

# Nutrition & You

Joan Salge Blake



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Joan Salge Blake



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# Brief Contents

<b>1</b>	<b>What Is Nutrition?</b>	<b>2</b>
<b>2</b>	<b>Tools for Healthy Eating</b>	<b>30</b>
<b>3</b>	<b>The Basics of Digestion</b>	<b>68</b>
<b>4</b>	<b>Carbohydrates: Sugars, Starches, and Fiber</b>	<b>98</b>
<b>5</b>	<b>Fats, Oils, and Other Lipids</b>	<b>144</b>
<b>6</b>	<b>Proteins and Amino Acids</b>	<b>186</b>
<b>7</b>	<b>Vitamins</b>	<b>226</b>
<b>8</b>	<b>Minerals and Water</b>	<b>282</b>
<b>9</b>	<b>Alcohol</b>	<b>340</b>
<b>10</b>	<b>Weight Management and Energy Balance</b>	<b>368</b>
<b>11</b>	<b>Nutrition and Fitness</b>	<b>416</b>
<b>12</b>	<b>Consumerism and Sustainability: Food from Farm to Table</b>	<b>458</b>
<b>13</b>	<b>Food Safety and Technology</b>	<b>494</b>
<b>14</b>	<b>Life Cycle Nutrition: Pregnancy through Infancy</b>	<b>528</b>
<b>15</b>	<b>Life Cycle Nutrition: Toddlers through the Later Years</b>	<b>568</b>
<b>16</b>	<b>Hunger at Home and Abroad</b>	<b>602</b>
<b>A</b>	<b>Calculations and Conversions</b>	<b>A-2</b>
<b>B</b>	<b>Organizations and Resources</b>	<b>B-1</b>
	<b>Glossary</b>	<b>G-1</b>
	<b>References</b>	<b>R-1</b>
	<b>Index</b>	<b>I-1</b>
	<b>Credits</b>	<b>CR-1</b>



# Contents

Preface: *Why I Wrote Nutrition & You* xvi

## 1 What Is Nutrition? 2

### What Drives Our Food Choices? 4

We Need to Eat and Drink to Live 4

We Choose Foods for Many Other Reasons 5

### What Is Nutrition and Why Is Good Nutrition So Important? 8

### What Are the Essential Nutrients and Why Do You Need Them? 9

Carbohydrates, Fats, and Proteins Provide Energy 9

You Can Calculate the Amount of Energy a Food Provides 10

Vitamins and Minerals Are Essential for Metabolism 10

Water Is Vital for Many Processes in Your Body 11

### How Should You Get These Important Nutrients? 11

The Best Way to Meet Your Nutrient Needs Is with a Well-Balanced Diet 11

You Can Meet Some Nutrient Needs with a Supplement 12

### How Does the Average American Diet Stack Up? 12

The Quality of the American Diet 13

Rates of Overweight and Obesity in Americans 13

Improving Americans' Diets Is One Goal of *Healthy People 2020* 14

### What's the Real Deal When It Comes to Nutrition Research and Advice? 15

Sound Nutrition Research Begins with the Scientific Method 17

Research Studies and Experiments Confirm Hypotheses 18

You Can Trust the Advice of Nutrition Experts 20

♥ **Health Connection: Fast-Food City** 21

You Can Obtain Accurate Nutrition Information on the Internet 22

**Visual Chapter Summary** 26



## 2 Tools for Healthy Eating 30

### What Is Healthy Eating and What Tools Can Help? 32

### What Are the Dietary Reference Intakes? 34

DRI's Tell You How Much of Each Nutrient You Need 34

DRI's Encompass Several Reference Values 34

● **Focus Figure 2.2 Dietary Reference Intakes** 35

How to Use the DRI's 37

### What Are the *Dietary Guidelines for Americans*? 37

### What Are MyPlate and ChooseMyPlate.gov? 39

MyPlate and ChooseMyPlate.gov Emphasize Changes in Diet, Eating Behaviors, and Physical Activity 40

How to Use MyPlate and ChooseMyPlate.gov 42

### What Is a Food Label and Why Is It Important? 48

The Food Label Tells You What's in the Package 49

The Food Label Can Help You Make Healthy Food Choices 51

● **Focus Figure 2.12 Understanding the Nutrition Facts Panel** 52

### Functional Foods: What Role Do They Play in Your Diet? 59

Are There Concerns Associated with Consuming Functional Foods? 60

How to Use Functional Foods 61

♥ **Health Connection: Functional Foods and Cholesterol** 62

**Visual Chapter Summary** 64

## 3 The Basics of Digestion 68

### What Is Digestion and Why Is It Important? 70

Digestion Occurs in the GI Tract 70

Digestion Is Mechanical and Chemical 70

### What Are the Organs of the GI Tract and Why Are They Important? 73

Digestion Begins in the Mouth 73

● **Focus Figure 3.3 The Digestive System** 74

The Stomach Stores, Mixes, and Prepares Food for Digestion 75

Most Digestion and Absorption Occurs in the Small Intestine 76

● **Focus Figure 3.6 Anatomy of the Small Intestine** 77

- The Large Intestine Eliminates Waste and Absorbs Water and Some Nutrients 78
- The Liver, Gallbladder, and Pancreas Are Accessory Organs 79



**How Do Hormones, Enzymes, and Bile Aid Digestion?** 79

- Hormones Regulate Digestion 79
- Enzymes Drive the Process of Digestion 80
- Bile Helps Digest Fat 80

**How Are Digested Nutrients Absorbed?** 81

- Digested Nutrients Are Absorbed by Three Methods 82

**What Happens to Nutrients After They Are Absorbed?** 83

- The Circulatory System Distributes Nutrients through Your Blood 83
- The Lymphatic System Distributes Some Nutrients through Your Lymph Vessels 84
- Your Body Can Store Some Surplus Nutrients 84
- The Excretory System Passes Waste Out of the Body 84

**What Other Body Systems Affect Your Use of Nutrients?** 84

- The Nervous System Stimulates Your Appetite 85
- The Endocrine System Releases Hormones That Help Regulate the Use of Absorbed Nutrients 85

**What Are Some Common Digestive Disorders?** 85

- Disorders of the Mouth and Throat 85
- Esophageal Problems 86
- Disorders of the Stomach 87
- Gallbladder Disease 87
- Disorders of the Intestines 88
- More Serious Intestinal Disorders 89

♥ **Health Connection: Tired of Gluten** 90

**Visual Chapter Summary** 94



**4 Carbohydrates: Sugars, Starches, and Fiber** 98

**What Are Carbohydrates and Why Do You Need Them?** 100

- Simple Carbohydrates Contain One or Two Sugar Units 100
- Polysaccharides Are Complex Carbohydrates 102
- Starch Is the Storage Form in Plants 102
- Fiber Is Important 102
- Glycogen Is the Storage Form in Animals 103

**What Happens to the Carbohydrates You Eat?** 104

- You Digest Carbohydrates in Your Mouth and Intestines 104
- What Is Lactose Malabsorption and Lactose Intolerance? 104
- **Focus Figure 4.4 Carbohydrate Digestion and Absorption** 105

**How Does Your Body Use Carbohydrates?** 106

- Insulin Regulates Glucose in Your Blood 107
- Carbohydrates Fuel Your Body between Meals and Help Spare Protein for Other Uses 107

● **Focus Figure 4.6 Hormones Regulate Blood Glucose** 108

- Carbohydrates Fuel Your Body during Fasting and Prevent Ketosis 109

**How Much Carbohydrate Do You Need and What Are the Best Food Sources?** 110

- You Need a Minimum Amount of Carbohydrates Daily 110
- The Best Carbohydrates Are Found in These Foods 111
- Whole Grains Can Help Meet Starch and Fiber Needs 112
- Fruits and Vegetables Provide Simple Sugars, Starch, and Fiber 113
- Legumes, Nuts, and Seeds Are Excellent Sources of Carbohydrates and Fiber 114
- Low-Fat and Fat-Free Dairy Products Provide Some Simple Sugars 115
- Packaged Foods Can Also Provide Carbohydrates 115

**What's the Difference between Natural and Added Sugars?** 115

- Foods with Natural Sugars Usually Contain More Nutrients for Fewer Calories 116
- Processed Foods and Sweets Often Contain Added Sugars 117
- Are Added Sugars Bad for You? 117
- Finding the Added Sugars in Your Foods 117
- How Much Added Sugar Is Too Much? 121

**Why Is Diabetes a Growing Epidemic?** 121

- What Are the Forms of Diabetes? 123
- **Focus Figure 4.13 Diabetes** 124
- What Effects Does Diabetes Have on Your Body? 125
- ♥ **Health Connection: Destined for Diabetes?** 127
- How Is Diabetes Treated and Controlled? 128
- Why Is Diabetes Called an Epidemic? 129
- Can Type 2 Diabetes Be Prevented? 129
- What Is Prediabetes? 129

**What Are Sugar Substitutes and What Forms Can They Take?** 130

- Polyols Are Sugar Alcohols 132
- Saccharin Is the Oldest Sugar Substitute 132
- Aspartame Is Derived from Amino Acids 132
- Neotame Is Also Made from Amino Acids 133
- Acesulfame-K Contains Potassium 133
- Sucralose Is Made from Sucrose 133
- Rebaudioside A Is Derived from the Stevia Plant 134
- Monk Fruit Is Another Sugar Substitute 134
- Advantame Is the Newer Sugar Substitute 134

**Why Is Fiber so Important?** 134

- Fiber Helps Prevent Constipation and Diverticulosis 134
- Fiber Helps Prevent Obesity 135
- Fiber Helps Prevent Heart Disease, Diabetes, and Cancer 136
- Too Much Fiber Can Cause Health Problems 137

**Visual Chapter Summary** 140

## 5 Fats, Oils, and Other Lipids 144

### What Are Fats and Why Do You Need Them? 146

- Fats Serve Multiple Functions in Foods and in Your Body 146
- Fatty Acids Are Found in Triglycerides and Phospholipids 146
- Triglycerides Contain Three Fatty Acid Chains 149
- Sterols Have a Unique Ring Structure 150

### What Happens to the Fat You Eat? 151

- You Digest Most Fat in Your Stomach and Small Intestine 151
  - **Focus Figure 5.10 Fat Digestion and Absorption** 152
- Lipoproteins Transport Fat through the Lymph and Blood 153

### How Does Your Body Use Fat and Cholesterol? 154

- Fat Provides Energy 154
- Fat Helps You Absorb Certain Compounds and Insulates the Body 154
  - **Focus Figure 5.13 The Roles of Lipoproteins** 155
- Essential Fatty Acids Help Keep Cells Healthy 156
- Cholesterol Has Many Important Roles 157

### How Much Fat Do You Need Each Day? 157

- You Need to Consume a Specific Percentage of Your Daily Calories from Fat 157
- You Need to Consume a Specific Amount of Essential Fatty Acids Daily 158
- Minimize Saturated and *Trans* Fats in Your Diet 158
- The Impact of Cholesterol in Your Diet 160

### What Are the Best Food Sources of Fats? 161

### What Are Fat Substitutes and How Can They Be Part of a Healthy Diet? 164

- Fat Substitutes Can Be Carbohydrate, Protein, or Fat Based 164
- Reduced-Fat Products Aren't Calorie Free 165

### What Is Heart Disease and What Increases Your Risk? 166

- Heart Disease Begins with Buildup in the Arteries 167
- What Are the Risk Factors for Heart Disease? 167
  - **Focus Figure 5.20 Development of Atherosclerosis** 168

### What Can You Do to Maintain Healthy Blood Cholesterol Levels to Reduce Your Risk of Heart Disease? 170

- Minimize Saturated Fats, *Trans* Fats, and Cholesterol in Your Diet 171
- Include Fish in Your Weekly Choices 173
  - ♥ **Health Connection: All Fats Are Not Created Equal** 175
- Eat Plenty of Plant Foods 175
- Routinely Select Foods Rich in Antioxidants and Phytochemicals 177
- Strive for Plenty of Exercise and Manage Your Weight 178
- A Word about Alcohol 179
- The Whole Is Greater Than the Sum of Its Parts 179

### Visual Chapter Summary 182



## 6 Proteins and Amino Acids 186

### What Are Proteins and Why Are They Important? 188

- The Building Blocks of Proteins Are Amino Acids 188
- Denaturation of Proteins Changes Their Shape 191

### What Happens to the Protein You Eat? 192

- You Digest and Absorb Dietary Proteins in Your Stomach and Small Intestine 192
- Your Body Degrades and Synthesizes Proteins 192
  - **Focus Figure 6.4 Protein Digestion and Absorption** 193
- DNA Directs the Synthesis of New Proteins 194
  - **Focus Figure 6.6 Protein Synthesis** 195

### How Does Your Body Use Proteins? 196

- Proteins Provide Structural and Mechanical Support and Help Maintain Body Tissues 196
- Proteins Build Most Enzymes and Many Hormones 197
- Proteins Help Maintain Fluid Balance 197
- Proteins Help Maintain Acid-Base Balance 198
- Proteins Transport Substances Throughout the Body 198
- Proteins Contribute to a Healthy Immune System 199
- Proteins Can Provide Energy 199
- Protein Improves Satiety and Appetite Control 199

### How Much Protein Do You Need? 200

- Healthy Adults Should Be in Nitrogen Balance 200
- Not All Protein Is Created Equal 202
- You Can Determine Your Personal Protein Needs 203

### What Are the Best Food Sources of Protein? 204

### What Happens If You Eat Too Much or Too Little Protein? 209

- Eating Too Much Protein Can Be Unhealthy 209
- Eating Too Little Protein Can Lead to Poor Health and Malnutrition 210

### How Do Vegetarians Meet Their Protein Needs? 212

- ♥ **Health Connection: Running on Empty** 213
- The Potential Benefits and Risks of a Vegetarian Diet 216
- How You Can Be a Healthy Vegetarian 216
- Athletes Can Follow a Vegetarian Diet 219

### Visual Chapter Summary 222

## 7 Vitamins 226

### What Are Vitamins? 228

- Vitamins Are Either Fat Soluble or Water Soluble 229
- Some Vitamins Function as Antioxidants 229
- Vitamins Differ in Bioavailability 231
- Vitamins Can Be Destroyed by Air, Water, or Heat 232
- Overconsumption of Some Vitamins Can Be Toxic 233
- Provitamins Can Be Converted to Vitamins by the Body 233



## The Storage of Fat-Soluble Vitamins 234

### Exploring Vitamin A 235

- What Is Vitamin A? 235
- Functions of Vitamin A 235
- **Focus Figure 7.6 Retinal and Its Role in Vision** 236
- Daily Needs 237
- Food Sources 238
- Too Much or Too Little 238

### Exploring Vitamin E 240

- What Is Vitamin E? 240
- Functions of Vitamin E 240
- Daily Needs 240
- Food Sources 240
- Too Much or Too Little 240

### Exploring Vitamin K 242

- What Is Vitamin K? 242
- Functions of Vitamin K 242
- Daily Needs 242
- Food Sources 242
- Too Much or Too Little 243

### Exploring Vitamin D 244

- What Is Vitamin D? 244
- Functions of Vitamin D 244
- Daily Needs 244
- Food Sources 245
- Too Much or Too Little 245

## The Roles of the Water-Soluble B Vitamins and Vitamin C 247

### Exploring Thiamin (B<sub>1</sub>) 248

- What Is Thiamin? 248
- Functions of Thiamin 248
- Daily Needs 248
- Food Sources 248
- Too Much or Too Little 248

### Exploring Riboflavin (B<sub>2</sub>) 250

- What Is Riboflavin? 250
- Functions of Riboflavin 250
- Daily Needs 250
- Food Sources 250
- Too Much or Too Little 251

### Exploring Niacin (B<sub>3</sub>) 252

- What Is Niacin? 252
- Functions of Niacin 252
- Daily Needs 252
- Food Sources 252
- Too Much or Too Little 252

### Exploring Vitamin B<sub>6</sub> 254

- What Is Vitamin B<sub>6</sub>? 254
- Functions of Vitamin B<sub>6</sub> 254
- Daily Needs 254
- Food Sources 254
- Too Much or Too Little 254

### Exploring Folate 255

- What Is Folate? 255
- Functions of Folate 255
- Daily Needs 256



- Food Sources 256
- Too Much or Too Little 256

### Exploring Vitamin B<sub>12</sub> 258

- What Is Vitamin B<sub>12</sub>? 258
- Functions of Vitamin B<sub>12</sub> 258
- Daily Needs 258
- Food Sources 258
- Too Much or Too Little 259

### Exploring Vitamin C 260

- What Is Vitamin C? 260
- Functions of Vitamin C 260
- Daily Needs 260
- Food Sources 260
- Too Much or Too Little 260

### Exploring Pantothenic Acid and Biotin 262

- What Are Pantothenic Acid and Biotin? 262
- Functions of Pantothenic Acid and Biotin 262
- Daily Needs 262
- Food Sources 262
- Too Much or Too Little 262



## Are There Other Important Vitamin-Like Nutrients? 263

- Choline Is an Essential Nutrient 263
- Carnitine, Lipoic Acid, and Inositol Are Vitamin-Like Substances 263

## How Should You Get Your Vitamins? 266

- Foods Are Still the Best Way to Meet Your Vitamin Needs 266
- Fortified Foods Can Provide Additional Nutrients, but at a Price 267
- Vitamin Supplements Are Not a Substitute for Healthy Eating 269

### Visual Chapter Summary 275

## 8 Minerals and Water 282

### Why Is Water So Important? 284

- Water Is the Universal Solvent 284
- Water Is a Transport Medium 285
- Water Helps Maintain Body Temperature 285
- Water Is a Lubricant and a Protective Cushion 286

### What Is Water Balance and How Do You Maintain It? 286

- You Take in Water through Beverages and Food 286
- You Lose Water through Your Kidneys, Large Intestine, Lungs, and Skin 287
- Losing Too Much Water Can Cause Dehydration 287
- Consuming Too Much Water Can Cause Hyponatremia 289
- **Focus Figure 8.7 Fluid Balance during Exercise** 290

### How Much Water Do You Need and What Are the Best Sources? 291

### What Are Minerals and Why Do You Need Them? 295

- Bioavailability Affects Mineral Absorption 296
- You Need Major Minerals in Larger Amounts 296
- The Trace Minerals Are Needed in Small Amounts 296



Overconsumption of Minerals Can Be Toxic 299

Other Minerals: Arsenic, Boron, Nickel, Silicon,  
and Vanadium 299

**Exploring Sodium 301**

What Is Sodium? 301  
Daily Needs 301  
Food Sources 301  
Too Much or Too Little 302

♥ **Health Connection: A High-Pressure Situation 303**

**Exploring Potassium 305**

What Is Potassium? 305  
Daily Needs 305  
Food Sources 305  
Too Much or Too Little 305

**Exploring Calcium 307**

What Is Calcium? 307  
Daily Needs 307  
Food Sources 307  
Too Much or Too Little 308

**Exploring Phosphorus 311**

What Is Phosphorus? 311  
Daily Needs 311  
Food Sources 311  
Too Much or Too Little 311

**Exploring Magnesium 313**

What Is Magnesium? 313  
Daily Needs 313  
Food Sources 313  
Too Much or Too Little 313

**Exploring Chloride 315**

What Is Chloride? 315  
Daily Needs 315  
Food Sources 315  
Too Much or Too Little 315

**Exploring Sulfur 315**

What Is Sulfur? 315  
Food Sources 315  
Daily Needs and Too Much or Too Little 315

**Exploring Iron 316**

What Is Iron? 316  
Daily Needs 316  
Food Sources 317  
Too Much or Too Little 318

**Exploring Copper 319**

What Is Copper? 319  
Daily Needs 319  
Food Sources 319  
Too Much or Too Little 319

**Exploring Zinc 320**

What Is Zinc? 320  
Daily Needs 320  
Food Sources 320  
Too Much or Too Little 321

**Exploring Selenium 322**

What Is Selenium? 322  
Daily Needs 322



Food Sources 322  
Too Much or Too Little 323

**Exploring Fluoride 324**

What Is Fluoride? 324  
Daily Needs 324  
Food Sources 324  
Too Much or Too Little 325

**Exploring Chromium 326**

What Is Chromium? 326  
Daily Needs 326  
Food Sources 326  
Too Much or Too Little 327

**Exploring Iodine 327**

What Is Iodine? 327  
Daily Needs 327  
Food Sources 328  
Too Much or Too Little 328

**Exploring Manganese 329**

What Is Manganese? 329  
Daily Needs 329  
Food Sources 329  
Too Much or Too Little 329

**Exploring Molybdenum 330**

What Is Molybdenum? 330  
Daily Needs 330  
Food Sources 330  
Too Much or Too Little 330

**Visual Chapter Summary 333**

**9 Alcohol 340**



**What Is Alcohol and How Is It Made? 342**

**Why Do People Drink Alcohol? 342**

People Drink to Relax, Celebrate, and Socialize 343  
Moderate Alcohol Consumption May Have Health Benefits 343

**What Happens to Alcohol in the Body? 344**

You Absorb Alcohol in Your Stomach and Small Intestine 345  
You Metabolize Alcohol Primarily in Your Liver 346  
Alcohol Circulates in Your Blood 346  
The Effects of Alcohol on Your Brain 346

**How Can Alcohol Be Harmful? 349**

Alcohol Can Disrupt Sleep and Cause Hangovers 349  
Alcohol Can Interact with Hormones 351  
Alcohol May Lead to Overnutrition and Malnutrition 351  
Alcohol Can Harm Your Digestive Organs, Heart, and Liver 353  
Alcohol Can Put a Healthy Pregnancy at Risk 355

**What Is Alcohol Use Disorder? 356**

Binge Drinking, Drinking and Driving, and Underage Drinking  
Are Harmful 357

♥ **Health Connection: Smashed: Story  
of a Drunken Girlhood 358**

Some People Should Avoid Consuming Alcohol 361

**Visual Chapter Summary 364**

## 10 Weight Management and Energy Balance 368

What Is a Healthy Weight and Why Is Maintaining It Important? 370

How Do You Know If You're at A Healthy Weight? 372

BMI Measurements Can Provide a General Guideline 372  
Measure Your Body Fat and Its Location 374

What Is Energy Balance and What Determines Energy Needs? 376

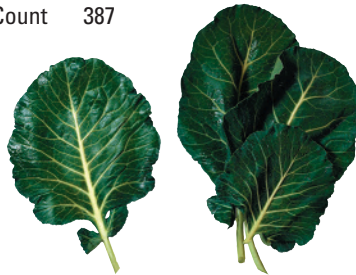
Energy Balance Is Calories In versus Calories Out 376  
● **Focus Figure 10.5 Energy Balance and Imbalances** 377  
Energy Needs Are Different for Everyone 378  
Calculating Your Energy Needs 379  
Energy Imbalances Over Time Can Lead to Changes in Body Weight 380

What Factors Are Likely to Affect Body Weight? 380

Hunger and Appetite Affect What You Eat 381  
Physiological Mechanisms Help Regulate Hunger 381  
● **Focus Figure 10.7 Your Brain Controls Hunger and Satiety** 382  
Genetics Partially Determine Body Weight 383  
Environmental Factors Can Increase Appetite and Decrease Physical Activity 384

How Can You Lose Weight Healthfully? 386

Eat Smart, Because Calories Count 387  
Move to Lose 392  
Break Bad Habits 392  
Dealing with Extreme Obesity 394  
The Bottom Line 396



How Can You Maintain Weight Loss? 396

♥ **Health Connection: Extreme Measures** 397

How Can You Gain Weight Healthfully? 398

What Is Disordered Eating and What Are the Warning Signs? 398

No Single Factor Causes Eating Disorders 401  
Anorexia Nervosa Results from Severe Calorie Deficit 403  
Bulimia Nervosa Involves Cycles of Binge Eating and Purging 403  
Binge Eating Disorder Involves Binge Episodes Without Compensation 405  
Other Disordered Eating Behaviors Can Be Harmful 405  
There Are Some Common Signs of Disordered Eating 406  
What Can You Do If You Suspect a Friend Has an Eating Disorder? 407  
Eating Disorders Can Be Treated 407

**Visual Chapter Summary** 411

## 11 Nutrition and Fitness 416

What Is Physical Fitness and Why Is It Important? 418

Physical Fitness Has Five Basic Components 418  
Physical Fitness Provides Numerous Benefits 419



What Does a Physical Fitness Program Look Like? 420

Cardiorespiratory Exercise Can Improve Cardiorespiratory Endurance and Body Composition 420  
Strength Training Can Improve Muscle Strength, Muscle Endurance, and Body Composition 421  
Stretching Can Improve Flexibility 422  
The FITT Principle Can Help You Design a Fitness Program 422  
The Progressive Overload Principle Can Help Improve Fitness over Time 424

How Are Carbohydrate, Fat, and Protein Used during Exercise? 425

Carbohydrate Is the Primary Energy Source during High-Intensity Exercise 426  
● **Focus Figure 11.3 What Fuels Our Activities?** 427  
Fat Is the Primary Energy Source during Low-Intensity Exercise 429  
Protein Is Primarily Needed to Build and Repair Muscle 433  
Total Calorie Needs Depend on the Type and Schedule of Exercise 434  
♥ **Health Connection: What Is Relative Energy Deficiency in Sport (RED-S)?** 434

How Does the Timing of Meals Affect Fitness and Athletic Performance? 436

Optimal Foods before Exercise 436  
Optimal Foods during Exercise 437  
Optimal Foods after Exercise 437

What Vitamins and Minerals Are Important for Fitness? 438

Antioxidants Can Help Protect Cells from Damage Caused by Exercise 438  
Adequate Levels of Vitamin D Are Important for Optimal Athletic Performance 439  
Some Minerals Can Be of Concern in Highly Active People 439  
Vitamin and Mineral Supplements Are Generally Not Necessary 440



How Does Fluid Intake Affect Fitness? 441

Fluid and Electrolyte Balance and Body Temperature Are Affected by Exercise 441

- You Need Fluids before, during, and after Exercise 442
- Some Beverages Are Better than Others 443
- Consuming Too Little or Too Much Fluid Can Be Harmful 444

### Can Dietary Supplements Contribute to Fitness? 446

- Dietary Supplements and Ergogenic Aids May Improve Performance, but Can Have Side Effects 446
- Sports Bars, Shakes, and Meal Replacers May Provide Benefits 449

**Visual Chapter Summary 454**

## 12 Consumerism and Sustainability: Food from Farm to Table 458

### How Do Advertising and Marketing Influence Your Food Choices? 460

#### Where Does Your Food Come From? 461

- Food Comes from Farms, Not Stores 461
- Food Production Outside the United States 467

#### What Is a Sustainable Food System? 468

- Sustainable Food Systems Are Environmentally Friendly, Economically Viable, and Socially Equitable 468
- The Most Sustainable Foods Are Locally Grown, Whole (Not Processed), and Plant Based 471
- Reducing Food Waste Is Part of Sustainability 472

### How Do We Balance the World Population's Need for Food with Sustainability? 475

- Costs and Benefits of Using Hormones in Our Food Supply 475
- Costs and Benefits of Using Antibiotics in Our Food Supply 476
- Costs and Benefits of Using Pesticides in Our Food Supply 476

### What Are the Risks and Benefits of Using Biotechnology in Agriculture? 479

- Genetic Engineering 480
- Concerns and Regulations Associated with GE Foods 481

### How Does Food Policy Affect the Foods Available to You to Buy and Consume? 483

- Food Policy Can Help Encourage Food Producers to Create Healthier Products 483
- Food Policy Can Lead to Relabeling and Reformulating without Providing a Healthier Food Product 484
- What Are the Politics of the Food Industry? 485

### How Do You Know How Foods Were Produced? 486

- Label Terms Provide Information about How Foods Were Produced 486
- Understand the Meaning of the Term *Organic* 487

**Visual Chapter Summary 490**

## 13 Food Safety and Technology 494

### What Causes Foodborne Illness? 496

- Foodborne Illnesses Are Often Caused by Pathogens 496
- Chemical Agents and Toxins Can Also Cause Illness 503
- Some People Are at Higher Risk for Foodborne Illness 503



### What Can You Do to Prevent Foodborne Illness? 503

- Clean Your Hands and Produce 504
- Separate Meat and Non-Meat Foods to Combat Cross-Contamination 505
- Cook Foods Thoroughly 505
- Chill Foods at a Low Enough Temperature 508
- ♥ **Health Connection: Getting the Lowdown on *Listeria* 509**

### Who Protects Your Food and How Do They Do It? 512

- Several Government Agencies Police the Food Supply 512
- Food Manufacturers Use Preservation Techniques to Destroy Contaminants 514
- Irradiation 515
- Product Dating Can Help You Determine Peak Quality 516

### What Are Food Additives and How Are They Used? 517

- Preservatives Prevent Spoilage and Increase Shelf Life 517
- Some Additives Enhance Texture and Consistency 518
- Some Additives Improve Nutrient Content 518
- Color and Flavor Enhancers Improve the Appeal of Foods 518
- Food Additives Are Closely Regulated by the FDA 519
- Some Food Additives Are Unintentional 520

### What Are Toxins and Chemical Agents? 521

- Toxins Occur Naturally 521
- Contamination Is Sometimes Due to Pollution 522

### What Is Bioterrorism and How Can You Protect Yourself? 523

**Visual Chapter Summary 525**

## 14 Life Cycle Nutrition: Pregnancy through Infancy 528

### What Nutrients and Behaviors Are Important Before Attempting a Healthy Pregnancy? 530

- A Man's Diet and Lifestyle Affect the Health of His Sperm 530
- Women Need to Adopt a Healthy Lifestyle Before Conception 530

♥ **Health Connection: The Stress of Infertility 533**



## What Nutrients and Behaviors Are Important in the First Trimester? 534

- During the First Trimester, the Fertilized Egg Develops into a Fetus 534
- “Morning Sickness” and Cravings Are Common 535
- Adequate Weight Gain Supports the Baby’s Growth 536
- The Need for Certain Nutrients Increases 536
- Pregnancy Increases the Risk for Foodborne Illness 538
- Pregnant Women Should Avoid Many Other Substances 539
- The Importance of Critical Periods 539

## What Nutrients and Behaviors Are Important in the Second Trimester? 541

- Pregnant Women Need to Consume Adequate Calories, Carbohydrate, and Protein to Support Growth 541
- Exercise Is Important for Pregnant Women 541
- Potential Complications: Gestational Diabetes and Hypertension 542

## What Nutrients and Behaviors Are Important in the Third Trimester? 544

### What Special Concerns Might Younger or Older Mothers-to-Be Face? 544

### What Is Breast-Feeding and Why Is It Beneficial? 545

- Breast-Feeding Provides Physical, Emotional, and Financial Benefits for Mothers 546
- Breast-Feeding Provides Nutritional and Health Benefits for Infants 547

### What Are the Best Dietary and Lifestyle Habits for a Breast-Feeding Mother? 549

### When Is Infant Formula a Healthy Alternative to Breast Milk? 550

- Some Women May Not Be Able to Breast-Feed 551
- Formula Can Be a Healthy Alternative to Breast-Feeding 551

### What Are the Nutrient Needs of an Infant and Why Are They So High? 552

- Infants Grow at an Accelerated Rate 552
- Monitoring Infant Growth 553
- Infants Have Higher Nutrient Needs 554

### When Are Solid Foods Safe to Feed a Baby? 555

- Solid Foods May Be Introduced Once Certain Milestones Are Met 555
- Solid Foods Should Be Introduced Gradually 556
- Some Foods Are Dangerous and Should Be Avoided 556

### Putting It All Together 560

Visual Chapter Summary 563

## 15 Life Cycle Nutrition: *Toddlers through the Later Years* 568

### What Are the Issues Associated with Feeding Young Children? 570

- Young Children Need to Eat Frequent, Small Meals with Nutrient-Rich Foods 570

- Young Children Have Special Nutrient Needs 572
- Picky Eating and Food Jags Are Common in Small Children 573
- Raising a Vegetarian Child 574

### What Are the Nutritional Needs and Issues of School-Aged Children? 574

- High Obesity Rates in School-Aged Children 576
- Daily Food Plans for Kids Help Guide Food Choices 577
- The Importance of Breakfast 578
- School Meals Contribute to a Child’s Nutritional Status 580

### What Are the Nutritional Needs and Issues of Adolescents? 581

- Peer Pressure and Other Factors Influence Teen Eating Behaviors 581
- Adolescents Need Calcium and Vitamin D for Bone Growth 582
- Teenage Girls Need More Iron 582
- Adolescents: At Risk for Disordered Eating 583

### What Are the Nutritional Needs of Older Adults? 583

- Older Adults Need Fewer Calories, Not Less Nutrition 584
- Older Adults Need Adequate Fiber and Fluid 584
- Older Adults Should Monitor Their Micronutrients 585

### What Additional Challenges Do Older Adults Face? 587

- Eating Right for Health and to Prevent and Manage Chronic Disease 587
- Economic and Emotional Conditions Can Affect Nutritional Health 593
- ♥ Health Connection: A Wake-Up Call 595
- Staying Physically Active 597

Visual Chapter Summary 599

## 16 Hunger at Home and Abroad 602

### What Are Food Insecurity, Food Security, and Hunger? 604

- Many People Experience Food Insecurity in the United States and Worldwide 604

### What Causes Food Insecurity in the United States? 606

- Poverty Is often the Cause of Food Insecurity in the United States 606
- Health Problems Contribute to Food Insecurity among Americans 608

♥ Health Connection: Overweight and Undernourished 609



## **What Causes Food Insecurity and Poverty Around the Globe? 610**

- Discrimination and Inequality Promote Poverty 610
- Political Sanctions, Armed Conflict, and Corruption 611
- Crop Failure, Natural Disasters, and Wasteful Agricultural Practices 611
- Population Overgrowth 612

## **Who Is at Increased Risk for Undernutrition? 613**

## **What Are the Effects of Chronic Malnutrition? 614**

- Children Suffer Impaired Growth and Development 614
- Impaired Immunity Can Result in Disease 615
- Infant and Child Mortality Rates Increase 616

## **What Can Be Done to Reduce Food Insecurity? 616**

- Better Land Management and Proper Sanitation 617
- Fortification of Foods 618
- Education Is Key 618
- You Can Help Reduce Food Insecurity 619

## **Visual Chapter Summary 621**

# **Appendices**

## **Appendix A**

**Calculations and Conversions A-2**

## **Appendix B**

**Organizations and Resources B-1**

**Glossary G-1**

**References R-1**

**Index I-1**

**Credits CR-1**

# Special Features

Scan this QR code with your mobile device to access instructional videos featuring the author.



## FOCUS



- Figure 2.2 Dietary Reference Intakes 35
- Figure 2.12 Understanding the Nutrition Facts Panel 52
- Figure 3.3 The Digestive System 74
- Figure 3.6 Anatomy of the Small Intestine 77
- Figure 4.4 Carbohydrate Digestion and Absorption 105
- Figure 4.6 Hormones Regulate Blood Glucose 108
- Figure 4.13 Diabetes 124
- Figure 5.10 Fat Digestion and Absorption 152
- Figure 5.13 The Roles of Lipoproteins 155
- Figure 5.20 Development of Atherosclerosis 168
- Figure 6.4 Protein Digestion and Absorption 193
- Figure 6.6 Protein Synthesis 195
- Figure 7.6 Retinal and Its Role in Vision 236
- Figure 8.7 Fluid Balance during Exercise 290
- Figure 10.5 Energy Balance and Imbalances 377
- Figure 10.7 Your Brain Controls Hunger and Satiation 382
- Figure 11.3 What Fuels Our Activities? 427

## A CASE STUDY

## HEALTH



## CONNECTION

- Fast-Food City 21
- Functional Foods and Cholesterol 62
- Tired of Gluten 90
- Destined for Diabetes? 127
- All Fats Are Not Created Equal 175
- Running on Empty 213
- A High-Pressure Situation 303
- Smashed: Story of a Drunken Girlhood 358
- Extreme Measures 397
- What Is Relative Energy Deficiency in Sport (RED-S)? 434
- Getting the Lowdown on *Listeria* 509
- The Stress of Infertility 533
- A Wake-Up Call 595
- Overweight and Undernourished 609



## Examining the Evidence

- How Can I Evaluate Nutrition News? 16
- Does the Time of Day You Eat Impact Your Health? 48

- Do Sugar-Sweetened Beverages Cause Obesity? 122
- Protein Supplements: Are They Necessary? 206
- Gesundheit! Myths and Facts about the Common Cold 266
- Alcohol and Advertising 350
- Evaluating Popular Diets 390
- The Truth about the Fat-Burning Zone 432
- Nutrition, Behavior, and Developmental Disabilities 575



## Nutrition in the Real World

- Poor, Obese, and Malnourished: A Troubling Paradox 14
- Don't Be Scammed! 23
- The *Dietary Guidelines for Americans* at a Glance 38
- When a Portion *Isn't* a Portion 46
- Tinkering with Your Body's Digestive Process 72
- Grains, Glorious Whole Grains 112
- Avoiding a Trip to the Dentist 118
- The Mediterranean Diet: What Do People Living Near the Mediterranean Do Differently? 172
- Mercury and Fish 176
- The Joy of Soy 214
- Tap Water or Bottled Water: Is Bottled Better? 292
- A Closer Look at Body Image 404
- Carbohydrate Loading 430
- You as a Sustainable Farmer: Growing Vegetables in a Container 474
- Sushi: A Cautionary Tale 502
- Breast-Feeding at Work Can Work 549
- Feeding the Baby 557
- Drug, Food, and Drug-Herb Interactions 590
- Natural Disasters and Food Insecurity: Focus on Haiti 612
- Food Insecurity among Us—and How You Can Help! 619



## SELF-ASSESSMENT

- Do Outside Factors Influence Your Food Choices? 7
- What Does the Health of Your Family Tree Look Like? 8
- Does Your Diet Have Proportionality? 41
- Are You at Risk for Type 2 Diabetes? 126
- How Much Fat Is in Your Diet? 161
- Do You Have a Protein-Friendly Diet? 208
- Are You Getting Enough Fat-Soluble Vitamins in Your Diet? 234
- Are You Getting Enough Water-Soluble Vitamins in Your Diet? 247
- Do You Consume Enough Water? 291



Are You at Risk for Osteoporosis? 310  
 Red Flags for Misusing Alcohol 359  
 What's Your Estimated Energy Requirement (EER)? 379  
 Are You at Risk for an Eating Disorder? 408  
 Calculating Your Fluid Needs for Endurance Exercise 445  
 Are You Meeting Your Fitness Recommendations and Eating for Exercise? 447  
 How Sustainable Is Your Food Shopping? 473  
 How Do Your Food-Safety Habits Stack Up? 510  
 Are You Ready for a Healthy Pregnancy? 532  
 Are You at Nutritional Risk? 596  
 Which Is Cheaper: Fast Food or a Homemade Lunch? 607  
 Are You at Risk for Food Insecurity? 610

Adopt Some Healthy Habits 394  
 Healthy Snacks for Healthy Weight Gain 398  
 Get Moving! 425  
 Don't Let Bad Bugs Ruin Your Trip 503  
 Scrub Away Pathogens 505  
 Ways to Avoid Toxins and Chemical Agents in Your Seafood 522  
 Avoid Foods That May Have Been Tampered With 523  
 Alleviating Morning Sickness 535  
 Exercising while Pregnant 542  
 Tasty Treats for Toddlers 571  
 Kid-Friendly, Iron-Rich Foods 572  
 Breakfast on the Go 579  
 Tips for Packing School Lunches 580  
 Teen Table Tips 583

### Table Tips

Tip-Top Nutrition Tips 37  
 Digest It Right! 85  
 Eat Gluten Free 89  
 Ways to Enjoy Whole Grains 113  
 High Five! Five Ways to Increase Fiber Daily 115  
 Lowering Your Added Sugars 117  
 Easy Ways to Add Fish to Your Diet 174  
 Nuts about Nuts? 178  
 Eating for a Healthy Heart 179  
 Protein Power 199  
 Preserve Your Vitamins! 233  
 Score an A 239  
 Enjoying Your E's 241  
 Getting Your K's 243  
 Dynamite Ways to Get Vitamin D 245  
 Thrive on Thiamin 249  
 Rally Your Riboflavin 251  
 Nail Your Niacin 253  
 Beam with B<sub>6</sub> 255  
 Fulfill Your Folate Needs 257  
 Boost Your B<sub>12</sub> 259  
 Juicy Ways to Get Vitamin C 261  
 Bottoms Up 295  
 Shake Your Salt Habit 302  
 Potassium Power! 306  
 Calcium Counts! 307  
 Fabulous Phosphorus 312  
 Magnificent Magnesium 314  
 Ironing out Your Iron Needs 318  
 Counting Your Copper 319  
 Zapping Your Zinc Needs! 321  
 Seeking Out Selenium 323  
 Fabulous Ways to Get Fluoride 325  
 Cram in the Chromium 327  
 Iodine Impact 328  
 Managing Your Manganese 329  
 Keeping Your Drinking to a Moderate Amount 361  
 Eat More to Weigh Less 389  
 Get UP and MOVE 393

### MADE OVER MADE BETTER

Try this to boost your fiber intake! 138  
 Try this to control your fat intake! 180  
 Try these healthier proteins! 220  
 Try these vitamin-rich foods! 273  
 Try these mineral-rich alternatives! 331  
 Try this mocktail! 362  
 Try these on-the-go options! 409  
 Try this to fuel your exercise! 452



### Two Points of View

Should Food Advertising to Children Be Regulated by the Government? 25  
 Is Supersizing Out? Should Restaurants Offer Half Portions? 63  
 Probiotics: Do You Need Them? 93  
 Are Food Labels That Distinguish between Naturally Occurring and Added Sugars Helpful to Consumers? 139  
 Is Coconut Oil Healthy for You? 181  
 Are High-Protein, Low-Carbohydrate Diets Good for You? 221  
 Should Vegetarians Take Vitamin B<sub>12</sub> Supplements? 274  
 Does Designer Water Have Nutritional Benefits? 332  
 Do the Health Benefits of Drinking Alcohol Outweigh the Risks? 363  
 Is Intermittent Fasting a Good Idea? 410  
 Vegan Diet for Elite Athletes? 453  
 Should Non-GMO Labeling Be Allowed on Foods? 489  
 Is It Safe to Get Your Meals from a Food Truck? 524  
 Should Parents Consider Baby-Led Weaning? 562  
 Should School Meals Be Exempted from Having to Align with the *Dietary Guidelines for Americans*? 598  
 Food versus Cash: Which Is More Effective for Alleviating Hunger? 620

# About the Author

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Joan is a member of the Academy of Nutrition and Dietetics (AND) and the Massachusetts Academy of Nutrition & Dietetics (MAND). She has been a presenter and presiding officer at both the AND Food & Nutrition Conference & Expo (FNCE) and the MAND Annual Convention, and she was previously named the MAND's "Young Dietitian of the Year," Outstanding Dietitian (2009), and Outstanding Dietetic Educator (2007). Joan has served on the MAND board for more than two decades in many roles, including delegate, 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 into understandable terms. She has conducted more than 1,400 media interviews. Joan is also a nutrition blogger for the *U.S. News & World Report's* Eat + Run website.



*I am nothing without  
my ABC's.*

*Thanks.*

# 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](http://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 answers 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 fifth 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):

- **Pearson eText** is a simple-to-use, mobile-optimized, personalized reading experience available within Mastering. It allows students to easily highlight, take notes, and review key vocabulary all in one place—even when offline. Seamlessly integrated videos and other rich media engage students and give them access to the help they need, when they need it. Pearson eText is available within Mastering when packaged with a new book; students can also purchase Mastering with Pearson eText online.

For instructors not using Mastering, Pearson eText can also be adopted on its own as the main course material.

- **Updated Practical Nutrition Tips videos in Mastering Nutrition** feature author Joan Salge Blake offering students suggestions on ways to keep nutrition in mind in their everyday lives. Each video is accompanied by assignable questions to ensure understanding. Updated videos include Reading a Food Label, Hidden Sugar in Soda, Enhanced Waters, and more.
- **New MyDietAnalysis Personalized Dietary Analysis activities in Mastering Nutrition** guide students in a thorough investigation of their dietary intake and are focused on the most commonly assigned topics in diet analysis projects. Follow-up feedback and a reflection question help students understand how to improve their diets. Activities can also be automatically graded, saving instructors valuable time from grading their students' lengthy diet analysis projects.
- **New! #ICYMI boxes**, shorthand for “In Case You Missed It,” feature interesting facts at various points within the narrative relevant to what students just read, such as within the discussion of polysaccharides as complex carbohydrates in Chapter 4, students are provided the explanation of why unripe fruit tastes more starchy than sweet.
- Updated **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 Mastering Nutrition, making the feature assignable

## Chapter-by-Chapter Updates

### Chapter 1

- All photos showing Nutrition Facts Panel now feature the new NFP.
- LO 1.1: Kilocalorie now defined earlier in the chapter.
- LO 1.4: Number of known phytochemicals updated to over 10,000.
- LO 1.5: Amount of sugar and fat consumed by Americans updated to 17 tsp and 54% of calories consumed, respectively.
- LO 1.5: Revised Figure 1.4, obesity map, now shows most current (2016) data.
- Photo caption revises population of Hispanics in the U.S. from 1 in 4 to 4 in 10.
- Revised “2 Points of View” feature on advertising food to children.

### Chapter 2

- Figure 2.9, How Solid Fats and Added Sugars Fit into a Healthy Diet, has been updated with new numbers for recommended calories of added sugar and fats.
- Figure 2.12 walks students through the new Nutrition Facts Panel.
- LO 2.4 includes advice about sodium intake.
- LO 2.5 has extensive information about the new Nutrition Facts Panel.
- LO 2.6 has new information about antioxidants and functional foods.
- Nutrition in the Real World feature has a new portion size table.
- Examining the Evidence feature on the timing of meals and its effect on nutrition has been revised.
- New “2 Points of View” feature on supersizing versus half-portions in restaurants.

### Chapter 3

- Figure 3.5 has been revised to show location of pyloric sphincter.
- LO 3.1: Chyme and bolus are now defined earlier in the chapter.
- LO 3.7: In Table 3.3, details about irritable bowel syndrome have been revised.
- Revised “2 Points of View” feature on probiotics.

## Chapter 4

- LO 4.1 has been modestly reorganized to more effectively present the units of carbohydrates and to better distinguish between types of fiber. *Fermentable fiber* and *viscous fiber* have been added to the key terms.
- LO 4.6: The term *prediabetes* has been added to key terms and discussed in the chapter.
- Figure 4.8 has been revised to focus on total fiber.
- Figure 4.10 has new Nutrition Facts information.
- Figure 4.12 has been revised to compare prevalence of diabetes in the U.S. in 1994 and 2015.
- Throughout the chapter, figures showing the chemical structure of sucrose have been corrected, and figures showing the Nutrition Facts panel have been updated.
- In LO 4.7, stevia and monk fruit have been added to the discussion of sugar substitutes.

## Chapter 5

- LO 5.4: New coverage of the FDA's decision to ban *trans* fats from foods.
- Figure 5.2 now links types of fats with foods that contain those fats.
- LO 5.8: Further coverage of *trans* fats. Clarification added on plant stanols and sterols.
- New unnumbered figure on fish: Which are safest to eat?
- Figure 5.21 has updated content on types of fats in foods.
- New "2 Points of View" feature on whether coconut oil is healthy or not.

## Chapter 6

- LO 6.3: New material on how protein contributes to satiety.
- LO 6.4: Quinoa has been added to the discussion of complete proteins.
- LO 6.6: Discussion of research showing that the type of protein consumed is more important in reducing the risk of heart disease than the quantity.
- Examining the Evidence feature has updated information on protein supplements and the accuracy of their labeling.
- Table 1 within the Examining the Evidence feature comparing energy bar content has been revised.
- Figure 6.11 has been updated with 2015 data.
- Figures 6.12 and 6.13 have been revised with the latest information.
- The Made Over Made Better figure replaces the bologna sandwich with a BLT.
- The Nutrition in the Real World feature discusses research showing that soy may prevent cancer development by reducing inflammation and inhibiting activation of proteins that promote cell growth.
- Revised "2 Points of View" feature on high-protein, low-carbohydrate diets.

## Chapter 7

- New coverage of the latest research on Vitamin E and its link to cardiovascular events.
- The Made Over Made Better figure replaces stuffed and baked potato with iceberg lettuce and collard greens.

## Chapter 8

- Table 8.2, Minerals at a Glance, has updated DRI for fluoride.
- Table Tips, "Shake Your Salt Habit," has new advice on lowering your sodium intake.
- Figure 8.12 has updated figures on average American sodium consumption.

## Chapter 9

- LO 9.2: Updated information on the correlation between moderate alcohol consumption and reduced risk of heart disease and Type 2 diabetes.
- LO 9.4: New information on congeners in fermented alcoholic beverages.
- LO 9.4: Updated statistics on the number of people with alcoholic hepatitis who eventually develop cirrhosis.
- LO 9.5: Updated data on underage drinking.
- LO 9.5: Revised discussion of alcohol use disorder.
- New "2 Points of View" feature: "Do the Health Benefits of Drinking Alcohol Outweigh the Risks?"

## Chapter 10

- New photo feature compares two people with the same BMI, an athlete and a nonathlete.
- New photo shows new Barbie dolls designed to reflect various body types.
- New photo shows a food tracker app on a cell phone.
- New "2 Points of View" feature on "Intermittent Fasting."
- Revised section 10.8 on disordered eating and body image now includes:
  - Latest research on genetics and anorexia and the complexity of separating environmental from genetic factors
  - Environmental factors behind eating disorders
  - Revised and more detailed Table 10.5, Diagnostic Criteria for Eating Disorders
  - New content on the role of social media in the development of eating disorders
  - Additional content on electrolyte imbalance and the impact of refeeding
  - More on orthorexia
  - Revised and expanded Table 10.6, Warning Signs for Eating Disorders
  - New discussion of research indicating that having friends or family express concern prompts people to accept treatment.

## Chapter 11

- LO 11.3: New coverage, figure, and Health Connection feature on “Relative Energy Deficiency in Sports (RED-S).”
- LO 11.5: New coverage of Vitamin D’s importance in athletic performance.
- LO 11.5: New coverage of magnesium’s importance in athletic performance.
- LO 11.7: Additional coverage of safety and testing of dietary supplements.
- New key term: Relative Energy Deficiency in Sports (RED-S)
- Additional web resources
- New “2 Points of View” feature, “Vegan Diet for Elite Athletes?”

## Chapter 12

- Statistics and references were updated throughout, including new data on agribusiness, crop production, and family farms.
- LO 12.2 includes new information about globesity.
- Figure 12.5 was revised to include the most up-to-date information on food imports.
- LO 12.3 includes a substantial new section on reducing food waste.
- LO 12.3: Self-assessment on sustainable eating is completely new.
- LO 12.4: Information added on the new FDA-issued guidelines for the use of antibiotics and hormones in livestock.
- LO 12.5: New material on gene editing, a new method of bioengineering used to produce GMOs. This section was revised significantly to address more current information on this issue, including the National Bioengineered Food Disclosure Law that was established in 2016, and updated public opinion surveys on GM foods.
- LO 12.7: Section on organic farming now reflects the costs and benefits of this method of farming and the fact that organic farming is not guaranteed sustainable farming.
- Check Your Understanding questions and answers have been revised and updated.
- Web resources have been updated with additional resources regarding sustainability.
- New “2 Points of View” feature, “Should GMO-free Labeling be Allowed on Foods?”
- Gene editing is now a key term.

## Chapter 13

- LO 13.1: New content on the cost of food-borne illness in the U.S.

- LO 13.1 and 13.3: New material on *E. coli* strains, such as STEC, including outbreaks of tainted flour.
- LO 13.1: New coverage of *Salmonella*.
- LO 13.1: New coverage of prions and bovine spongiform encephalopathy.
- LO 13.2: New guidelines for proper hand washing and kitchen sanitation.
- LO 13.2: A new eLearn feature on food safety apps.
- LO 13.3: Coverage of the dangers of honey for infants.
- LO 13.4: New section on Bisphenol A.
- LO 13.5: Additional coverage of methylmercury in fish.

## Chapter 14

- LO 14.1 and 14.2: New coverage of whether pregnant women should take vitamin and mineral supplements, and which ones.
- LO 14.6: Latest guidelines on breast-feeding and on the process by which breast milk provides immune protections to infants.
- LO 14.10: Latest recommendations on introducing solid foods.
- LO 14.10: Latest recommendations on introducing peanuts into a child’s diet.
- Updated Nutrition in the Real World feature on breast-feeding at work.
- New “2 Points of View” feature on baby-led weaning.

## Chapter 15

- Revised Table Tips on helping children get enough iron.
- LO 15.2: Updated information on rates of childhood obesity and activity levels.
- LO 15.2: Latest data on school lunches.
- LO 15.4: Revised estimates on population demographics in 2050.
- LO 15.4: Revised coverage of zinc needs in the older adult.
- LO 15.5: New coverage of the effects of glucosamine and chondroitin on older adults.
- LO 15.5: New content on the link between the MIND diet and Alzheimer’s disease risk reduction.
- LO 15.5: New content on the link between diet and cancer.
- Revised Examining the Evidence feature on diet and developmental disabilities.
- Revised “2 Points of View” feature on 2017 changes to school meal requirements to meet the Dietary Guidelines for Americans.
- Revised Figure 15.1 reflects most recent statistics on childhood obesity.
- Revised Figure 15.4 reflects most recent statistics on sugar intake among children.
- Revised Figure 15.6 shows the new dietary guidelines for older adults.



## Chapter 16

- LO 16.1 includes updated statistics on number of food insecure households in the U.S. and worldwide.
- LO 16.1 also includes coverage of food insecurity among college students.
- LO 16.2 includes updated statistics on poverty and the working poor, and a new Figure 16.3 showing trends in food insecurity over time.
- LO 16.2 also includes new coverage of food deserts and food swamps.
- LO 16.3 has more new statistics on hunger worldwide, political sanctions, corruption, and refugees.
- LO 16.3 also includes updated information about food waste worldwide.
- LO 16.5 has new data on stunting in children.
- Food deserts and food swamps are now key terms.

## 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 students to make better, informed choices in their personal nutrition, and become critical media consumers of nutrition information.
- **MyDietAnalysis mobile website** is available, so students can track their diets and activities accurately, anytime and anywhere, from their mobile devices.
- **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 students 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 students to think critically about pro and con arguments on a given issue and decide for themselves which side they agree with. Students will be applying the critical-thinking skills that they learned in the chapter as they think through each point of view presented.

- **True or False?** Pre-tests open each chapter with 10 true/false statements that help students realize that the things they think they 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 students 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. Students can access the videos via Mastering Nutrition, or via the QR code on page xiii.
- **Table Tips** give practical ideas for incorporating adequate amounts of each nutrient into students' diets using widely available foods.
- **Self-Assessments** throughout the book ask students to think about their own diets and behaviors and how well they are meeting their various nutrient needs.
- **Made Over Made Better** food comparisons at the end of Chapters 4 through 11 can help students visually see how to make more nutritious decisions.
- **eLearn activities** within the chapters direct students to websites to extend their knowledge on various topics, such as the American Institute for Cancer Research, Vegetarian Resource Group, Center for Science in the Public Interest, etc.

## Digital Learning Products

### Mastering Nutrition

[www.masteringhealthandnutrition.com](http://www.masteringhealthandnutrition.com)

**Mastering Nutrition** 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:*

- **Pearson eText** is a simple-to-use, mobile-optimized, personalized reading experience available within Mastering. It allows students to easily highlight, take notes, and review key vocabulary all in one place—even when offline. Seamlessly integrated videos and other rich media engage students and give them access to the help they

need, when they need it. Pearson eText is available within Mastering when packaged with a new book; students can also purchase Mastering with Pearson eText online.

For instructors not using Mastering, Pearson eText can also be adopted on its own as the main course material.

- ▶ **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 versus expending; whether they're meeting the RDAs for vitamins and minerals, etc.). A **MyDietAnalysis activity** has been added within Mastering Nutrition 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.
  - **New - MyDietAnalysis Personalized Dietary Analysis activities** guide students in a thorough investigation of their dietary intake and are focused on the most commonly assigned topics in diet analysis projects. Follow-up feedback and a reflection question help students understand how to improve their diets. Activities can also be automatically graded, saving instructors valuable time from grading their students' lengthy diet analysis projects.
- ▶ **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 help 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. Activities, such as Carbohydrates on a Food Label and FDA Packaging Requirements, have been updated and/or created to reflect recently updated nutrition standards.
- ▶ **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 Mastering Nutrition 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.
- ▶ **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—and at their own pace. How? By keeping them motivated and engaged. The assignable modules rely on the latest research in cognitive science, using methods—such as adaptivity, gamification, and intermittent rewards—to stimulate learning and improve retention. Each module poses a series of questions about a course topic. These question sets adapt to each student's performance and offer personalized, targeted feedback to help them master key concepts.
- ▶ With **Learning Catalytics**, you'll hear from every student when it matters most. You pose a variety of questions that help students recall ideas, apply concepts, and develop critical-thinking skills. Your students respond using their own smart phones, tablets, or laptops. You can monitor responses with real-time analytics and find out what your students do—and don't—understand. Then you can adjust your teaching accordingly and even facilitate peer-to-peer learning, helping students stay motivated and engaged. Updated for this edition: newly added clicker questions from the Digital Instructional Resources. All questions will be specifically tagged to *Nutrition & You* and non-majors nutrition.
- ▶ **The Study Area** is broken down into learning areas and includes videos, animations, MP3s, and much more for student self-study.

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 versus 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.

## Instructional Resources for *Nutrition & You* (Download Only)

The digital Instructional Resources provide everything an instructor needs to prep for the course, and deliver a dynamic lecture, in one convenient place. All resources are downloadable from Mastering Nutrition and include:

- 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 Mastering Nutrition tutorials*
- *Great Ideas in Teaching Nutrition*
- *Eat Right! Healthy Eating in College and Beyond*
- *Food Composition Table*

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*Joan Salge Blake*

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1

# What Is Nutrition?







## True or False?

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

## 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.<sup>1</sup> 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 might 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. In China, rice, a staple, might 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, in Alaska, fish is plentiful, but people have less access to locally-grown produce most of the year. 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

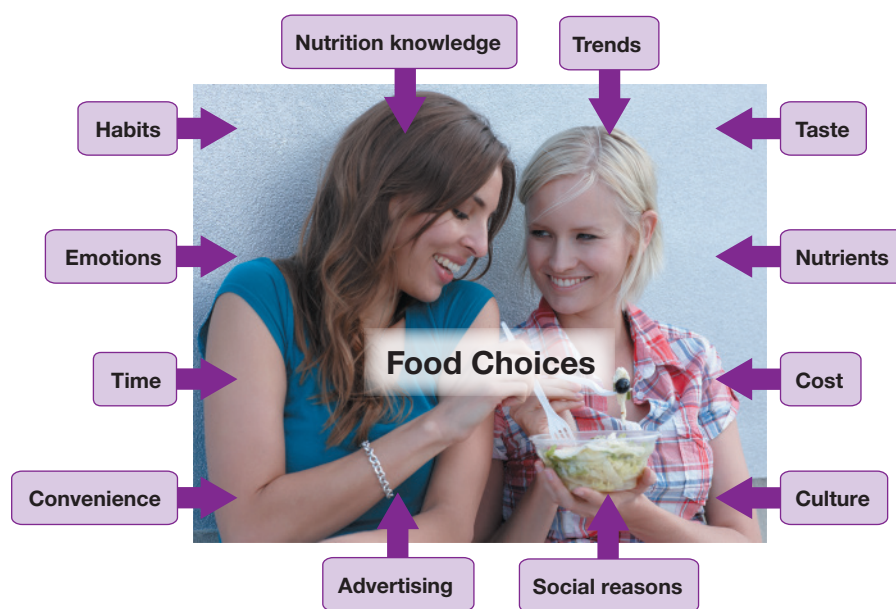


FIGURE 1.1 Many Factors Influence Your Food Choices

**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.



Four in ten Americans are of Hispanic, Native American, Asian, or African descent. Cultural food preferences often influence food choices.

for some food items. People living in some states may have less access to fresh fish, compared to those living on the coasts where seafood is more abundant.

### 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 44 million turkeys as they celebrate Thanksgiving.<sup>2</sup> 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.<sup>3</sup>

For many people, activities like watching a football game with fellow fans or going to a movie with friends often involve particular foods. For example, Americans purchase more than 12 million pizzas on Super Bowl Sunday.<sup>4</sup>

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 peppers and 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 changing eating habits of millennials. According to the United States Department of Agriculture (USDA), millennials, born between the 1980s and mid 2000s, are looking for healthier and fresher foods and meals that are already prepared. In other words, they want home-cooked meals but may want someone else to cook them.<sup>5</sup>



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

### Cost, Time, and Convenience

According to the U.S. 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.<sup>6</sup> It's not surprising, then, that many people may be forced to base their food choices on cost. A large, store-brand bag of potato chips, on sale, may appear to be a more economical way to fill a dinner plate than with fresh or frozen vegetables. However, 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.<sup>7</sup> Buying produce in season, on sale, and using frozen varieties can actually be very economical ways to consume fruits and vegetables.

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. A recent survey reported that close to 60 percent of millennials spend as little as 15 minutes cooking dinner during the week.<sup>8</sup> 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





## 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 snack when I stream movies at home.  
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!

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 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 29,000 coffee shops across the United States.<sup>9</sup> Pizza and coffee are just two examples of a broad trend of Americans spending more of their household food budget on eating out.

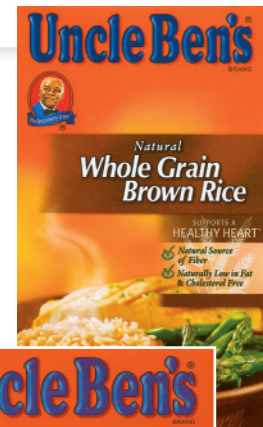
#### Habits and Emotions

Many people start their day with a bowl of cereal. In fact, ready-to-eat cereals are the number-one breakfast food choice for most people in the morning.<sup>10</sup> 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. Many people turn to food during times of stress or sadness. 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** 

**Cancer**

Respiratory Diseases

Accidents

**Stroke**

Alzheimer's Disease

**Diabetes**

Influenza/Pneumonia

Kidney Disease

Intentional Self-Harm

## 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**).<sup>11</sup> 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, 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.



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

# 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.

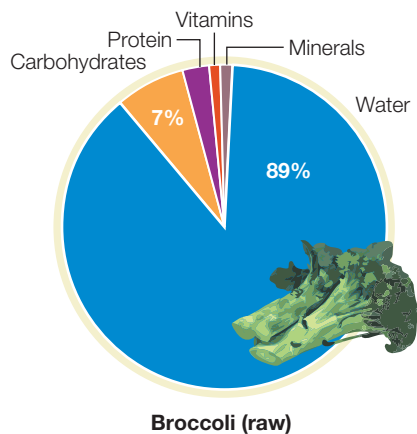
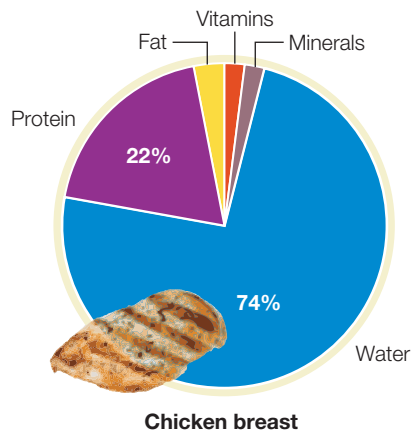
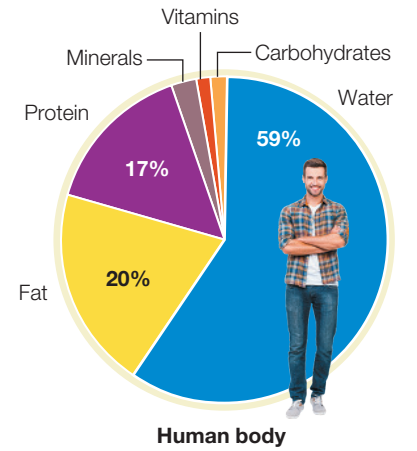
Calories from the macronutrients are used as energy during the process of metabolism, and many vitamins, minerals, and water are essential to this process. Vitamins and minerals are also needed for growth and reproduction and to help repair and maintain your body (**FIGURE 1.3**).

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 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. Carbohydrates and protein provide 4 calories per gram, and fats provide 9 calories per gram. The number of calories in a given food can be determined by measuring the weight, in grams, of each of the three nutrients in one serving of the food.

The amount of calories that you need daily to maintain your weight is estimated based on your age, sex, and activity level. However, you need these nutrients for many

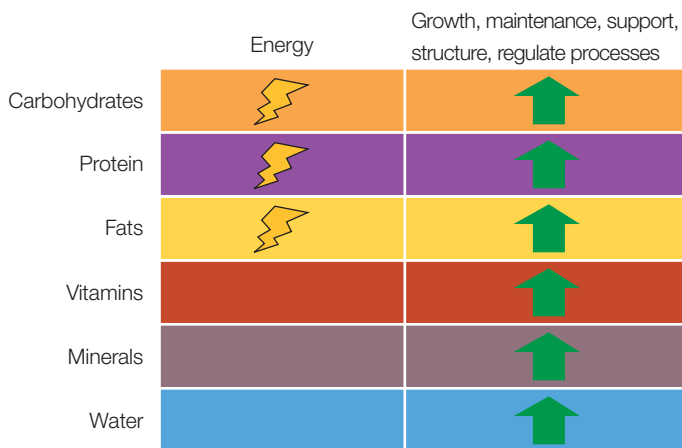


**FIGURE 1.2** Nutrients in Foods and in the Body The nutrients found in the foods that you eat are the same ones that provide structure for your body and allow your normal body processes to occur.

**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.



**FIGURE 1.3** Nutrients and Their Functions

Nutrients work closely together to provide energy, structure, and support, and to regulate body processes.