

Nutrition

50

Reading Prep

In preparation for this chapter, research the new federal menu labeling requirements compelled by Section 4205 of the Patient Protection and Affordable Care Act of 2010. As you are reading the chapter, keep in mind the goal of this law.

Culinary Terminology

nutrition, p. 773
nutrients, p. 773
essential nutrients, p. 774
calorie, p. 774
protein, p. 774
complete protein, p. 774
incomplete protein, p. 774
carbohydrate, p. 775
lipids, p. 776
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hydrogenation, p. 777
cholesterol, p. 777
phytochemicals, p. 781
probiotics, p. 781
prebiotics, p. 781
nutrient-dense food, p. 782

Academic Terminology

bonds, p. 776
preclude, p. 789

Practice vocabulary activities online



Objectives

After studying this chapter, you will be able to

- explain how the six nutrient groups affect health.
- compare nonnutrients to nutrients.
- summarize the recommendations from *Dietary Guidelines for Americans* and MyPlate food guidance system.
- interpret ingredient lists and nutritional facts on food labels.
- apply nutrition principles to create healthful menu selections and accommodate special needs.

Understanding how different foods and food preparations affect health is important for all chefs. A chef can apply this knowledge during menu planning, and food purchasing and preparation to provide more healthful options for diners.

Nutrients

Nutrition is the study of foods, their components, and how the body processes and utilizes them. While this may sound unrelated to the study of cooking, nutrition is affecting the chef's profession more and more. A chef must consider not only the appearance and flavor of a dish, but also the nutritional impact of a dish. Customers are interested in how the foods they eat may benefit or harm them.

Nutrients are the substances in food that the body uses for energy, growth, and to regulate various functions. Nutrients are divided into six groups—proteins, carbohydrates,



SCIENCE & TECHNOLOGY

Calorie or Kilocalorie?

The scientific definition of a calorie is the heat required to raise the temperature of one gram of water one degree Celsius. When measuring the energy value of food, the term Calorie is used. A Calorie is the amount of heat required to raise the temperature of one kilogram of water one degree Celsius. Another name for Calorie is *kilocalorie*. Dietitians and other health professionals use kilocalories when calculating the energy value of foods, however, individuals outside the scientific community generally use the term *calorie* with a lowercase c to measure their energy intake from food.

lipids, water, vitamins, and minerals. The human body can manufacture some nutrients. The nutrients that the body cannot make and must be supplied by the diet are called **essential nutrients**. Serious illness and even death can result if a diet is lacking or missing essential nutrients.

Proteins, lipids, and carbohydrates are the nutrients that supply the body with energy. A **calorie** is the unit used to measure the amount of energy contained in foods. The term *calorie* is commonly used when discussing nutrition.

Proteins

Proteins are the building blocks of the human body. A **protein** is a chain of various amino acids that form a molecule. How the amino acids are combined and in what sequence determines the type of protein. There are nine *indispensable amino acids* (also known as *essential amino acids*) that must be consumed to support life. *Dispensable amino acids* (also known as *nonessential amino acids*) can be manufactured by the human body. Some health issues can inhibit the body's ability to

produce a dispensable amino acid and then it must be obtained from a food source. Proteins contribute four calories of energy per gram.

Protein is found throughout the human body. For instance, protein is part of the skin, blood vessels, blood, inner organs, hair, nails, enzymes, hormones, and antibodies. Early in life, protein is essential to support a rapidly growing body. During adulthood, protein still remains an important part of the diet and is needed for growth, maintenance, and repair of body tissues. In addition, proteins are required to replace other proteins that are damaged or used up.

Food sources of protein can be either animal or plant based. Animal proteins, which include meats, poultry, seafood, eggs, milk, and cheese, are complete proteins. **Complete proteins** contain all nine indispensable amino acids in the correct proportions needed to support life. Plant-based protein sources include legumes, nuts, and grains. Most of these are **incomplete proteins** because they are missing one or more of the indispensable amino acids. Therefore, vegetarians must combine different vegetable protein sources to create the equivalent of a complete protein. Two traditional combinations that supply complete proteins are corn tortilla with refried beans and peanut butter on bread, 50-1. Some plant-based protein sources do supply the indispensable amino



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50-1 Many Central American dishes combine beans and rice to provide a complete protein.

acids and are considered complete proteins. They are quinoa and amaranth, which are grains and soybean, which is a legume.

Carbohydrates

Carbohydrates are the body's chief energy source. Carbohydrates are further divided into simple and complex carbohydrates. Simple carbohydrates are sugars and complex carbohydrates include starch and fiber. Carbohydrates contribute four calories of energy per gram. Plants are the principal sources of carbohydrates. Animals store carbohydrates as glycogen.

Simple carbohydrates consist of either a single sugar unit or two sugar units combined. There are six sugar units that are considered simple carbohydrates, 50-2. Of these six sugars, *glucose* is the body's preferred source of energy. Milk contains a small amount of sugar called *lactose*. Some people have lactose intolerance and are unable to digest the lactose. When these individuals consume food containing lactose, it can lead to digestive discomfort. Another sugar, *fructose*, is the sweetest of all the sugars. Fructose is present in fruits and honey. The scientific name for common table sugar is *sucrose*. Sucrose is composed of glucose and fructose. Common table sugar is made from sugarcane or sugar beets.

Starch is one of two types of complex carbohydrate. Starch consists of long chains of glucose molecules. Starches provide the body

with energy because these chains are broken into single glucose molecules during digestion. As a result, starches provide energy at a slower pace than simple carbohydrates. Common sources of complex carbohydrates include pasta, potatoes, bread, grains, and legumes.

Fiber is another type of complex carbohydrate. Fiber—like starch—is made of long chains of glucose. Unlike starch, these chains do not break down during digestion. As a result, fiber is not digested. Instead, it passes



SCIENCE & TECHNOLOGY

Nonnutritive Sweeteners

For the last 100 years, scientists have been inventing nonnutritive sweeteners (NNS). Nonnutritive sweeteners are intensely sweet chemicals that have very little or no caloric value. The *Dietary Guidelines* state “Substituting NNS for higher-energy foods and beverages can decrease energy intake, but evidence of their effectiveness for weight management is limited.” Nonnutritive sweeteners approved for use in the United States include

- **Acesulfame-K** is 200 times as sweet as table sugar and can be used in baking.
- **Aspartame**, also called NutraSweet®, is 200 times as sweet as table sugar and cannot be used in baking.
- **Luo han guo**, also known as *monk fruit* extract is 150 to 300 times sweeter than table sugar.
- **Neotame** is 7,000 to 13,000 times sweeter than sugar and can be used in baking.
- **Saccharin** is 300 times as sweet as table sugar and can be used in baking.
- **Stevia** (Rebaudioside A or Reb-A) is 250 to 300 times sweeter than table sugar and can be used for baking and is more stable in liquid form than acesulfame K and aspartame.
- **Sucralose** is 600 times as sweet as table sugar and can be used in baking.

Simple Carbohydrates

- Fructose
- Glucose
- Galactose
- Lactose (glucose + galactose)
- Maltose (glucose + glucose)
- Sucrose (glucose + fructose)

50-2 Lactose, maltose, and sucrose are each composed of two sugar units.

through the body and is excreted. Sufficient amounts of fiber contribute to overall health by reducing the risk of various cancers and heart disease. There are two types of fiber—soluble and insoluble, 50-3. Soluble fiber absorbs large amounts of liquid during digestion. Oats, fruits, vegetables, and legumes are good sources of soluble fiber. Insoluble fiber, which is not soluble in water, absorbs far less liquid during digestion. Good sources of insoluble fiber include whole grains and the structural parts of various fruits and vegetables.

Lipids

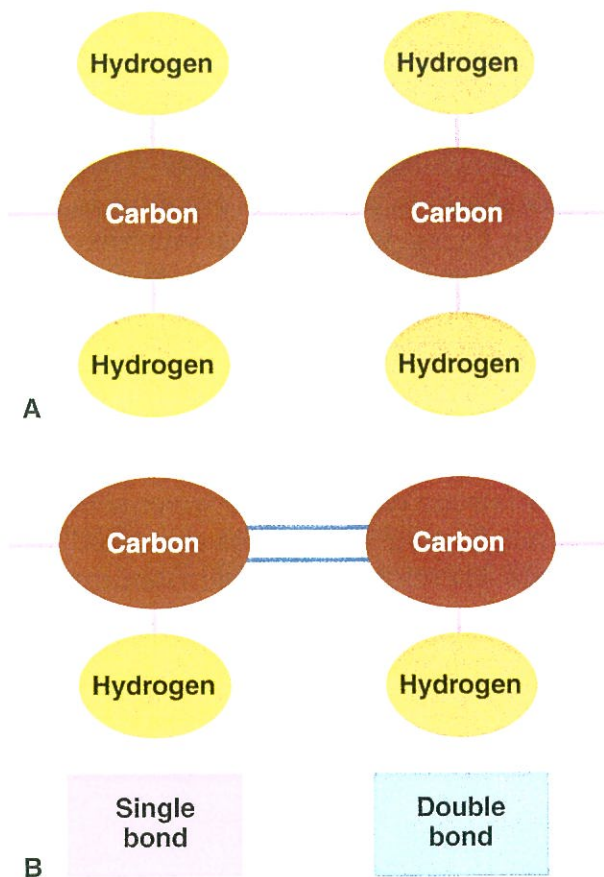
Lipids are the most energy-dense nutrients that humans consume. **Lipids** include fats and oils, as well as other fat-like substances such as cholesterol. Fats and oils are chains of carbon atoms to which

hydrogen atoms are attached. The chains vary in length depending on the type of fat or oil. The chains of carbon atoms also differ in the types of **bonds**, or forces that hold the chains together, 50-4. Lipids contain nine calories of energy per gram. Compare that to four calories per gram for both carbohydrates and proteins.

Fats are found primarily in animal-based foods. This type of lipid is solid at room temperature and is called a **saturated fat**. Saturated fats contain only single bonds. Dietary sources high in saturated fat include fatty meats, poultry skin, eggs, and dairy products. Coconut oil and palm kernel oil are unusual because they are plant-based products that are high in saturated fat. Oils are liquid at room temperature and are **unsaturated fats**. These fats are found in plant-based foods. Unsaturated fats contain



50-3 Plant-based foods contain fiber, animal-based foods do not.



50-4 (A) Single bonds link carbon atoms to four other atoms. (B) When a double bond links carbon atoms, each carbon atom can bond to only two additional atoms. Double bonds are stronger bonds than single, but less stable.

one or more double bonds depending on the specific oil. Dietary sources of unsaturated fats include nuts, seeds, avocados, and olive, safflower, soybean, and sunflower oils, 50-5.

Lipids are often blamed for contributing to obesity and heart disease, but not all lipids are the same. Some oils are healthful and essential for the body to function. Lipids play a critical role in the body. Lipids are needed for normal growth and development, provide a concentrated source of energy, and transport fat-soluble vitamins. Lipids that are stored in the body tissue provide insulation for the body, supply energy when food is unavailable, and protect the body's organs.

Trans fat is a type of lipid that is created when an unsaturated oil is chemically changed

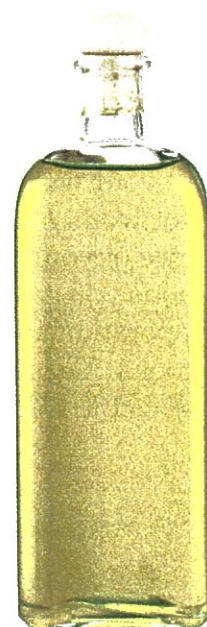
to resemble a saturated fat. The chemical process that changes liquid oil to a solid fat is called **hydrogenation**. *Trans* fats are often created when oil is partially hydrogenated. Some of the most common partially hydrogenated oils are margarine and deep-fryer oils. *Trans* fats have adverse health effects and intake of them should be as low as possible.

Another type of lipid is cholesterol.

Cholesterol is a white, pasty, fat-like substance found in the bloodstream and cells that is essential for many of the body's functions. For instance, cholesterol is needed for cell membrane structure and to construct various hormones. It is not necessary to consume food sources of cholesterol because the body is able to make it. Cholesterol is found only in animal tissue and never in plant tissue.



A



B

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50-5 (A) Butter is solid at room temperature and a saturated fat. (B) Olive oil, an unsaturated fat, is liquid at room temperature.

Cholesterol is transported in the blood by high-density lipoprotein (HDL) and low-density lipoprotein (LDL). LDL circulates cholesterol in the body. High levels of LDL in the blood can deposit excess cholesterol on artery walls that feed blood to the heart and brain. If the arteries are narrowed and a clot forms, it could result in a heart attack or stroke. HDL has the opposite effect of LDL. HDL takes cholesterol to the liver which then removes it from the body. Thus, high levels of HDL and low levels of LDL in the blood are desirable.

Water

Water is the single greatest component of the human body. Water accounts for 50 to 60 percent of the weight of the human body. Without water, humans can only survive a short while. While water provides no energy, it is part of almost all bodily functions. For instance, water lubricates joints, is an essential part of digestion, and transports nutrients and waste throughout the body. Aside from drinking liquids, people get water through the foods they eat. Almost all food has some amount of water in it.

Thirst is the body's way of signaling that the body is starting to dehydrate and that more water is needed quickly to maintain optimal water levels. Beverages provide about 75 percent of your water needs, or roughly 8½ cups for women and 11½ cups for men. The balance of your water needs is supplied by the foods you eat. The body loses water through evaporation and excretion. In a hot kitchen, cooks may easily need to drink more to replace the water lost through perspiration.

Vitamins

Vitamins are necessary to support many of the systems within the body. For instance, vitamins ensure proper vision, support the immune system, aid in the formation of healthy bones and teeth, and are part of the blood-clotting process. While

small amounts of vitamins are essential, large doses of vitamin supplements can be harmful. Vitamins are either water-soluble or fat-soluble.

Water-soluble vitamins dissolve in water and are stored in very small amounts in the body. Excess water-soluble vitamins are carried out of the body in urine. As a result, there must be a continual supply of them to ensure proper health. Water-soluble vitamins come from a wide range of both animal and plant sources.

Fat-soluble vitamins are ingested when various fats are eaten. Unlike water-soluble vitamins, fat-soluble vitamins are stored in the body. Therefore, fat-soluble vitamins can become toxic if consumed in abnormally high amounts. As with water-soluble vitamins, fat-soluble vitamins are found in a wide range of foods, 50-6.

Minerals

Like vitamins, minerals are necessary for many body processes and become part of the body's bones, tissues, and fluids. Minerals are necessary for many important functions such as energy metabolism, water balance, bone formation, and proper functioning of the nervous system. Minerals are divided into major and trace minerals. Major minerals are those that are needed in the diet in amounts of 100 milligrams or more per day. Trace minerals are required in amounts of less than 100 milligrams per day. Both major minerals and trace minerals are important for good health, 50-7.

Nonnutrients

Other substances are found in foods that provide benefits to the body but are not classified as nutrients. These nonnutrients do not supply energy, but play useful roles throughout the body. Phytochemicals, prebiotics, and probiotics are examples of nonnutrients.

Vitamins and Their Functions

Vitamin	Function
Fat-Soluble Vitamins	
Vitamin A	Aids normal vision, helps body fight infections, needed for normal growth and development Sources: beef liver, sweet potato, broccoli, cantaloupe, spinach, peaches
Vitamin D	Needed for proper development of bones and teeth, controls cell growth Sources: produced by the body when exposed to sunlight, cod liver oil, fortified milk
Vitamin E	Protects cells from possible damage due to exposure to oxygen Sources: vegetable oils, whole-grain breads and cereals, eggs, organ meats, leafy green vegetables
Vitamin K	Helps blood clot Sources: green leafy vegetables, cauliflower, liver, egg yolk
Water-Soluble Vitamins	
Thiamin (vitamin B₁)	Needed for energy production; aids proper heart, nerve, and muscle function Source: whole-grain products, pork, legumes
Riboflavin (vitamin B₂)	Needed for growth and red blood cell production; aids energy production Sources: eggs, green leafy vegetables, lean meats, milk, legumes, nuts
Niacin (vitamin B₃)	Aids digestion, contributes to healthy skin and nerve function, aids energy production Sources: meat, fish, poultry, whole-grain products
Pantothenic acid	Aids growth and development, helps body break down and use food Sources: broccoli, avocado, mushrooms, potatoes, oatmeal, sunflower seeds
Biotin	Aids growth and development, helps body break down and use food Sources: cauliflower, liver, cheese, peanuts
B₆	Needed for production of proteins and red blood cells, aids energy production, promotes healthy nervous system Sources: fortified cereals, bananas, potatoes, liver, garbanzo beans
Folate	Promotes healthy cell growth, critical for healthy development of fetus Sources: dark-green, leafy vegetables, orange juice, liver, sunflower seeds, legumes, fortified cereals
B₁₂	Helps body break down and use food, aids development of red blood cells and healthy nerve function Sources: beef, milk products, shellfish
Vitamin C	Protects cells from possible damage due to exposure to oxygen, aids skin and bone health, helps body use iron, aids healing Sources: oranges, strawberries, broccoli, raw spinach, banana, cauliflower

Lists of food sources are not all inclusive.

50-6 Eating a variety of foods helps supply your body with the vitamins needed for health.

Minerals and Their Functions

Mineral	Function
Major Minerals	
Sodium	Helps with nerve and muscle function, maintains fluid balance in the body Sources: table salt, processed foods
Magnesium	Helps with energy production and transport, needed for protein production, aids nerve and muscle function Sources: dark green, leafy vegetables; bananas; avocados; almonds; legumes; whole grains
Phosphorus	Needed for tooth and bone formation, needed for energy storage and protein production, aids body's use and storage of carbohydrate and fat Sources: meats, milk products
Sulfur	Helps maintain acid-base balance in body, aids in removing drugs from the body Sources: all foods containing protein
Chloride	Maintains fluid balance in the body, needed for proper digestion Sources: table salt, tomatoes, lettuce, celery, olives
Potassium	Needed for growth, helps regulate acid-base balance in body, aids in production of proteins, needed for normal heart function Sources: meat, poultry, salmon, cod, soy products, broccoli, sweet potatoes, cantaloupe, bananas, milk, nuts
Calcium	Supports structure of bones and teeth, needed for muscle movement and proper nerve function, helps move blood throughout body, aids in release of hormones and enzymes Sources: dairy foods, broccoli, Chinese cabbage, canned sardines and salmon, fortified foods
Trace Minerals	
Flouride	Supports the structure of bones and teeth Source: drinking water
Chromium	Involved in body's use and storage of carbohydrate, protein, and fat Sources: meat, whole-grain products
Manganese	Serves as key part of enzymes involved in preventing tissue damage Sources: fresh pineapple, oatmeal, brown rice, tea, coffee
Iron	Helps carry oxygen throughout the body, part of many proteins in the body Sources: Dried beans, dried fruits, lean red meat, dark meat poultry, salmon, whole grains
Copper	Helps red blood cell formation; needed for healthy bones, nerves, blood vessels, and immune system Sources: oysters, shellfish, whole grains, beans, nuts, potatoes
Zinc	Needed for immune system to work properly, aids cell growth and healing, required for senses of taste and smell Sources: meats, dark meat poultry, nuts, whole grains, legumes
Selenium	Helps prevent cell damage Sources: vegetables, fish, meat, grains, eggs
Molybdenum	Required for production of some important enzymes in the body Sources: Peas, beans, some breakfast cereals, liver
Iodine	Helps convert food into energy, required for normal thyroid function Sources: iodized table salt, seafood, dairy products

Lists of food sources are not all inclusive.

50-7 Both animal and plant foods can be sources of minerals.

Phytochemicals

Phytochemicals are substances produced by plants that may provide health benefits for humans. Plants make phytochemicals to protect themselves from such things as bacteria, fungi, and high levels of damaging light from the sun. When plant-based foods containing phytochemicals are eaten, people benefit from the phytochemicals in much the same way as the plants do. Research has shown some phytochemicals may help prevent heart disease and some types of cancer. Eating a wide variety of colorful plant foods is the best way to include phytochemicals in your diet.

Prebiotics and Probiotics

Some bacteria can make you sick. Other bacteria can help protect you from disease. **Probiotics** are foods containing live, beneficial bacteria that help to counteract the “bad” bacteria in your gut. The presence of “good” bacteria in the gut is believed to improve digestion, enhance immune function, and reduce risk for developing allergies. Food sources of probiotics include yogurt containing live culture, fermented vegetable preparations such as sauerkraut or kimchi, and fermented soybean products such as tempeh or miso, 50-8.



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50-8 Yogurt containing live culture is a source of “good” bacteria.

Prebiotics are nondigestible food products that encourage the growth of good bacteria in the gut. Foods containing prebiotics include whole grains, honey, bananas, garlic, onions, leeks, and artichokes.

Government Guidelines

The Food and Nutrition Board of the Institute of Medicine, National Academy of Sciences developed dietary reference intakes (DRI) to help plan and assess the diets of Americans. The dietary reference intakes (DRI) are a set of recommended nutrient intake values for healthy individuals and groups. The DRIs are very comprehensive and provide recommended intake levels or ranges based on age group and gender for each nutrient. Many of the nutrient recommendations address the needs of pregnant and nursing women.

The DRIs include four types of nutrient standards

- Estimated Average Requirement (EAR)
- Recommended Dietary Allowance (RDA)
- Adequate Intake (AI)
- Tolerable Upper Intake Level (UL)

DRIs are quite technical and are used mainly by health and nutrition experts. These standards are too complex for most people to use in their daily lives. The DRIs serve as the basis for other nutrition-related guidance such as the *Dietary Guidelines for Americans* and MyPlate food guidance system.

Dietary Guidelines for Americans

Revised every five years, the *Dietary Guidelines for Americans* is a publication that provides information and advice to promote health through nutrition and physical activity. The *Guidelines* serve as

- authoritative advice on proper dietary habits to promote health and decrease risk for major chronic diseases in individuals two years and older.

Nutrition Connection

Other Dietary Recommendations

While the USDA's *Dietary Guidelines for Americans* and MyPlate are among the most well-known recommendations, there are other sets of dietary guidelines. Other important sets of recommendations come from organizations such as the American Heart Association and the American Cancer Society.

- the basis for nutrition education programs, federal nutrition assistance programs, and dietary guidance provided by health professionals.
- assistance for development and implementation of nutrition-related programs. The *2010 Dietary Guidelines for Americans* promote two leading principles:

- Maintain calorie balance over time to achieve and sustain a healthy weight.
- Focus on consuming nutrient-dense foods and beverages.

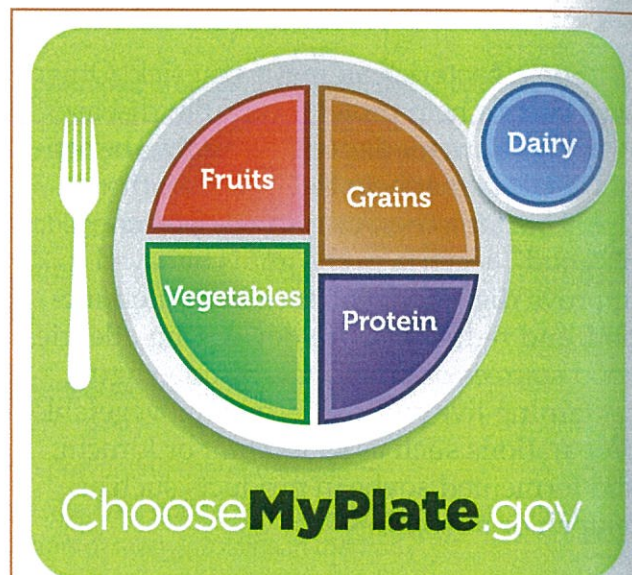
Achieving and maintaining a healthy body weight across the life span is critical for good health and quality of life. A healthy weight results when calories consumed are balanced with calories expended during physical activity. Additionally, it is much easier to take steps to avoid unhealthy weight gain than to lose weight.

Nutrient-dense foods provide vitamins, minerals, and other substances that may have beneficial health effects, but supply relatively few calories. Conversely, foods that contain many calories from solid fats or added sugars should be limited or avoided. Examples of nutrient-dense foods include green leafy vegetables, whole-grain breads, fat-free milk, and soybeans. In contrast, a calorie-dense food may supply many calories but little nutritional value. Examples of calorie-dense foods include candy, soft drink, cream, butter, and cake.

MyPlate Food Guidance System

The USDA developed the MyPlate food guidance system to help people apply the *Dietary Guidelines*. MyPlate is a simple visual message communicating how a healthful meal should look, 50-9.

MyPlate divides commonly eaten foods into five main groups—fruits, grains, vegetables, protein foods, and dairy. Foods from each of these categories, as well as oil, are necessary for a healthy diet. Oils are not represented on the MyPlate symbol because they are not a food group.



Balancing calories

- Enjoy your food, but eat less.
- Avoid oversized portions.

Foods to increase

- Make half your plate fruits and vegetables.
- Make at least half your grains whole grains.
- Switch to fat-free or low-fat (1%) milk.

Foods to reduce

- Compare sodium in foods like soup, bread, and frozen meals—and choose the foods with lower numbers.
- Drink water instead of sugary drinks.

USDA

50-9 MyPlate encourages key behaviors for more healthful eating.

Fruits The fruit group is rich in nutrients and fiber. Fresh, frozen, canned, and dried fruits and fruit juices are included in this group. Whole fruits should be selected more often than fruit juice. Whole fruits supply fiber and are more nutrient dense than juice.

Grains This group includes foods made from wheat, rice, oats, cornmeal, barley, and other grains. The grains may be either whole or refined, but it is recommended that half of the grains you eat be whole grains. Examples of whole grains include oatmeal, quinoa, brown rice, whole-wheat breads, and whole cornmeal. White breads, white rice, and other white flour products often used in crackers and cakes are examples of refined grains.

Vegetables Vegetables provide a variety of nutrients and fiber. This group includes fresh, frozen, canned, and dried vegetables as well as vegetable juices. Vegetables are further divided into the following subgroups:

- *dark green vegetables* such as broccoli, spinach, and kale
- *red and orange vegetables* such as carrots, red peppers, tomatoes, and sweet potatoes
- *beans and peas* such as black-eyed peas, soybeans, and lentils
- *starchy vegetables* such as green peas, corn, and potatoes
- *other vegetables* such as celery, onions, and zucchini

MyPlate recommends eating vegetables from each group weekly. The amounts vary based on individual need.

Dairy The dairy group includes foods high in calcium such as milk, cheese, yogurt, and milk-based desserts. Foods in this group supply other nutrients such as protein, potassium, and vitamin D. Calcium-fortified soymilk is a dairy group option for individuals with lactose intolerance. However, calcium-fortified foods and beverages may lack some of the other nutrients that milk-based foods in this group supply. Select fat-free and low-fat dairy foods

to reduce calories and saturated fats. Milk products that contain little or no calcium, such as cream cheese and butter, are not in this group.

Protein Foods In addition to protein, foods in this group supply a variety of nutrients such as essential fatty acids, B vitamins, iron, zinc, magnesium, and vitamin E. Protein foods include fish, seafood, meats, poultry, eggs, nuts, seeds, beans, and peas. Choose lean meats and poultry to limit saturated fats and cholesterol. MyPlate recommends consuming fish or seafood at least twice a week and incorporating plant-based proteins more often.

Recommended Amounts The amount of food you need changes across your life span. The food you eat supplies you with energy and many factors affect your energy needs. For instance, an individual's age, gender, height, and weight influence his or her energy requirements. Physical activity levels, health conditions, and pregnancy also affect energy needs.

As energy needs increase or decrease, the amount of food consumed must also increase or decrease if balance is to be maintained. However, not only the amounts of food you eat are important, but also the types of foods. As the *Guidelines* suggest, you should strive to select nutrient-dense foods more often. Choosing nutrient-dense foods ensures you are supplying your body with the vitamins, minerals, and other nutrients it requires for health. The MyPlate food guidance system provides tools to help individuals create personalized food plans, 50-10.

Understanding Food Labels

Food labels contain a large amount of information in a small amount of space. US laws and regulations require certain information on the label of all processed, packaged food products. Information required includes

- name and form of the food
- amount of food in the package in both U.S. and metric units of measure
- name and address of the manufacturer, packer, or distributor

In addition, a list of ingredients and a Nutrition Facts panel must be provided. Understanding how to read these labels allows a chef to make nutritionally informed decisions.

Ingredient Labeling

In the United States, food product labels must include a list of ingredients. The ingredients must be listed in descending order by

weight. Including the actual percentage of each ingredient is voluntary. Manufacturers are not required to list flavorings by their common or usual names. Often, these ingredients are listed as “flavorings” or “natural flavors.”

You may have noticed special statements underneath the ingredients list such as “Contains wheat ingredients.” This note is to alert individuals who have wheat allergies. Food manufacturers are required to include the name of the food source of any major food allergens contained in their product. Major food allergens include milk, eggs, fish, crustacean shellfish, tree nuts, wheat, peanuts, and soybeans.

My Daily Food Plan

Based on the information you provided, this is your daily recommended amount from each food group.

GRAINS 6 ounces	Make half your grains whole Aim for at least 3 ounces of whole grains a day
VEGETABLES 2½ cups	Vary your veggies Aim for these amounts each week : Dark green veggies = 1½ cups Beans & peas = 1½ cups Other veggies = 4 cups Red & orange veggies = 5½ cups Starchy veggies = 5 cups
FRUITS 2 cups	Focus on fruits Eat a variety of fruit Choose whole or cut-up fruits more often than fruit juice
DAIRY 3 cups	Get your calcium-rich foods Drink fat-free or low-fat (1%) milk, for the same amount of calcium and other nutrients as whole milk, but less fat and calories Select fat-free or low-fat yogurt and cheese, or try calcium-fortified soy products
PROTEIN FOODS 5½ ounces	Go lean with protein Twice a week, make seafood the protein on your plate Vary your protein routine—choose more fish, beans, peas, nuts, and seeds Keep meat and poultry portions small and lean

Find your balance between food and physical activity

Be physically active for at least **60 minutes** each day.

Know your limits on fats, sugars, and sodium

Your allowance for oils is **6 teaspoons** a day.
Limit extras—solid fats and sugars—to **260 Calories** a day.
Reduce sodium intake to less than **2300 mg** a day.

Your results are based on a 2000 calorie pattern.

Name: _____

This calorie level is only an estimate of your needs. Monitor your body weight to see if you need to adjust your calorie intake.

Ingredient lists are not only crucial for people with allergies, but also for those who carefully monitor what they consume for religious or cultural reasons.

Nutrition Labeling

A Nutrition Facts panel must also be displayed on a product label, 50-11. This panel provides easy-to-use nutrition information.

Serving size. This section tells you the serving size and how many servings each container supplies. All the nutritional information listed on the Nutritional Facts panel is based on one serving size. Therefore, if a person consumes two servings, all the nutritional information must be doubled.

Amount of calories. The number of calories per serving and the number of calories from fat are shown next. This information

can be used to compare similar products for caloric and fat content.

Limit these nutrients. Chronic consumption of too much total fat, saturated fat, trans fat, cholesterol, and sodium has been linked to elevated risk for certain diseases such as heart disease, some cancers, or high blood pressure. It is recommended that the total percent Daily Value for each of these nutrients be less than 100 percent.

Get enough of these nutrients. Dietary fiber, vitamin A, vitamin C, calcium, and iron are often lacking in the American diet. Increasing these nutrients in the diet may improve health and reduce the risk for some diseases and conditions.

Percent (%) Daily Value. The percent Daily Value is based on a 2,000-calorie diet. It states what percentage of the recommended daily intake for each nutrient is contained in one serving size. For example, if the percent Daily Value for total fat is 20 that would mean that for an individual on a 2,000-calorie diet, one serving meets 20 percent of his or her daily fat allowance.

Footnote with Daily Values (DV).

This section supplies information about the DVs for important nutrients. Information is provided for both 2,000-calorie and 2,500-calorie diets. The amounts identified for total fat, saturated fat, cholesterol, and sodium are maximum amounts.

Nutrition Facts	
Serving Size 1 cup (228g)	
Servings Per Container about 2	
Amount Per Serving	
Calories 250	Calories from Fat 110
% Daily Value*	
Total Fat 12g	18%
Saturated Fat 3g	15%
Trans Fat 3g	
Cholesterol 30mg	10%
Sodium 470mg	20%
Total Carbohydrate 31g	10%
Dietary Fiber 0g	0%
Sugars 5g	
Proteins 5g	
Vitamin A	4%
Vitamin C	2%
Calcium	20%
Iron	4%
*Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.	
	Calories: 2,000 2,500
Total Fat	Less than 65g 80g
Saturated Fat	Less than 20g 25g
Cholesterol	Less than 300mg 300mg
Sodium	Less than 2,400mg 2,400mg
Total Carbohydrate	300g 375g
Dietary Fiber	25g 30g

1 Serving Size

Amount of Fat

3 Limit these Nutrients

4 Get Enough of these Nutrients

5 Percent (%) Daily Value

Footnote with Daily Values (DV)

The Chef's Role in Nutrition

With the rise of obesity in the United States and the continued interest in nutrition, the need for chefs to prepare and serve healthful food has never been greater. The professional organization of chefs—American Culinary Federation—requires its members to study nutrition as part of its certification.

Chefs are increasingly called on to assume a leadership role in defining America's eating patterns. Through educating the general

50-11 The Nutrition Facts panel provides useful information for making healthful food choices.

FDA

public, chefs can promote healthful eating styles that do not sacrifice the enjoyment of eating. Therefore, chefs need to create dishes that not only look and taste great, but also are healthful. Chefs must also be prepared to make accommodations for diners with special dietary needs such as food allergies and intolerance, vegetarianism, and health conditions.

Offer Healthful Menu Selections

When developing the menu, offering healthful selections should be a consideration. A number of factors influence the nutritional quality of a menu item—the ingredients, cooking method, proportion, and portion size.

Ingredients A healthful menu item begins with healthful ingredients. Select nutrient-dense ingredients more often and limit or reduce the use of solid fats and added sugars. More healthful alternatives can be found



SCIENCE & TECHNOLOGY

Seeking Valid Information

Every day, consumers are barraged with nutritional information from many different sources. It is important to evaluate the source of the information. Beware of product sponsored information or information from unknown institutions or individuals. Verify that information is not outdated. Credible sources include prominent universities, medical schools, and professional organizations such as the Academy of Nutrition and Dietetics (AND) formerly known as the *American Dietetic Association*. Beware of information contained on Internet sites that promote or sell nutritional products.

for any ingredient. For instance, replacing refined, highly processed grains with whole grains adds interest as well as beneficial nutrients to a dish. Whole-grain flour can replace a portion of refined flour in baked goods. Any number of colorful, appealing whole-grain rice varieties can be used to enhance a meal. Consider whole-grain pastas for salads and Italian dishes.

High-fat dairy products can be replaced with low-fat options. Use low-fat milk instead of full fat. Select cheeses that are naturally lower in fat than others. For instance, Parmesan cheese contains about 25 percent less fat than cheddar cheese. Feta cheese is another lower-fat option that is also packed with flavor.

Some protein ingredients are more healthful than others. Leaner cuts of meat such as those from the round or loin primals can replace cuts with greater fat content. Ground meats and poultry should have less than five percent fat content. Simply trimming visible fat off meat before cooking can reduce calories from fat. The *Dietary Guidelines* encourages Americans to incorporate more fish and seafood into their diets. Many people are unsure how to prepare these proteins, but are eager to try fish when prepared by a chef, 50-12. Some diners are interested in plant-based proteins either due to health, religious beliefs, or other reasons. Dishes featuring dried beans or legumes provide a healthful and possibly more profitable alternative.

Whole, unpeeled fruits and vegetables often retain more of their nutrients. Processing these ingredients on-site may assist in providing healthful menu selections. Nutritional value of fresh produce declines as the fruit or vegetable ages. Using produce as close to harvest as possible translates to more nutrients in the meal. Consider serving seasonal, locally grown fruits and vegetables to shorten the time from farm to the table. Many times, frozen or canned produce are processed shortly after harvesting, which aids in high nutrient retention. Consider

canned or frozen as healthful options when fresh is not available.

Fat, sugar, and salt should be used more sparingly. Replace butter, lard, or shortening with healthier fats such as oils. When decreasing salt or sugar in a dish, consider filling the flavor void with herbs, spices, lemon juice, chiles, or flavored vinegars. Marinades and rubs can be used to enhance the flavor of meats and poultry.

Cooking Methods How food is cooked affects its nutritional value. Certain cooking methods such as deep frying and panfrying add large amounts of fat to a dish. Boiling can dissolve water-soluble vitamins from vegetables. Other cooking techniques such as grilling, sautéing, roasting, baking, and steaming maximize nutrient density by decreasing fat. With braising, the nutrients that leach out of the food during cooking are captured and served in the sauce.

Poaching fish in flavorful liquid is a more healthful option than deep frying or panfrying. Reduce fat content by grilling marinated chicken rather than deep-fat



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50-12 Fish should be prepared using healthful cooking methods such as poaching or grilling.

frying it. Remove unnecessary fat by refrigerating braised dishes and then skimming the fat off the surface once it hardens.

Feature reduction sauces on the menu in place of sauces thickened with fats and starches. Reduction also acts to concentrate the flavors and produce a superior sauce.

Cook fruits and vegetables with as little surface area exposed as possible. This can be done by cutting them into large pieces and avoiding peeling when practical. Less surface area means fewer nutrients are leaching into the cooking liquid. Additionally, using as little cooking liquid as possible helps preserve water-soluble nutrients. Heat-sensitive nutrients, such as vitamin C and folate, benefit when cooking time is kept as brief as possible.

Proportion Ideally, restaurant menus should reflect the eating patterns recommended in the *Dietary Guidelines* and MyPlate. Restaurants often serve large amounts of protein and



Safe Weight Management

For many reasons, many Americans battle unwanted weight gain. While there are many different strategies for losing weight, they are not all equal. Some fad diets are unproven and may have negative health effects. When evaluating a strategy for weight management, avoid diets that

- prohibit certain nutrients while allowing only large amounts of other nutrients.
- do not also include physical activity.
- prescribe medicines or dietary supplements as a sole source of weight loss.
- do not address long-term lifestyle changes.
- claim to have extremely rapid weight loss.
- are based on scientific studies that have been performed by questionable sources and that have not been verified by a credible institution.
- treat all individuals as having the same nutritional needs.

small amounts of grains and vegetables. This is contrary to the recommendations of the *Guidelines* and in MyPlate. Creating healthier meals means that menus should contain larger amounts of whole grains, fruits, and vegetables, and smaller amounts of protein and fat.

Portion Size Moderation is key when the goal is healthful eating. Excess portion sizes should be avoided. In keeping with the goal of moderation, chefs need to evaluate their portion sizes. Serving appropriate portion sizes not only promotes good health, but also reduces wasted food. However, chefs are often caught between the nutritional goal of smaller portions and the customer's desire for the perceived value of large portions.

Make Accommodations for Special Needs

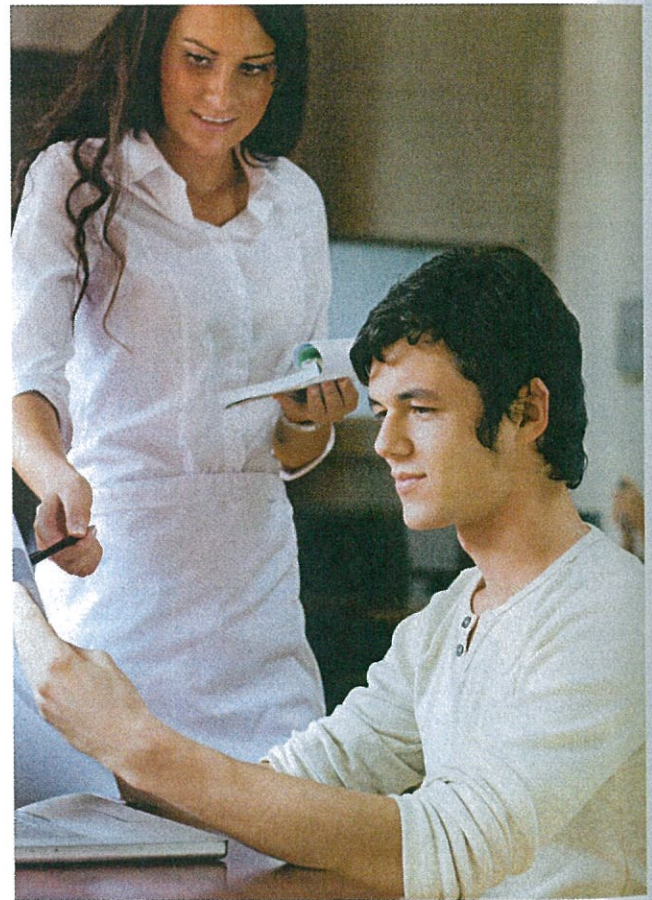
Chefs must also be prepared to respond to the special dietary needs of customers. Customers may have conditions that prohibit them from eating certain foods or ingredients. Making sure waitstaff and kitchen staff alike are aware of the importance of responding to these needs is critical.

Food Allergies and Intolerances A *food allergy* is an immune system response to a specific food. The response can range in severity from mild to life threatening. The amount of food that triggers the response can vary from person to person. A *food intolerance* is a digestive system response. This occurs when a food irritates the digestive system or the body is unable to break down the food properly. Symptoms of food intolerance may include nausea, vomiting, heartburn, headaches, or diarrhea.

Waitstaff must know and be able to communicate to the customer, which dishes contain potential allergens, 50-13. Understanding how dishes are prepared and their ingredients enables the waitstaff to aid the customer in identifying dishes that may precipitate a reaction. Waitstaff can

encourage customers to select simpler, more straightforward menu items that are easier to describe. Some foodservice operations list allergens contained in certain dishes on the menu. Meals for customers with food allergies should be delivered to the table separately from the other meals to avoid accidental contact.

In the kitchen, staff must ensure that allergens are not transferred from one dish to another by accident. For instance, using the same sauteuse to sauté both shrimp and then chicken can transfer the shrimp allergens to the chicken. Allergens can often survive cooking temperatures. Using the same deep fryer to cook foods that contain potential allergens and foods for customers with food allergies can result in transfer of the allergens. Foods for customers with food allergies should be cooked in a separate deep fryer.



50-13 Foodservice staff must be trained to respond appropriately to customers with special dietary needs.

All equipment and utensils must be washed, rinsed, and sanitized after coming in contact with a food allergen and before being reused. Food handlers should wash hands and change gloves to avoid transferring food allergens to food that does not normally contain these allergens. A separate area should be designated for preparing food for individuals with food allergies.

Vegetarian Diets People choose to follow vegetarian diets for a number of reasons. There are also different types of vegetarian diets.

- **Vegans** eat no food from animal sources and limit their diets to plant-based foods only.
- **Lacto-vegetarians** eat milk, cheese, and other dairy products, but do not eat meat, fish, poultry, or eggs.
- **Ovo-vegetarians** do not eat meat, poultry, or dairy products, but will eat eggs.
- **Lacto-ovo vegetarians** eat dairy products and eggs, but do not consume meat, fish, or poultry.
- **Pescetarians** consume vegetables, fruits, nuts, beans, and fish or seafood, but exclude animal and poultry products.

Understanding the restrictions of various vegetarian diets is essential so a chef can respond to customers' special requests. Many operations routinely offer vegetarian selections on the menu.

Health Conditions Individuals with various health conditions may be following more healthful eating patterns. This should not **preclude**, or prevent, these individuals from being able to enjoy a meal at a restaurant. Offering healthful menu choices has been a growing trend in foodservice. More and more operations are providing the



Diabetes and Hypoglycemia

Both diabetes and hypoglycemia are disorders characterized by the body's inability to metabolize carbohydrates properly. Diabetes results when the body cannot properly absorb glucose. Insulin is a chemical messenger produced by the body. It is needed for glucose metabolism. If the body does not produce enough insulin, high levels of undigested glucose result. This condition is called *diabetes* and can be fatal if untreated. Hypoglycemia results from abnormally low levels of glucose. Hypoglycemia can also be very serious if untreated, but is generally very rare.

nutritional analyses for menu items so diners can make informed selections.

Individuals with diabetes, heart disease, or who are simply trying to manage their weight can often meet their special needs with menu selections such as fruits, vegetables, whole grains, lean meats and poultry, plant-based proteins, fish and seafood. Healthful selections with little or no added solid fat, salt, and sugar and served in moderate portion sizes can address many diet restrictions. Individuals who are trying to improve their overall eating habits will welcome these options as well. Consider options such as

- broiled or grilled meats served without rich sauces
- steamed or sautéed vegetables seasoned with lemon juice or vinegar
- poached fish seasoned with herbs
- seasonal fresh fruits for dessert
- salads served with vinegar and oil dressing