is not an essential nutrient; even though it provides energy in the form of kilocalories, your body does not need it to function.) Your body is, in fact, made up of the same essential nutrients that are found in foods (see **Figure 1.2**).

Carbohydrates, lipids (fats), and proteins are called **macronutrients**, because you need higher amounts of them in your diet. Vitamins and minerals, though equally important to your health, are considered **micronutrients** because you need them in lesser amounts. You need to consume the final nutrient, water, in copious amounts daily so that you are well hydrated.

Kilocalories from the macronutrients are used as energy during the process of metabolism, and many vitamins, minerals, and water are essential to this process. Vitamins and minerals are also needed for growth and reproduction and to help repair and maintain your body (**Figure 1.3**).

Although each nutrient is unique, they are all equally important, as they work together in numerous ways to keep you healthy. An imbalance of just one will affect your health. Let's take a closer look at the macro- and micronutrients, and water.

Carbohydrates, Fats, and Proteins Provide Energy

Carbohydrates, fats (lipids), and proteins are the energy-providing nutrients, because they contain calories. When we talk about energy, we mean that your body breaks down these nutrients and "burns" them to fuel your activities and internal functioning. One kilocalorie equals the amount of energy needed to raise the temperature of 1 kilogram of water 1 degree Celsius. (Note that *kilocalories* are commonly referred to as *calories,* which is the term we will use from here on.) Carbohydrates and protein provide 4 calories per gram, and fats provide 9 calories per gram. The number of

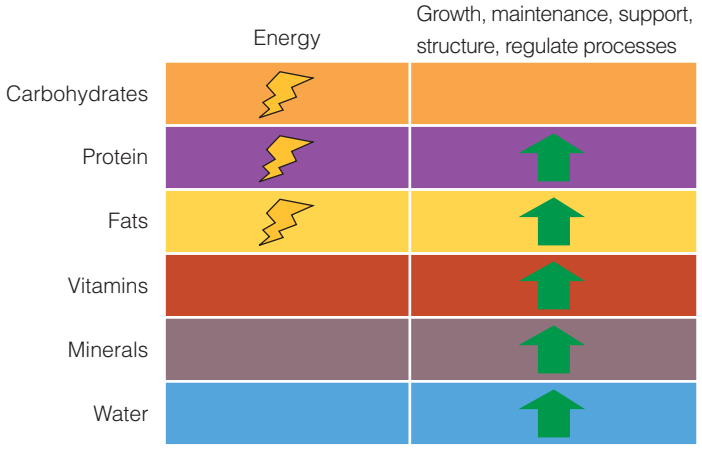


Figure 1.3 Nutrients and Their Functions
Nutrients work closely together to provide energy, structure, and support, and to regulate body processes.

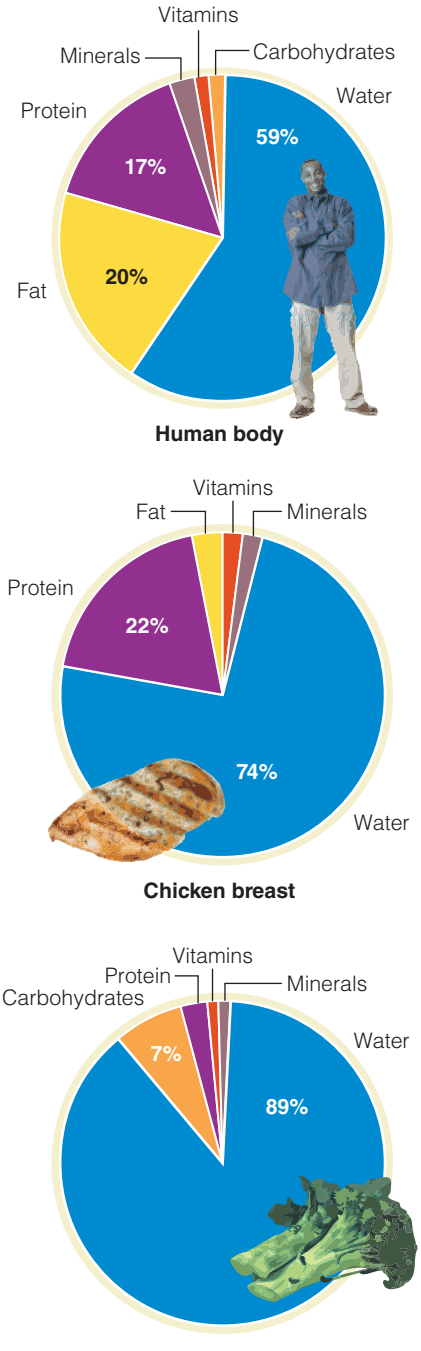


Figure 1.2 Nutrients in Foods and in the Body
The nutrients found in the foods that you eat are the same ones that provide structure for your body and allow your normal body processes to occur.

nutrition The science that studies how the nutrients and compounds in foods that you eat nourish and affect your body functions and health.

macronutrients The energy-containing essential nutrients that you need in higher amounts: carbohydrates, lipids (fats), and proteins.

micronutrients Essential nutrients that you need in smaller amounts: vitamins and minerals.