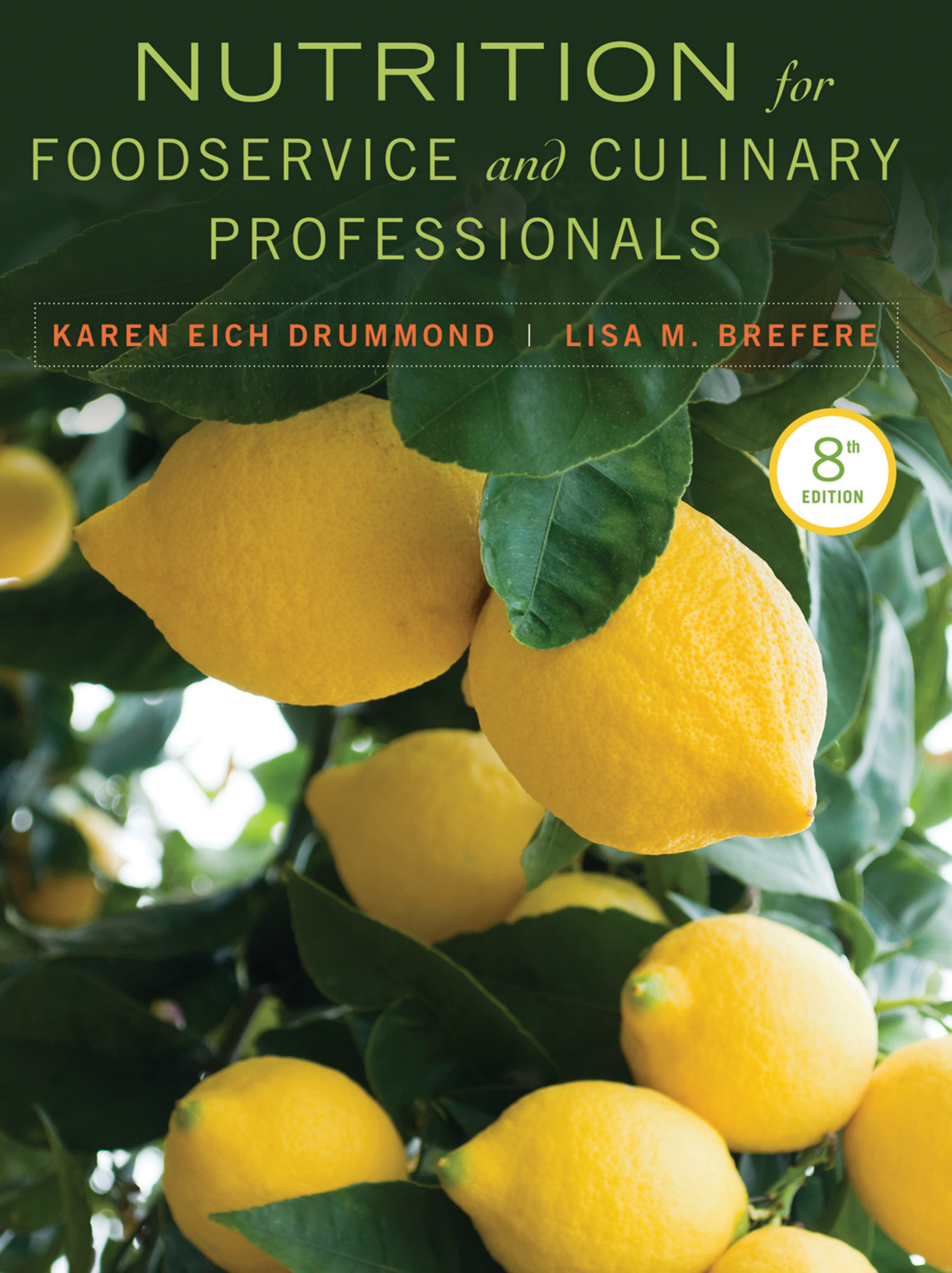
NUTRITION *for* FOODSERVICE *and* CULINARY PROFESSIONALS

KAREN EICH DRUMMOND | LISA M. BREFERE

8th EDITION



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Ed.D., R.D., L.D.N., F.A.D.A., F.M.P. C.E.C., A.A.C.

8th EDITION

WILEY

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In memory of my father, Frank J. Eich

Karen Eich Drummond

To my husband, Joe and my 4 children, Joe Jr., Julia, John, and Jeremy.

Thank you for inspiring and motivating my passion for wholesome balanced and pure cooking through the moderation of ingredients and without compromising taste, flavor, presentation, or satisfaction. The kitchen is truly the hub of our family.

Lisa M. Brefere

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CONTENTS

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PREFACE

Nutrition for Foodservice and Culinary Professionals, Eighth Edition is written for students in culinary programs, as well as those in hotel, restaurant, and onsite management programs. Practicing culinary and management professionals will find it useful as well. As with previous editions, this is meant to be a practical how-to book tailored to the needs of students and professionals.

Nutrition is constantly in the news, with reports on overweight Americans, vegetarian eating, school lunch, and many more topics being streamed on the Internet 24/7 and reported by the media as well. Hectic lifestyles force many to eat out or get take-out meals at least several times a week. The typical American purchases a meal, whether breakfast, lunch, dinner, or snack, from a foodservice operation about three to five times a week. As a foodservice professional, you have a responsibility to your clients to understand contemporary cooking techniques that are balanced, moderate in rich ingredients, well prepared, and, of course, great tasting. You have a captive audience of people who depend on the chef, cooks, and foodservice employees to prepare nutritious food for them with the limits and balance they require to maintain their current lifestyles.

This book is written to help you use nutritional principles to evaluate and modify menus and recipes, as well as to respond knowledgeably to customers' questions and needs. As in the previous editions, co-author Lisa Brefere, C.E.C., A.A.C., lends her firsthand experiences applying nutrition to selecting, cooking, and menuing healthy foods in restaurants and foodservices. After all, we eat foods, not nutrients!

WHAT'S NEW FOR THE EIGHTH EDITION

Many important changes and additions have been made to ***Nutrition for Foodservice and Culinary Professionals*** to make this text even more accessible and practical. Among the most significant changes are the following:

- The ***Eighth Edition*** includes a discussion of the *Dietary Guidelines for Americans, 2010,* and ChooseMyPlate.gov graphic and key content.
- *WileyPLUS*, Wiley's online teaching and learning environment, is now available for this textbook. *WileyPLUS* is a research-based online environment for effective teaching and learning. *WileyPLUS* builds students' confidence because it takes the guesswork out of studying by providing a clear roadmap and many opportunities to practice and apply concepts.
- More photos, charts, and recipes are used to effectively convey nutrition concepts and applications in a visual manner.
- A new section, called **Culinary Focus**, is included in Chapters 3 to 7. Culinary Focus examines each food group from the perspective of a chef, from picking your ingredients to putting a new dish on the menu.
- The chapters on balanced cooking and menus (Part Two) have been thoroughly updated and expanded with more examples and tips. Recipe makeovers, which were previously

part of Chapter 9, are now in their own chapter. Chapter 10, **Balanced Menus**, has been reorganized to give ideas and tips on balanced ingredients and preparation for each section of the menu, followed by menu ideas and presentation tips.

- Part Three, **Applied Nutrition**, includes a chapter on meeting customers' special nutrition requests. From low kcalorie to vegan, you are given ideas for foods and menu items from appetizer to dessert. There is also guidance to enable you to create a food allergy management plan for restaurants. Part Three also includes chapters on weight management and nutrition for all ages.
- More coverage of important topics in the field today—such as organic and sustainable foods, special diets such as gluten-free and allergy diets, healthy dining programs, and childhood obesity—are included. Also, every chapter now includes a Hot Topic, the section at the end of each chapter that discusses current areas of interest in foods and nutrition.

ORGANIZATION

The ***Eighth Edition*** of ***Nutrition for Foodservice and Culinary Professionals*** is organized into three major parts, beginning with an introduction to nutrition and foods, continuing on to provide advice on healthy recipes and menus, and finally applying nutrition concepts.

- **Part I: Fundamentals of Nutrition and Foods (Chapters 1–7)** consists of two introductory chapters, followed by five chapters concerned with specific nutrients, vitamins, and minerals. The first two chapters introduce basic nutrition concepts and explain how to use the *Dietary Guidelines for Americans, 2010*, MyPlate, and food labels when planning menus. The next chapters focus on particular nutrients: carbohydrates, fats and oils, proteins, vitamins, water, and minerals.
- **Part II: Balanced Cooking and Menus (Chapters 8–10)** begins with a chapter dedicated to the foundations of balanced cooking, including descriptions of how to use ingredients, flavoring principles, and cooking techniques to create healthy and delicious dishes. In Chapter 9, **Recipe Makeovers**, Chef Lisa Brefere explains exactly how she accomplished each makeover, including many tips on ingredients and how to modify recipes and build flavor. These recipes include not only main dishes but also sauces, dressings, desserts, and others. Chapter 10, **Balanced Menus**, offers hundreds of examples of healthy menu items for meals and snacks, and includes examples of healthy dining programs.
- **Part III: Applied Nutrition (Chapters 11–13)** begins with a chapter that explains how to handle customers' special nutrition requests—such as no gluten or low sugar. Charts are given to help you determine which menu items would be appropriate for each section of the menu. Chapters 12 and 13 discuss weight management and lifespan nutrition. Chef Lisa Brefere includes tips on providing healthy meals to children.

LEARNING TOOLS

Nutrition for Foodservice and Culinary Professionals contains many special features that enable students to better understand concepts and extend and test their knowledge. These pedagogical tools include tables, charts, and illustrations, as well as the following:

Chapter Outline Each chapter begins with a brief overview of that chapter's content, allowing students to visualize the chapter as a whole.

CARBOHYDRATES

CHAPTER 3

LEARNING OBJECTIVES

- Identify food sources of carbohydrates and distinguish between simple and complex carbohydrates.
- Compare and contrast glucose, fructose, sucrose, and lactose.
- Identify sugars on an ingredient label, foods high in added sugars, and the number of teaspoons of sugar in a food using a food label.
- Identify the simple sugar found in starch and fiber, list four foods rich in starch, and explain gelatinization and how starch is used in cooking.
- Identify examples of high-fiber foods and explain the difference between soluble and insoluble fiber, and between dietary fiber and functional fiber.
- Distinguish between a whole grain and a refined grain and explain why a whole grain is more nutritious.
- Summarize the functions of carbohydrates and describe how glycogen functions in the body.
- Describe how carbohydrates are digested and absorbed in the body, and explain how the body regulates the level of glucose in the blood.
- Identify foods with low to medium glycemic loads and how a low glycemic diet might affect your health.
- Discuss current recommendations for carbohydrate, sugar, fiber, and intake of fruits, vegetables, legumes, and whole grains.
- Explain the health effects (if any) of added sugars on dental cavities, obesity, diabetes, heart disease, hypoglycemia, and hyperactivity in children.
- Demonstrate how to select whole grains, and list two ways eating whole grains can improve your health.
- List three ways that a high fiber diet can improve your health.
- Define lactose intolerance and describe three strategies to manage it.
- Describe how to cook whole grains and legumes.
- Create an appetizer, entrée, side dish, salad, and snack using high-fiber carbohydrate foods.
- Read food labels to identify foods using alternative sweeteners.

Learning Objectives A bulleted list of learning objectives at the beginning of each chapter provides students with key points and a sequential organization of the chapter.

Key Terms and Concepts Whenever key terms and concepts are first introduced, their definitions can be found in these sidebars, located right next to the bolded term.

Carbohydrate A large class of nutrients, including sugars, starch, and fibers, that function as the body's primary source of energy.

Photosynthesis A process in which plants use energy from sunlight to convert carbon dioxide and water to carbohydrate.

Simple carbohydrates or sugars A form of carbohydrate

You may, like many Americans, have a love-hate relationship with carbohydrates. You love to eat them, especially snack foods like cookies or pretzels or soda (and they are so easy to eat or drink), but you hate them because they have a reputation for being fattening. **Carbohydrates** include sugars, starches, and fiber. As you will learn in this chapter, carbohydrates containing fiber are your healthiest carbohydrates, including whole grains (such as whole wheat and products made from them), fruits, and vegetables.

We find carbohydrates in many of the foods we eat. Grains, such as oats and rice, are rich in carbohydrates. When grains such as wheat are ground, it produces flour used to bake breads, tortillas, crackers, cakes, and cookies (Figure 3-1). Fruits, vegetables, and milk also contain carbohydrates.

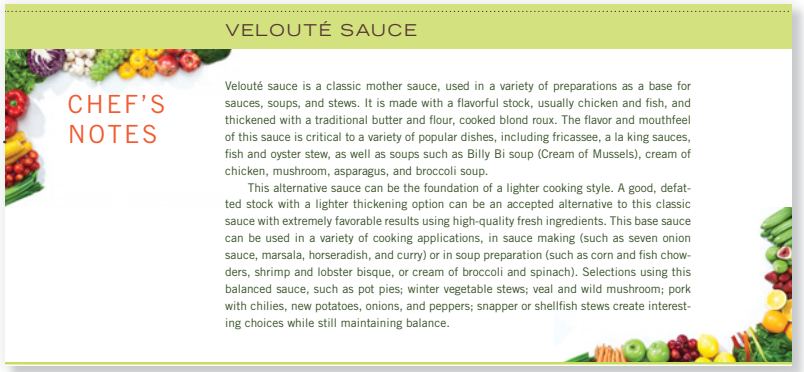
As you may have noticed, most carbohydrate foods are plant foods. Plants make their own carbohydrates in a process known as **photosynthesis**. In photosynthesis, plants use carbon dioxide from the air, water from the soil, and energy from the sun to make a carbohydrate called glucose. The plant then uses the energy in carbohydrates to grow and be healthy, much like we do.

SUMMARY

1. In lactose intolerance, lactase is deficient so lactose (milk sugar) is not split into its components in the small intestines. Instead, it travels to the colon where it attracts water and causes bloating and diarrhea. In addition, intestinal bacteria ferment lactose and produce gas. Symptoms usually occur with 30 minutes to 2 hours and clear up within 2 to 5 hours.
2. Lactose intolerance is an inherited problem and is especially prevalent among Asians, Native Americans, African Americans, and Latinos.
3. Treatment for lactose intolerance includes a diet limited in lactose (present in dairy and added to some other foods), use of lactose-free milk and milk products and/or lactase, and consuming small servings of dairy with a meal and/or dairy products lower in lactose (such as hard cheeses and yogurt) as tolerated.

Summary Designed to help students focus on the important concepts within each chapter, a summary is given after each section within a chapter.

Chef's Tips Chef's Tips provide an experienced chef's advice on all aspects of cooking, including which foods go together, how to use foods' natural colors to create an attractive dish, and how to use culinary techniques to create healthy and delicious dishes.



CULINARY FOCUS: GRAINS AND LEGUMES

Most Americans need to get more whole grains and legumes such as beans into their diet. Both whole grains and legumes are very nutritious, contain little fat, and are filling due to their fiber content. This section will help you highlight dishes with grains and legumes on the menu.

Culinary Focus Culinary Focus, which replaces "Food Facts," examines various food groups from the perspective of a chef. Organized into Product, Preparation, and Menuing and Presentation, Culinary Focus is full of tips for you to use to produce tasty and healthy menu items. You will find this feature in Chapters 3-7.

HOT TOPIC

ALTERNATIVE SWEETENERS

The introduction of diet soda in the 1950s sparked the widespread use of alternative sweeteners, substitutes for sugar that provide no, or almost no, kcalories. If you drink diet soda, look at the food label and see which alternative sweeteners are present. The following alternative sweeteners are approved for use by the Food and Drug Administration: saccharin, aspartame, acesulfame potassium, sucralose, and neotame. The only one that contains kcalories is aspartame—but because so little is used, the kcalories are close to 0. Besides offering virtually no kcalories, alternative sweeteners are beneficial because they do not cause tooth decay or force insulin levels to rise as do added sugars such as high-fructose corn syrup.

Because they are considered food additives, the FDA requires that they be tested for safety before going on the market. The FDA uses the concept

Approved Alternative Sweeteners

SACCHARIN

Saccharin, discovered in 1879, has been consumed by Americans for more than 100 years. Its use in foods increased slowly until the two World Wars, when its use increased dramatically due to sugar shortages. Saccharin is about 200 to 700 times sweeter than sucrose and is excreted unchanged directly into the urine. It is approved for use at specific maximum amounts in foods and beverages and as a tabletop sweetener. Known as Sweet'N Low or Sweet Twin, it is sold in liquid, tablet, packet, and bulk form. Because saccharin leaves some consumers with an aftertaste, it is frequently combined with other alternative sweeteners, such as aspartame.

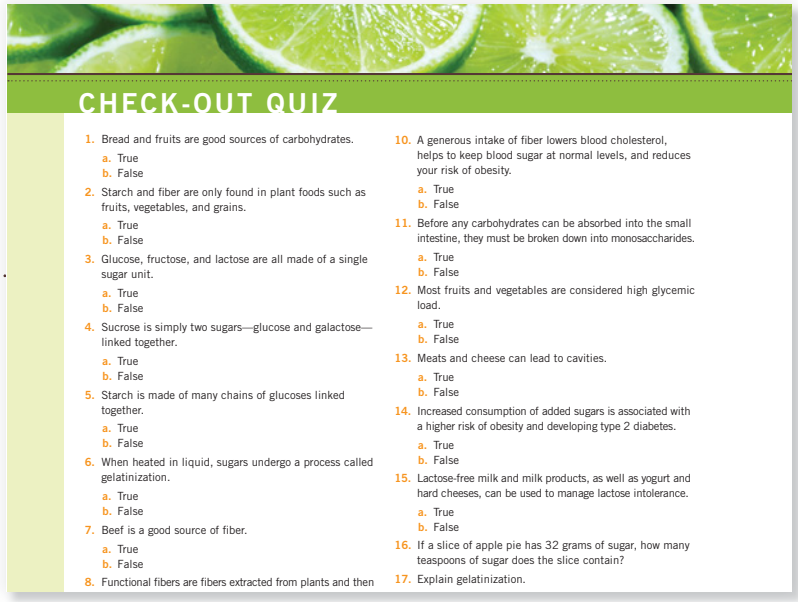
ASPARTAME

Aspartame is approximately 160 to 220 times sweeter than sucrose and has an acceptable flavor with no bitter aftertaste. It is marketed under the brand names NutraSweet and Equal. Aspartame is approved as a general-purpose sweetener and is found in diet sodas, cocoa mixes, pudding and gelatin mixes, fruit spreads and toppings, and other foods. If you drink diet soft drinks, chances are, they are sweetened with aspartame. Fountain-made diet soft drinks are more commonly sweetened with a blend of aspartame and saccharin, because saccharin helps provide increased stability.

Aspartame breaks down during prolonged heating and starts to lose its sweetness. For stovetop cooking, it is best to add aspartame at the end of cooking or after removing the food from the heat. For baking, it is best to use aspartame with regular sweeteners such as brown sugar in specially su-

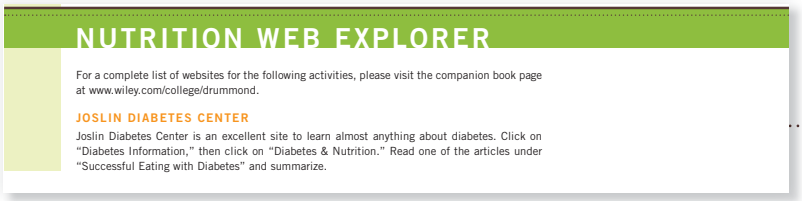
Hot Topics Hot Topics promote critical thinking and discussion forums on current issues related to nutrition, including functional foods and phytochemicals, gluten-free cooking, and sustainable foods. Every chapter contains a Hot Topic.

Check-Out Quiz At the end of each chapter, a Check-Out Quiz allows students to check their comprehension of the chapter's concepts. Answers to these quizzes are found in Appendix C.



CHECK-OUT QUIZ

1. Bread and fruits are good sources of carbohydrates.
   a. True
   b. False
2. Starch and fiber are only found in plant foods such as fruits, vegetables, and grains.
   a. True
   b. False
3. Glucose, fructose, and lactose are all made of a single sugar unit.
   a. True
   b. False
4. Sucrose is simply two sugars—glucose and galactose—linked together.
   a. True
   b. False
5. Starch is made of many chains of glucoses linked together.
   a. True
   b. False
6. When heated in liquid, sugars undergo a process called gelatinization.
   a. True
   b. False
7. Beef is a good source of fiber.
   a. True
   b. False
8. Functional fibers are fibers extracted from plants and then
10. A generous intake of fiber lowers blood cholesterol, helps to keep blood sugar at normal levels, and reduces your risk of obesity.
    a. True
    b. False
11. Before any carbohydrates can be absorbed into the small intestine, they must be broken down into monosaccharides.
    a. True
    b. False
12. Most fruits and vegetables are considered high glycemic load.
    a. True
    b. False
13. Meats and cheese can lead to cavities.
    a. True
    b. False
14. Increased consumption of added sugars is associated with a higher risk of obesity and developing type 2 diabetes.
    a. True
    b. False
15. Lactose-free milk and milk products, as well as yogurt and hard cheeses, can be used to manage lactose intolerance.
    a. True
    b. False
16. If a slice of apple pie has 32 grams of sugar, how many teaspoons of sugar does the slice contain?
17. Explain gelatinization.



NUTRITION WEB EXPLORER

For a complete list of websites for the following activities, please visit the companion book page at www.wiley.com/college/drummond.

JOSLIN DIABETES CENTER

Joslin Diabetes Center is an excellent site to learn almost anything about diabetes. Click on "Diabetes Information," then click on "Diabetes & Nutrition." Read one of the articles under "Successful Eating with Diabetes" and summarize.

Nutrition Web Explorer This feature encourages students to visit specific websites in order to learn more about a wide variety of topics. Students are usually asked to complete a specific, written assignment for each website.

In the Kitchen In the Kitchen is a new feature found in all chapters that brings the content of the text directly into the kitchen. Students are first asked to prepare menu items, such as low kcalorie foods in the chapter on weight management. Then students complete a brief written assignment based on the topic and recipes. The recipes and assignment sheets are in the Instructor's Manual.

IN THE KITCHEN

Whole Grain and High Fiber Cooking

Each group of students will prepare two recipes as follows.

- Traditional Rice Pilaf and Cracked Wheat Pilaf
- Smoked Chicken Noodle Soup and Smoked Chicken Soup with Lentils
- Hearty Beef Chili and Hearty Turkey Chili with Beans
- Raisin Muffins and Raisin Bran Muffins
- Traditional Pasta with Marinara Sauce and Whole Wheat Pasta with Marinara Sauce
- Blueberry Buttermilk Pancakes and Whole Grain Pancakes with Blueberries

As you can see, the second recipe in each pair includes whole grains and good sources of fiber. Your instructor will hand you a worksheet at the end to compare the fiber content of all the dishes, as well as compare and evaluate each dish's taste and appearance.

Glossary All key terms and definitions are listed in the glossary, easily found in the back of the book.

Appendices A very useful reference for readers, the appendices include a variety of useful information, including serving sizes for MyPlate food groups and body mass index charts. Additional appendix materials on the nutritive value of foods, food patterns, Dietary Reference Intakes, sample menus, and growth charts for children and adolescents can also be found on the Book Companion Website: www.wiley.com/college/drummond.

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Different learning styles, different levels of proficiency, different levels of preparation—each student is unique. *WileyPLUS* empowers each of them to take advantage of individual strengths:

- Students receive **anytime/anywhere access** to resources that address their demonstrated needs, and they get immediate feedback and remediation when needed.
- Integrated multimedia resources—including **videos, animations, worksheets, interactive activities such as Create-a-Plate and Revise-a-Recipe**, and much more—offer multiple study paths to fit each student's learning preferences and encourage more active learning.
- Students can take advantage of many opportunities for self-assessment linked to relevant portions of the text. They can take control of their own learning and practice until they master the material.

For Instructors

WileyPLUS empowers instructors with tools and resources that make teaching even more effective:

- Instructors can customize their classroom presentations with a wealth of resources and functionality, from PowerPoint slides to a database of rich visuals. They can even add their own materials to their *WileyPLUS* courses.
- Instructors can identify students who are falling behind and intervene accordingly, without waiting to see them during office hours.
- Instructors can take advantage of the program's pre-built assignments and extensive question bank, therefore simplifying and automating such tasks as student performance assessment, creating assignments, scoring student work, keeping grades, and more.

Create-a-Plate and Revise-a-Recipe

Create-a-Plate interactive exercises help students create their own virtual plate of food and also provide those guidelines and hints on how to make a healthy meal. Students can build a plate by selecting a menu and seeing real-time nutritional analysis based on their selections. As modifications are made, nutritional information adjusts, helping to create a balanced meal. In addition to creating balanced meals, students can use this exercise to create meals with specific guidelines, such as low in kcalories or high in fiber or protein.

Through the ***Revise-a-Recipe*** interactive exercises, students are provided recipes to choose from, and then immediately can see how the recipe's nutritional values change as ingredients are adjusted or substituted based on the goals of the activity.

SUPPLEMENTARY MATERIALS

A ***Study Guide*** (ISBN: 978-1-118-50721-6) for students is available to help reinforce nutrition concepts and allow students to make nutrition applications.

A ***Companion Website*** (www.wiley.com/college/drummond) provides links to both the Student and Instructor websites. The **Student Website** includes self-tests as well as a number of interactive activities that are designed to reinforce key concepts from each chapter. The Student Website also includes supplementary recipes.

From the **Instructor Website**, instructors can download the *Instructor's Manual* as well as PowerPoint slides, *Study Guide* solutions, test bank questions and answers, and student worksheets and activites for each chapter. A selection of bonus recipes is also available here.

An ***Instructor's Manual*** (ISBN: 978-1-118-50696-7) that includes class outlines, student worksheets, key terms and definitions, In the Kitchen recipes and activities, and test questions and answers is available. Please contact your Wiley representative for a copy or visit the companion website to download a copy.

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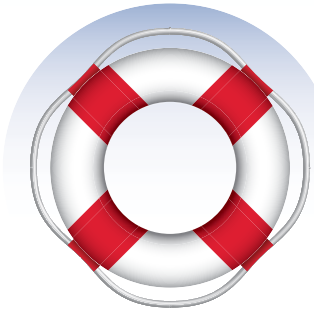

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PART 1

FUNDAMENTALS OF NUTRITION & FOODS

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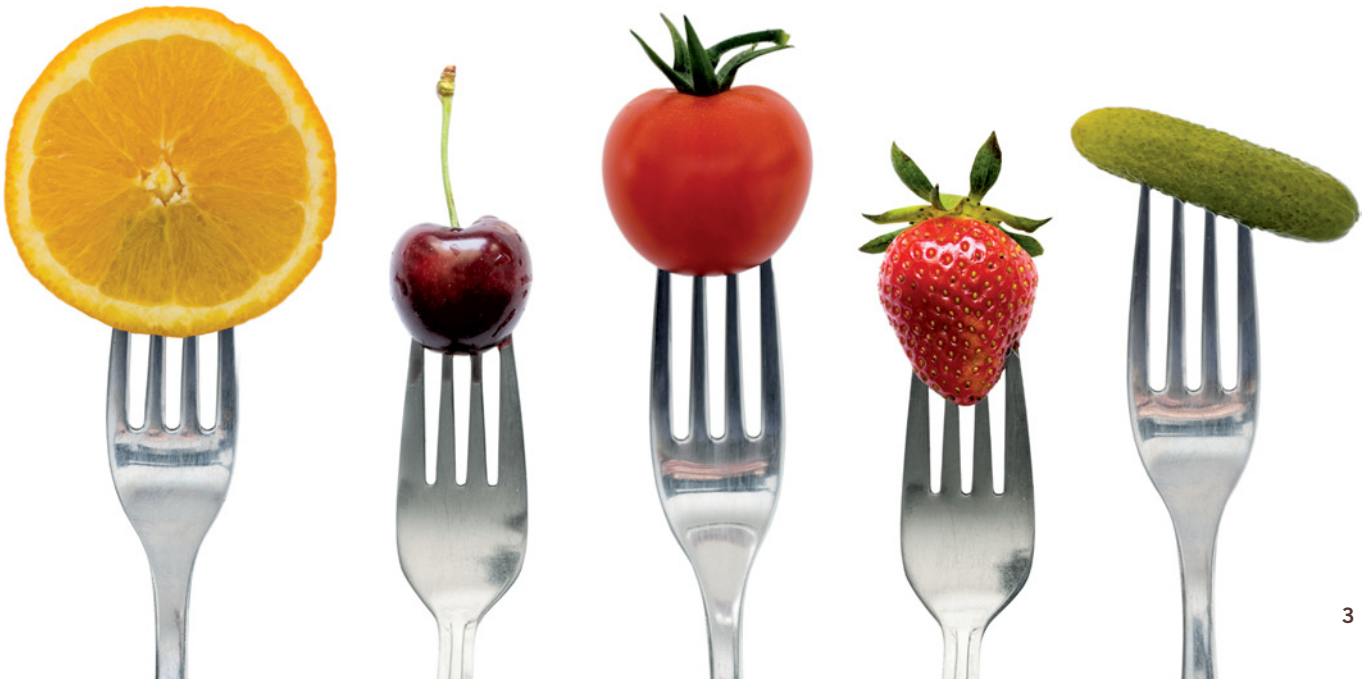
INTRODUCTION TO NUTRITION

CHAPTER 1

- Nutrition and You
- Why Do You Eat the Foods You Do?
  - Flavor
  - Other Aspects of Food
  - Demographics
  - Culture and Religion
  - Health
  - Social and Emotional Influences
  - Marketing and the Media
  - Environmental Concerns
- What Are Kilocalories?
- What Are Nutrients?
- Characteristics of a Nutritious Diet
- How to Recognize Whole, Processed, Fortified, and Organic Foods
- Dietary Reference Intakes
- What Happens When You Eat?
- Check-Out Quiz
- Nutrition Web Explorer
- In The Kitchen
- Hot Topic: Sustainable Food Systems



LEARNING OBJECTIVES

- Explain what nutrition is and why it should be important to you on a personal level and as a culinary/foodservice professional.
- Identify three food groups we don't eat enough of and two food groups we eat too much of.
- Define flavor and explain how it involves all five senses.
- Discuss five factors that influence what you eat.
- Define kilocalories, identify the three factors that influence the number of kcalories you use every day, and explain the effect of the following on basal metabolic rate: gender, age, exercise, and growth.
- Name the six classes of nutrients and their characteristics.
- Give two examples of foods that are nutrient dense and two that are empty kcalorie foods and explain why you chose these foods.
- Describe four characteristics of a nutritious diet.
- Identify a given food as a whole food, processed food, enriched or fortified foods, and/or organic food.
- Explain what is meant by Recommended Dietary Allowance, Adequate Intake, and Tolerable Upper Intake Level of a nutrient.
- Explain how food is digested and absorbed in the gastrointestinal tract.
- To run a sustainable facility, list five steps chefs are taking in the kitchen and five steps managers are taking in the dining room and production areas.

NUTRITION AND YOU

Americans are fascinated with food: choosing foods, reading newspaper articles on food, finding recipes online, preparing and cooking foods, checking out new restaurants, and, of course, eating foods. Why are we so interested in food? Of course, eating is fun, enjoyable, and satisfying, especially when we are eating with other people whose company we like. You probably know that eating the right foods and eating the right amounts of foods are part of a healthy lifestyle. A healthy lifestyle also involves maintaining a healthy weight, being physically active, getting enough sleep, and not smoking.

Nutrition A science that studies nutrients and other substances in foods and in the body and the way those nutrients relate to health and disease. Nutrition also explores why you choose particular foods and the type of diet you eat.

Nutrients The nourishing substances in food that provide energy and promote the growth and maintenance of your body.

Diet The food and beverages you normally eat and drink.

Nutrition is a science that studies nutrients (such as protein or vitamin C) found in foods and the body. Nutrition is important because what you eat can affect your health. Almost daily you are bombarded with news reports that something in the food you eat, perhaps a nutrient such as sugar, may not be good for you—that it may indeed cause or complicate conditions such as diabetes or heart disease. Nutrition researchers look closely at the relationships between nutrients and disease, as well as the processes by which you choose what to eat and the balance of foods and nutrients in your diet.

Nutrients are the nourishing substances in food that give you energy, allow your body to grow, and keep you feeling healthy. They help regulate many processes that go in your body, such as the beating of your heart or the digesting of food in your stomach. Examples of nutrients include carbohydrates, fats, protein, water, and vitamins. In summary, nutrition is a science that studies nutrients and other substances in foods, and how they affect the body, especially in terms of health and disease. Nutrition also explores why you choose the foods you do and the type of **diet** you eat.

Diet is a word that has several meanings. Anyone who has tried to lose weight has no doubt been on a diet. In this sense, diet means a weight-reducing diet and is often thought of in a negative way. But a more general definition of diet is the foods and beverages you normally eat and drink every day. Of course, your normal diet may change, such as when you started college and had new places to eat.

Your lifestyle choices, including diet, strongly influence whether you might get heart disease, cancer, and stroke—the three biggest killers in the United States. Your genetics and environment can also put you at greater risk for disease. Table 1-1 takes a look at diet-related diseases and some of their risk factors. A risk factor is anything that affects your chance of get-

TABLE 1-1 A Look at Diet-related Diseases

Cardiovascular disease	• 37 percent of Americans have cardiovascular disease. • Major risk factors include high levels of blood cholesterol, overweight and obesity, high blood pressure, physical inactivity, type 2 diabetes, and smoking.
High blood pressure (hypertension)	• 34 percent of American adults have high blood pressure. • 36 percent of American adults have blood pressure numbers that are higher than normal, but not yet in the high blood pressure range. • Dietary factors that increase blood pressure include excessive sodium intake, overweight and obesity, and excess alcohol consumption. • High blood pressure is a risk factor for heart disease, stroke, heart failure, and kidney disease.
Cancer	• Almost one in two men and women will be diagnosed with cancer during their lifetime. • Dietary factors are associated with risk of some types of cancer, such as breast (post-menopausal), colon, kidney, mouth, and esophagus.
Diabetes	• Almost 11 percent of Americans ages 20 years and older have diabetes. The vast majority of cases are type 2 diabetes, which is heavily influenced by diet and physical activity. • About 35 percent of American adults have pre-diabetes. Pre-diabetes means that blood glucose levels are higher than normal, but not high enough to be called diabetes.

Source: US Department of Agriculture and US Department of Health and Human Services. *Dietary Guidelines for Americans, 2010,* 7th ed. (Washington, DC: US Government Printing Office, December 2010).

ting a disease. For example, if you get little to no physical activity (such as walking), you are at a higher risk of getting heart disease.

Poor diet and physical inactivity are the most important factors contributing to an epidemic of overweight and obesity in this country. The most recent data indicate that 73 percent of men and 64 percent of women are overweight or obese, and 32 percent of children and adolescents ages 2 to 19 years are overweight or obese.

If you are overweight or obese, you have an increased risk of many health problems, such as type 2 diabetes and heart disease. These increased health risks are not limited to adults. More children and adolescents are being diagnosed with type 2 diabetes and high blood pressure than in the past. Preventing obesity in childhood is an important way to combat and reverse the obesity epidemic, because overweight children are more likely to be overweight or obese as adults than normal-weight children.

Eating healthy can help you maintain a healthy body weight as well as reduce your risk of heart disease, high blood pressure, diabetes, and several types of cancer. As described in the *Dietary Guidelines for Americans, 2010,* eating healthy means focusing on foods such as the following:

- Vegetables
- Fruits
- Beans and peas
- Whole grains (such as whole wheat bread or oatmeal)
- Fat-free or low-fat milk and milk products
- Lean meats and poultry
- Seafood
- Nuts and seeds

Healthy eating also includes eating minimal solid fats (such as butter), sugars, or sodium (found in salt). Figure 1-1 shows how typical American diets compare to the *Dietary Guidelines for Americans*. Unfortunately, we eat too few whole grains, fruits, vegetables, seafood, and dairy, and we eat too many foods high in solid fat and sugar (such as cookies and most sweets), as well as too many foods high in sodium.

Now that you know that good nutrition, as part of a healthy lifestyle, is beneficial for your long-term health, we can look at why good nutrition is important for foodservice and

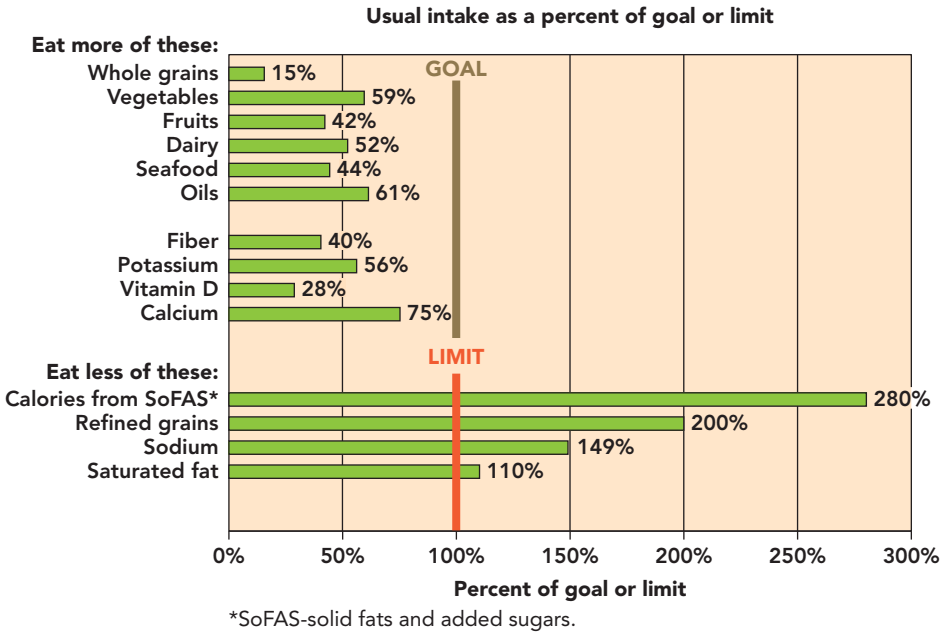


FIGURE 1-1 How American diets compare to recommendations.

Source: US Department of Agriculture and US Department of Health and Human Services. *Dietary Guidelines for Americans, 2010*, 7th ed. (Washington, DC: US Government Printing Office, December 2010).

culinary students. Even though restaurants sell a lot of big hamburgers and fries, the National Restaurant Association reported in 2011 that 71 percent of adults are trying to eat healthier at restaurants than two years earlier. Research from the NPD Group shows that consumers have indeed been ordering fewer foods high in sugar content (such as carbonated soft drinks) and high in fat (such as hot dogs). At the same time, more consumers are selecting healthier foods such as grilled chicken, fruit, and yogurt. Consumers who seek healthy options are looking for fresh and nutritious ingredients.

When professional chefs, all members of the American Culinary Federation, were asked to identify the top 20 trends in foods, beverages, cuisines, and culinary themes for the National Restaurant Association's "What's Hot in 2012" survey for full-service restaurants, nutrition/health was one of the top trends. Other related trends included the following:

- Gluten-free/food-allergy conscious
- Sustainability and locally grown and sourced foods
- Children's nutrition and healthful kids' meals (Figure 1-2) with whole grains, fruits, and vegetables
- Restaurant gardens

FIGURE 1-2 Feeding children nutritious meals is a trend in foodservice.

Courtesy of Monkey Business Images/Shutterstock.

Surveys for quickservice restaurants showed similar trends. This is significant, considering that the average consumer spends 49 percent of their food budget in restaurants.

Understanding good nutrition is important for you on both a personal and a professional level. This introductory chapter explores why we choose the foods we eat and then explains several important nutrition concepts that build a foundation for the remaining chapters. You will learn more about nutrients, kcalories, empty-kcalorie foods, characteristics of a nutritious diet, and how to recognize whole foods, processed foods, and organic foods in a grocery store.

SUMMARY

1. Nutrition is a science that studies nutrients and other substances in foods and in the body and the way those nutrients relate to health and disease. Nutrition also explores why you choose particular foods and the type of diet you eat. Nutrients are the nourishing substances in food that provide energy and promote the growth and maintenance of your body.
2. Eating healthy can help reduce your risk for heart disease, high blood pressure, diabetes, and several types of cancer, as well as help you maintain a healthy body weight.
3. Americans eat too few whole grains, fruits, vegetables, seafood, and dairy, and we eat too many foods high in solid fat and sugar (such as many desserts) as well as processed foods high in sodium.
4. Many adults are trying to eat healthier at restaurants by ordering fewer foods high in sugar and/or fat. Consumers are looking for fresh and nutritious ingredients such as grilled chicken, fruit, and yogurt.

WHY DO YOU EAT THE FOODS YOU DO?

Think about what you ate for your last meal yesterday. Did you eat at your job, at home, or out with friends? Were you making food choices based on cost or convenience, taste, or simply what foods are familiar to you? As you can see from this list, many factors influence what you eat:

- Flavor
- Other aspects of food (such as cost, convenience, nutrition)
- Demographics
- Culture and religion
- Health
- Social and emotional influences
- Marketing and the media
- Environmental concerns

Now we will look at these factors in depth.

FLAVOR

The most important consideration when choosing something to eat is the taste of the food (Figure 1-3). You may think that taste and flavor are the same thing, but taste is actually a component of flavor. **Flavor** is an attribute of a food that includes its taste, smell, feel in the mouth or texture, temperature, and even the sounds made when it is chewed. Flavor is a combination of all five senses: taste, smell, touch, sight, and sound. The taste buds in your mouth and the smell receptors in your nose work together to deliver signals to the brain that are translated into the flavor of food.

Flavor An attribute of a food that includes its taste, smell, feel in the mouth, texture, temperature, and even the sounds made when it is chewed.

FIGURE 1-3 The most important consideration when choosing something to eat is taste.

Courtesy of Anna Omelchenko/Shutterstock.

Taste

Taste comes from 10,000 **taste buds**—clusters of cells that resemble the sections of an orange. Taste buds, found on the tongue, cheeks, throat, and roof of the mouth, house 60 to 100 receptor cells each. The body regenerates taste buds about every three days.

These taste cells bind food molecules dissolved in saliva and alert the brain to interpret them. Although the tongue is often depicted as having regions that specialize in particular taste sensations—for example, the tip is said to detect sweetness—researchers know that taste buds for each sensation (sweet, salty, sour, bitter, and umami) are actually scattered around the tongue. In fact, a single taste bud can have receptors for all five sensations. We also know that the back of the tongue is more sensitive to bitter, and that food temperature can influence taste. For example, sugar seems sweeter at warmer temperatures whereas salt tastes stronger at colder temperatures.

Taste buds are most numerous in children under age six, and this might explain why youngsters are such picky eaters (Figure 1-4). We know that many children do not like bitter taste, thereby interfering with vegetable consumption. However their heightened sensitivity to bitter tastes will decrease with age and they will eventually eat more vegetables as long as they are presented with them. As for older adults, it is normal for smell and taste to gradually decline. By age 50, the number of taste buds begins to decrease, which may explain why some older people like saltier and spicier foods. Smoking and some medications also reduce the ability to taste food normally.

Umami, the fifth basic taste, differs from the traditional sweet, sour, salty, and bitter tastes by providing a savory, sometimes meaty, sensation. Umami is a Japanese word, and the taste is evident in many Japanese ingredients and flavorings, such as seaweed, dashi stock, soy sauce, and mushrooms, as well as other foods. The umami taste receptor is very sensitive to glutamate, an amino acid found in protein that occurs in foods such as meat, fish, and milk, and it is often added to processed foods in the form of the flavor enhancer monosodium glutamate (MSG). MSG is an inexpensive, intensely umami ingredient with no off-flavors. Despite the frequent description of umami as meaty, many foods, including mushrooms, tomatoes, and Parmesan cheese, have a higher level of glutamate than an equal amount of beef or pork. This explains why foods that are cooked with mushrooms or tomatoes seem to have a fuller, rounder taste than when cooked alone.

Umami flavor is strengthened when sodium is present, which explains why tomatoes have a strong taste after adding salt. Many popular sauces for cooking combine savory and salty tastes—think of ketchup, soy sauce, or fish sauce.

Taste Sensations perceived by the taste buds on the tongue.

Taste buds Clusters of cells found on the tongue, cheeks, throat, and roof of the mouth. Each taste bud houses 60 to 100 receptor cells that bind food molecules dissolved in saliva and alert the brain to interpret them.

Umami A taste often referred to as "savory" that is characteristic of monosodium glutamate and is associated with meats, mushrooms, tomatoes, Parmesan cheese, and other foods. It is a basic taste along with sweet, sour, salty, and bitter.

FIGURE 1-4 Taste buds are most numerous in children under age six, which might explain why they can be picky eaters.

Courtesy of Zurjeta/Shutterstock.

FIGURE 1-5 The heat of hot peppers is felt not by the taste buds but by pain receptors in the mouth that sense heat.

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When incorporating umami ingredients such as Parmesan cheese and tomato products into recipes, chefs can reduce the fat and salt content of foods without sacrificing flavor. Chefs can also build umami flavor through cooking techniques. Any process that breaks down protein—such as drying, aging, curing, and slow cooking—increases umami because glutamate is released from protein.

If you like to eat hot chili peppers, you may wonder what kind of taste it has. The heat of chili peppers is not felt by the taste buds. The substance that makes a chili so hot is called capsaicin. Capsaicin actually binds with pain receptors in the mouth and throat that are responsible for sensing heat (Figure 1-5). When you eat, you perceive heat or cooling in the food.

Smell

If you could only taste sweet, salty, sour, bitter, and umami, how could you taste the flavor of cinnamon, chicken, or any other food? This is where smell comes in. Your ability to identify the flavors of specific foods requires smell.

The ability to detect the strong scent of a fish market, the antiseptic odor of a hospital, the aroma of a ripe melon or a glass of wine, and thousands of other smells is possible thanks to a yellowish patch of tissue the size of a quarter high up in your nose (Figure 1-6). This patch is actually a layer of 12 million specialized cells, each sporting 10 to 20 hairlike growths that bind with the smell and send a message to the brain. Our sense of smell may not be as refined as that of dogs, which have billions of olfactory cells, but we can distinguish among about 10,000 scents.

Of course, if you have a bad cold and mucus clogs up your nose, you lose some sense of smell and everything tastes bland. With a cold, you can still taste salty and sweet, but you will have a hard time distinguishing the difference between flavors.

You can smell foods in two ways. If you smell coffee brewing while you are getting dressed, you smell it directly through your nose. But if you are drinking coffee, the smell of the coffee goes to the back of your mouth and then up into your nose. To some extent, what you smell (or taste) is determined by your genetics and also your age.

FIGURE 1-6 The sense of smell and detecting the aromas in wine is the way wine is tasted.

Courtesy of Chiyacat/Shutterstock.

Touch

All foods have **texture**—think of a tender cookie or a smooth soup. The human body is very adept at evaluating a food's texture. We use not only the sense of feeling in our mouths—or **mouthfeel**, as food professionals refer to it—but also our other senses to evaluate the texture of foods. Textures can range from moist to dry, tender to tough, fluid to solid, thick to thin, gritty/rough to smooth, coarse to fine, hard to soft, crunchy to soggy. Even carbonated drinks have texture—they tingle in your mouth as you drink them.

Texture Those physical properties of food that can be felt with the tongue, mouth, teeth, or fingers—such as tender, juicy, or firm.

Mouthfeel How the texture of a food is perceived in the mouth.