

# Culinary Nutrition

## SECTIONS

11.1 Nutrition Basics

11.2 Meal Planning Guidelines

11.3 Keep Food Nutritious

## WRITING ACTIVITY

### Write Using Details

Use sense detail to help your reader see, hear, taste, and touch your subject. Write a paragraph about a meal that tastes good, but is also healthful. Use adjectives that describe the food's look, taste, and texture.

### Writing Tips

- 1 Start by writing down adjectives that you can use to describe your subject.
- 2 Do not get too caught up in the details.
- 3 Do not use too many adjectives. This will confuse the reader.



### EXPLORE THE PHOTO

A nutritious meal contains a variety of nutrients to keep your body functioning properly. *How could you help create a nutritious menu?*

# Nutrition Basics

Discover the building blocks of good nutrition.

## Reading Guide

### Before You Read

**Think of an Example** Look over the Key Concepts for this section. Think of an example of how or when you could use one of the skills from the Key Concepts. Thinking of how you might apply a skill can help motivate your learning by showing you why the skill is important.

### Read to Learn

#### Key Concepts

- **Summarize** the six categories of nutrients.
- **List** the types and uses of food additives.

#### Main Idea

Foodservice employees must understand the basics of nutrition to help them create healthful menus or make healthful ordering suggestions to diners.

### Content Vocabulary

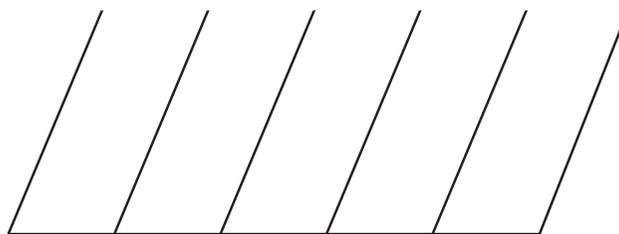
- nutrient
- carbohydrate
- legume
- glucose
- fiber
- protein
- amino acid
- complete protein
- incomplete protein
- fat
- hydrogenation
- trans fatty acid
- cholesterol
- lipoprotein
- cardiovascular
- saturated fat
- monounsaturated fat
- polyunsaturated fat
- vitamin
- minerals
- additive

### Academic Vocabulary

- role
- regulate

### Graphic Organizer

As you read, use a fishbone like the one below to list the six categories of nutrients.



Nutrients



**Graphic Organizer** Go to this book's Online Learning Center at [glencoe.com](http://glencoe.com) for a printable graphic organizer.

## ACADEMIC STANDARDS

### English Language Arts

**NCTE 6** Apply knowledge of language structure and conventions to discuss texts.

### Mathematics

**NCTM Measurement** Understand measurable attributes of objects and the units, systems, and processes of measurement.

### Science

**NSES B** Develop an understanding of the structure and properties of matter.

**NSES B** Develop an understanding of chemical reactions.

**NCTE** National Council of Teachers of English

**NCTM** National Council of Teachers of Mathematics

**NSES** National Science Education Standards

**NCSS** National Council for the Social Studies

# The Nutrients

Imagine that your cafeteria does not offer enough healthful choices on its menu. How will you make suggestions? You must first understand the basics of nutrition. You can then make more healthful suggestions.

The human body needs food for growth and to maintain life. An important factor in meeting this need is a food's nutrient content. A **nutrient** is a chemical compound that helps the body to carry out its functions. There are more than 40 nutrients in food. They are grouped into six categories: carbohydrates, proteins, fats, vitamins, minerals, and water.

## Carbohydrates

A **carbohydrate** is the nutrient that is the body's main source of energy. Simple carbohydrates, or sugars, include both natural sugars and refined sugars. Natural sugars are part of many foods like fruits, vegetables, and milk. Foods with natural sugars also have other impor-

tant nutrients. Refined sugars are processed. These sugars provide little more than calories.

Complex carbohydrates are starches, such as pasta, grains, cereals, and legumes. A **legume** is the seeds and pods from certain plants. Beans, lentils, and peas are examples of legumes. Foods that are high in complex carbohydrates contain many other nutrients your body needs, such as vitamins and minerals. Your body breaks down simple and complex carbohydrates into a usable energy source known as **glucose**. Glucose gives your body the energy it needs to work properly.

## Fiber

A unique form of a complex carbohydrate that does not provide energy is **fiber**. There are two types of fiber. Soluble fiber dissolves in water. Insoluble fiber absorbs water. Fiber helps the body's digestive system and waste elimination system function. Its main advantage is that it cannot be digested. As it passes through the body, fiber helps remove wastes.



**Nutrient Variety**  
Create dishes with a wide variety of nutrients.  
*Do you see sources of carbohydrates present in this salad?*



**Simple Sugars** Refined sugars are simple carbohydrates. *What is the difference between natural sugar and refined sugar?*

Insoluble fiber is found in the outer coating of whole grains. Soluble fiber is found in foods such as oat bran and grains. Soluble fiber has been linked with the prevention of heart disease and some cancers.

## Proteins

**Protein** is a nutrient that builds, maintains, and repairs body tissues. It is essential for healthy muscles, skin, bones, eyes, and hair. It also plays an important role in fighting disease. If a person does not eat enough carbohydrate and fat, the body will use protein for energy.

Through digestion, protein is broken down into small units that can be combined in certain ways to produce complete proteins. These units are called **amino acids**. There are 22 amino acids. Some amino acids can be created by the body, while others cannot and must be gotten from food.

Animal foods, such as fish, meats, poultry, eggs, milk and milk products, provide all of the essential amino acids. A protein source that provides all of the amino acids is called a **complete protein**. Most plant foods lack some of the essential amino acids. A protein source that does not provide all of the amino acids is called an **incomplete protein**. However, by combining nuts or dry beans and grains, a person can eat all of the essential amino acids. This is especially important for those who do not eat animal products.

### Small Bites

**Complete Combinations** These are some food combinations that provide complete proteins:

- Rice and red beans
- Refried beans and corn tortillas
- Split pea soup and whole-wheat bread

## Fats and Cholesterol

Fat and cholesterol play an essential **role**, or function performed, in keeping the body healthy. **Fat** regulates bodily functions and helps carry some vitamins through the system. It is a source of stored energy and a cushion for body organs. Fat adds flavor to foods. Popular types of cooking fat are lard and shortening, which are 100% fat. Butter and margarine are about 80% fat. There is strong evidence that shows that a diet higher than 30% in fat and cholesterol can put you at risk for heart disease and cancer.

Many fats, such as those in margarine and shortening, have gone through a hydrogenation process. **Hydrogenation** (hī-drā-jə-nā-shən) is a process in which hydrogen is added under pressure to polyunsaturated fats, such as soybean oil. Hydrogenation changes liquid oil into a solid fat. An unsaturated fat that goes through the hydrogenation process becomes a **trans fatty acid**, or trans fat. Stick margarine and vegetable shortening are examples of hydrogenated fat.

## Cholesterol

**Cholesterol** (kə-'les-tə-rōl) is a fatlike substance that is found in all body cells and in all animal foods, such as meat, egg yolks, and dairy products. The body makes its own cholesterol to produce cell membranes, hormones, vitamin D, and bile acids, which help digest fats. Some cholesterol circulates through the bloodstream in a chemical package called a **lipoprotein** (lī-pə-'prō-tēn). There are two types of lipoproteins. They are low-density lipoproteins (LDL) and high-density lipoproteins (HDL).

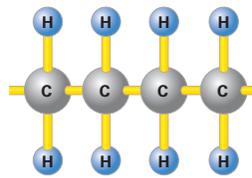
Too much LDL, or bad cholesterol, can contribute to **cardiovascular** (kār-dē-ō-'vas-kyə-lər), or heart-related, problems. LDL can build up on artery walls. This buildup slows or prevents the flow of blood to the heart and other vital organs. Higher HDL, or good cholesterol, helps lower the amount of total cholesterol in the blood. Make wise food choices to help reduce the amount of harmful cholesterol in the blood.

## Science à la Carte

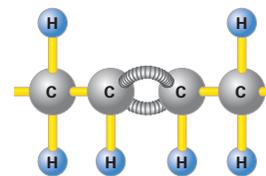
### What Is Fat?

Fat is a compound that contains a chain of carbon and hydrogen atoms. All carbon atoms have four bonds, or links, to other atoms. Some of the bonds are single bonds and some are double bonds. Single bonds are formed when two atoms share one pair of electrons. Double bonds are formed when hydrogen bonds are missing. Without hydrogen, carbon cannot form single bonds. To make up for a missing hydrogen atom, a carbon atom will form a double bond with another carbon atom.

Fats are characterized by their chemical structure. All saturated fats have single bonds. Unsaturated fats are classified by the number of double bonds that form. For example, mono-unsaturated fat is missing two hydrogen atoms, and so has one double bond. Polyunsaturated fat has more than one double bond.



**Saturated Fat**  
(Single Bonding)



**Unsaturated Fat**  
(Double Bonding)

### Procedure

Gather a brown paper lunch bag, cooking oil, an apple, peanut butter, mayonnaise, and flour. Cut the lunch bag into five sections. Label each section with the name of one of the ingredients listed and place it on a table or countertop. Use your finger to rub a small amount of cooking oil on one of the bag sections. Repeat the process with each of the other ingredients listed. When you are finished, lift each section of paper up to a light source. Which foods caused the paper to become transparent?

### Analysis

Make a chart of each substance you test and record your observations. Which substances appear to contain fat? Which substances do not?

**NSES B** Develop an understanding of the structure and properties of matter.

## Saturated Fats

A fat that tends to increase the amount of cholesterol in the blood and is solid at room temperature is called a **saturated** ('sa-chə,rāt-əd) **fat**. Saturated fats can be found in lard, butter, whole-milk products, the visible fat on meat, and tropical (coconut, palm, and palm kernel) oils. Saturated fats have been linked to an increased risk of heart disease and other cardiovascular problems. Studies show that trans fatty acids may have the same, or even worse, effect on cholesterol as saturated fats.

## Monounsaturated Fats

A **monounsaturated** (mə-nō-ən-'sa-chə,rā-təd) **fat** is usually liquid at room temperature. Olive oil and peanut oil are both examples of monounsaturated fat. Unsaturated fats are considered more healthful than saturated fats because they generally do not raise cholesterol levels. Monounsaturated fats are also present in foods such as avocados. Foods that contain monounsaturated fat can help lower the total cholesterol in your body as well as lower the risk of heart disease.

### **FIGURE 11.1 Water-Soluble Vitamins**

**Daily Vitamins** Water-soluble vitamins must be eaten every day. *What water-soluble vitamins can be found in eggs?*

Vitamin	Function in the Body	Food Sources
<b>Thiamin</b> ( <sup>1</sup> thī-ə-mən) ( <b>Vitamin B<sub>1</sub></b> )	<ul style="list-style-type: none"> <li>Helps use carbohydrates for energy</li> <li>Promotes normal appetites</li> </ul>	Dry beans; pork and other meats; whole and fortified grains
<b>Riboflavin</b> ( <sup>1</sup> rī-bə-'flā-vən) ( <b>Vitamin B<sub>2</sub></b> )	<ul style="list-style-type: none"> <li>Keeps skin and eyes healthy</li> <li>Helps use carbohydrates, fats, and proteins for energy</li> </ul>	Dairy products; meat, poultry, and fish; whole and fortified grains; eggs
<b>Niacin</b> ( <sup>1</sup> nī-ə-sən) ( <b>Vitamin B<sub>3</sub></b> )	<ul style="list-style-type: none"> <li>Keeps skin and nervous system healthy</li> <li>Enables normal digestion</li> <li>Helps use nutrients for energy</li> </ul>	Meat, poultry, and fish; liver; shellfish; dry beans; nuts; whole and fortified grains
<b>Vitamin B<sub>6</sub></b>	<ul style="list-style-type: none"> <li>Assists in building red blood cells</li> <li>Helps use carbohydrates and proteins</li> <li>Keeps nervous system healthy</li> </ul>	Meat, poultry, and fish; liver; shellfish; dry beans; potatoes; whole grains; some fruits and vegetables
<b>Vitamin B<sub>12</sub></b>	<ul style="list-style-type: none"> <li>Assists in building red blood cells</li> <li>Keeps nervous system healthy</li> <li>Helps use carbohydrates, fats, and proteins</li> </ul>	Eggs; meat, poultry, and fish; dairy products; shellfish; some fortified foods
<b>Folate</b> ( <sup>1</sup> fō-'lāt) ( <b>Folic Acid</b> )	<ul style="list-style-type: none"> <li>Helps prevent birth defects</li> <li>Assists in building red blood cells</li> <li>Helps use proteins</li> </ul>	Dark green, leafy vegetables; dry beans; orange juice; seeds; whole and fortified grains; fruits
<b>Vitamin C</b> ( <b>Ascorbic Acid</b> ) (ə-'skōr-bik)	<ul style="list-style-type: none"> <li>Strengthens immune system</li> <li>Keeps teeth, gums, blood vessels, and bones healthy</li> <li>Helps heal wounds and absorb iron</li> </ul>	Citrus fruits such as oranges and grapefruits; kiwi; cabbage; strawberries; broccoli; tomatoes; cantaloupes; green peppers; potatoes
<b>Biotin</b> ( <sup>1</sup> bī-ə-tən)	<ul style="list-style-type: none"> <li>Helps use carbohydrates, fats, and proteins</li> </ul>	Dark green, leafy vegetables; liver; egg yolks; whole grains
<b>Pantothenic Acid</b> ( <sup>1</sup> pan-tə-'the-nik)	<ul style="list-style-type: none"> <li>Helps use carbohydrates, fats, and proteins for energy</li> <li>Promotes growth and development</li> <li>Helps produce cholesterol</li> </ul>	Dry beans; meat, poultry, and fish; eggs; milk; whole grains; fruits and vegetables

## FIGURE 11.2 Fat-Soluble Vitamins

**Stored Vitamins** Fat-soluble vitamins are stored in fat cells in the body. *What fat-soluble vitamins can be found in dark green, leafy vegetables?*

Vitamin	Function in the Body	Food Sources
<b>Vitamin A</b>	<ul style="list-style-type: none"> <li>Keeps skin and hair healthy and strengthens immune system</li> <li>Protects eyes and enables night vision</li> </ul>	Dark green, leafy vegetables such as spinach; yellow-orange fruits and vegetables such as carrots, pumpkin, and apricots; dairy products; liver; egg yolks
<b>Vitamin D</b>	<ul style="list-style-type: none"> <li>Helps body absorb and regulate calcium and phosphorus for strong bones, teeth, and muscles</li> </ul>	Fortified milk; fatty fish such as salmon, liver, egg yolks; exposure to sunlight causes the body to produce vitamin D
<b>Vitamin E</b>	<ul style="list-style-type: none"> <li>Protects other nutrients</li> <li>Helps create muscles and red blood cells</li> </ul>	Dark green, leafy vegetables such as spinach; vegetable oils; nuts; seeds; whole grains; wheat germ
<b>Vitamin K</b>	<ul style="list-style-type: none"> <li>Assists in blood clotting</li> </ul>	Egg yolks; dark green, leafy vegetables such as spinach; liver; wheat germ and wheat bran

## FIGURE 11.3 Major Minerals

**Mineral Power** Major minerals help the body to build strong bones and teeth, and maintain blood pressure. *What major minerals can be found in dairy products?*

Mineral	Function in the Body	Food Sources
<b>Calcium</b>	<ul style="list-style-type: none"> <li>Builds and renews bones and teeth</li> <li>Needed for muscle contraction</li> <li>Assists in blood clotting</li> <li>Regulates nervous system and other processes</li> </ul>	Dairy products; dry beans; fortified juices and cereals; dark green, leafy vegetables such as kale; turnips; canned sardines and salmon
<b>Magnesium</b> (mag- <sup>1</sup> nē-zē-əm)	<ul style="list-style-type: none"> <li>Builds and renews bones</li> <li>Helps nervous system and muscles work</li> </ul>	Whole grains; dry beans; dark green, leafy vegetables; nuts; seeds; fish; shellfish
<b>Phosphorus</b> ( <sup>1</sup> fās-f(ə-)rəs)	<ul style="list-style-type: none"> <li>Builds and renews bones and teeth</li> <li>Helps use nutrients for energy</li> </ul>	Dairy products; nuts; dry beans; whole grains; meat, poultry, and fish; egg yolks
<b>Potassium</b> (pə- <sup>1</sup> ta-sē-əm)	<ul style="list-style-type: none"> <li>Helps maintain blood pressure and heartbeat</li> <li>Maintains fluid balance in body</li> </ul>	Fruits such as bananas, oranges, and cantaloupes; meat, poultry, and fish; dry beans; vegetables; dairy products
<b>Sodium</b>	<ul style="list-style-type: none"> <li>Helps regulate blood pressure</li> <li>Maintains fluid balance in body</li> </ul>	Salt; foods that contain salt; soy sauce; MSG

## FIGURE 11.4 Trace Minerals

**Minor Minerals** Trace minerals help the body with functions like using energy and healing wounds. *What trace minerals can be found in fish and shellfish?*

Mineral	Function in the Body	Food Sources
<b>Chloride</b> ( <sup>1</sup> klôr-īd)	<ul style="list-style-type: none"> <li>• Works with sodium to balance fluids</li> <li>• Helps nerve transmittal</li> </ul>	Salt; foods that contain salt; soy sauce; meats; milk
<b>Iron</b>	<ul style="list-style-type: none"> <li>• Helps cells use oxygen</li> <li>• Helps the blood carry oxygen</li> </ul>	Meat, fish; shellfish; dry beans; egg yolks; dried fruit; whole and fortified grains; dark green, leafy vegetables
<b>Iodine</b>	<ul style="list-style-type: none"> <li>• Helps use energy</li> </ul>	Iodized salt; saltwater fish; shellfish; breads
<b>Zinc</b>	<ul style="list-style-type: none"> <li>• Assists in growth and maintenance of tissues</li> <li>• Helps heal wounds and form blood</li> <li>• Helps use carbohydrates, fats, and proteins</li> <li>• Affects taste and smell</li> </ul>	Whole grains; poultry, fish; shellfish products; legumes; dairy products; eggs
<b>Copper</b>	<ul style="list-style-type: none"> <li>• Assists iron in building red blood cells</li> <li>• Keeps nervous system, bones, and blood vessels healthy</li> </ul>	Meat, fish; shellfish; whole grains; nuts; seeds; dry beans
<b>Fluoride</b> ( <sup>1</sup> flôr-īd)	<ul style="list-style-type: none"> <li>• Strengthens teeth and prevents decay</li> </ul>	Fish; shellfish; fluoride is often added to drinking water
<b>Selenium</b> (sə- <sup>1</sup> lē-nē-əm)	<ul style="list-style-type: none"> <li>• Helps heart function normally</li> </ul>	Fish; shellfish; eggs; liver; whole grains

## Polyunsaturated Fats

A **polyunsaturated** (ˌpɑ-lē-ən-<sup>1</sup>sa-chə-,rā-təd) **fat** is also usually liquid at room temperature. Corn oil, sunflower oil, and soybean oil are all polyunsaturated fats. Nuts, seeds, and fish also contain some polyunsaturated fats.

## Vitamins

A **vitamin** is a substance that helps **regulate**, or control, many bodily functions. Vitamins are grouped by how they function with a letter. For example, there are many different types of B vitamins. Vitamins also help other nutrients to do their jobs. Vitamins are divided into two types: water-soluble and fat-soluble. Both types are vital to have in a diet for normal growth and bodily function.

## Water-Soluble Vitamins

Water-soluble vitamins dissolve in water. They must be eaten every day because the body loses them in waste fluids. Water-soluble vitamins include vitamin C and all the B vitamins. (See **Figure 11.1** on page 283.)

## Fat-Soluble Vitamins

Unlike water-soluble vitamins, fat-soluble vitamins are stored in the liver. Vitamins A, D, E, and K are fat-soluble vitamins. Fat-soluble vitamins can build up in the body if they are taken in very large quantities for a long period of time. This can cause disease or even death. (See **Figure 11.2** on page 284.) These vitamins are sometimes added to food. Milk is fortified with vitamin D. Vitamin D helps the body absorb the calcium already in the milk.

## FIGURE 11.5 Food Additives

**Improve Food** Additives help to improve a food's shelf life, flavor, texture, or appearance. *Why might you choose to use a fat or sugar substitute?*

Type of Additive	Name of Additive	Foods with Additive
<b>Thickeners and Stabilizers</b>	<ul style="list-style-type: none"> <li>Modified food starches</li> <li>Cornstarch</li> <li>Flour</li> </ul>	<ul style="list-style-type: none"> <li>Fruit fillings; pie fillings; puddings</li> <li>Sauces; instant foods</li> <li>Sauces</li> </ul>
<b>Gelling Agents</b>	<ul style="list-style-type: none"> <li>Gelatin</li> <li>Pectin</li> </ul>	<ul style="list-style-type: none"> <li>Baked desserts; fillings</li> <li>Sherbets; fruit jellies, preserves, jams; glazes</li> </ul>
<b>Nutrients</b>	<ul style="list-style-type: none"> <li>Iron, vitamin C, thiamin, Riboflavin</li> </ul>	<ul style="list-style-type: none"> <li>Enriched foods, such as breads, cereals, flour, juices, and flavored beverages</li> </ul>
<b>Coloring Agents</b>	<ul style="list-style-type: none"> <li>Annato (ə-<sup>1</sup>nä-(, )tō)</li> <li>Citrus Red No. 2, Red No. 3, Green No. 3, Yellow No. 6</li> </ul>	<ul style="list-style-type: none"> <li>Cheese</li> <li>Soft drinks; baked items; cereals; candy</li> </ul>
<b>Flavoring Agents</b>	<ul style="list-style-type: none"> <li>Vanilla, almond, lemon</li> <li>MSG</li> </ul>	<ul style="list-style-type: none"> <li>Baked items; ice cream; candy</li> <li>Asian foods; soups</li> </ul>
<b>Fat Substitutes</b>	<ul style="list-style-type: none"> <li>Olestra (ō-<sup>1</sup>les-trə)</li> <li>Simplese (sim-<sup>1</sup>ples)</li> </ul>	<ul style="list-style-type: none"> <li>Snack foods, such as potato chips</li> <li>Frozen desserts, such as ice cream; sour cream; margarine; salad dressings</li> </ul>
<b>Sugar Substitutes</b>	<ul style="list-style-type: none"> <li>Aspartame (<sup>1</sup>as-pər-tām)</li> <li>Saccharin (<sup>1</sup>sa-k(ə-)rən)</li> <li>Acesulfame-K (<sup>1</sup>ā-sē-,səl-,fām)</li> <li>Sucralose (<sup>1</sup>sü-krə-,lōs)</li> </ul>	<ul style="list-style-type: none"> <li>All-purpose sweetener used in all foods and beverages</li> <li>Used as a table-top sweetener and in a variety of foods and beverages</li> <li>Gelatin; pudding; candy; chewing gum; as a table-top sweetener</li> <li>Dairy products; carbonated beverages; jams and jellies; chewing gum; syrup; as a table-top sweetener</li> </ul>

## Minerals

**Minerals** are an essential part of your bones and teeth. They also regulate body processes, such as nerve function. Minerals are needed in very small quantities. Not having enough of a particular mineral in a diet is called a mineral deficiency.

Minerals are divided into two categories: major and trace. The body needs more of the major minerals than it does of the trace minerals. However, both types are equally important for good health. **Figure 11.3** on page 284 lists the major minerals, their functions, and sources. **Figure 11.4** on page 285 lists the trace minerals.

## Water

Water is essential to sustain life. Water makes up about 60% of an adult's body weight. It cleans toxins from the body, cushions joints, and increases the body's ability to transport nutrients. Healthy adults need to drink 64 to 80 ounces of water each day. This water can come from any substance that is mostly water, such as juice, gelatin, soup, milk, and ice. However, water-based beverages that contain caffeine cause the body to eliminate water.

 **Reading Check Identify** How many different nutrients can be found in food?

# Food Additives

An **additive** is a substance added to a food to improve it in some way. Additives are used to:

- Allow food products to maintain their consistency.
- Improve the nutritional value of food products.
- Keep food products from spoiling, or losing their quality, too quickly.
- Provide rising for baked goods, or to control the acidity or alkalinity of foods.
- Improve the flavor or color of food products.

Direct food additives are added to a food product specifically to enhance or change it. Indirect food additives become part of a food product because of the way it is processed.

Some additives, such as vinegar and salt, have been used for centuries. Some additives are natural, while others are chemically produced. See **Figure 11.5** for additives that are commonly used in the foodservice industry.

The FDA is responsible for regulating additives that are put into foods to make sure that they are safe to eat. In some cases, the approval of additives may take many years. Food manufacturers must test an additive for its effectiveness, how it is measured, and its overall safety. The test results are submitted to the FDA for approval. Additives are evaluated regularly by the FDA. No additive has permanent FDA approval.

 **Reading Check List** Which additives have permanent FDA approval?

## SECTION 11.1 After You Read

### Review Key Concepts

1. **Compare** water-soluble vitamins and fat-soluble vitamins.
2. **List** the products in which coloring agents may be found.

### Practice Culinary Academics



#### Science

3. **Procedure** Iodine dissolved in a solution of potassium iodide can be used to test for starch. Under your teacher's supervision, use a dropper to add iodine solution to a slice of potato, a slice of apple, and a piece of cheese.

**Analysis** Make note of any color changes in the food. Write a paragraph theorizing what the color change means.

**NSES B** Develop an understanding of chemical reactions.



#### English Language Arts

4. Create a poster to illustrate nutrient functions, and sources of nutrients. Be creative when you choose how to present your information. Use photos, illustrations, and diagrams to help show important information.

**NCTE 6** Apply knowledge of language structure and conventions to discuss texts.



### Mathematics

5. A can of cola has 41 grams of sugar in each 12-ounce can. If you drink nine cans over the span of a week, how many pounds of sugar have you consumed during that week from the soda?

#### Math Concept Converting Metric Weights

Metric weights are measured in grams. There are approximately 454 grams in one pound. To convert grams to pounds, divide the grams amount by 454. To convert pounds to grams, multiply the pounds amount by 454.

**Starting Hint** Determine how many total grams of sugar you will consume by multiplying the number of cans times the sugar grams per can. Then, convert grams to pounds by dividing the total grams by 454.

**NCTM Measurement** Understand measurable attributes of objects and the units, systems, and processes of measurement.



Check your answers at this book's Online Learning Center at [glencoe.com](http://glencoe.com).

# Meal Planning Guidelines

## Reading Guide

### Before You Read

**Get Your Rest** The more well rested and alert you are when you sit down to study, the more likely you will be to remember the information later. Studying in the same state of mind as when you are likely to take a test (fully rested and mentally sharp) will help to ensure your best performance.

### Read to Learn

#### Key Concepts

- **Explain** the purpose of the Dietary Guidelines for Americans, nutrition labels, and MyPyramid.
- **Analyze** how age, activity level, lifestyle, and health influence dietary needs.

#### Main Idea

Government guidelines and dietary recommendations can help a professional chef create well-balanced meals. A well-planned menu should take into account different lifestyles and health needs.

### Graphic Organizer

Use a table like this one to illustrate the four factors that influence dietary needs and how they affect those dietary needs.

Dietary Needs

Factor	Influence



**Graphic Organizer** Go to this book's Online Learning Center at [glencoe.com](http://glencoe.com) for a printable graphic organizer.

### Content Vocabulary

- Recommended Dietary Allowance (RDA)
- nutrition label
- daily value
- Dietary Guidelines for Americans
- nutrient-dense food
- glycogen
- dehydration
- vegetarian
- lacto-vegetarian
- ovo-vegetarian
- lacto-ovo-vegetarian
- vegan
- raw vegan
- macrobiotics
- food allergy
- diabetes
- cancer
- phytochemical

### Academic Vocabulary

- duration
- impact

*Today's customers want nutritious, tasty meals.*

### ACADEMIC STANDARDS



#### English Language Arts

**NCTE 5** Use different writing process elements to communicate effectively.



#### Mathematics

**NCTM Problem Solving** Apply and adapt a variety of appropriate strategies to solve problems.



#### Social Studies

**NCSS VIII B Science, Technology, and Society** Make judgments about how science and technology have transformed the physical world and human society.

**NCSS II F Time, Continuity, and Change** Apply ideas, theories, and modes of historical inquiry to analyze historical and contemporary developments.

**NCTE** National Council of Teachers of English

**NCTM** National Council of Teachers of Mathematics

**NSES** National Science Education Standards

**NCSS** National Council for the Social Studies

# Government Guidelines

For almost 100 years, the U. S. government has provided dietary guidelines and recommendations to help consumers make healthful food choices. It is important for foodservice professionals to know these guidelines. They can help you create well-balanced meals. In addition, you must be aware of the factors that influence a person's dietary needs. These factors include age, activity level, lifestyle, and health.

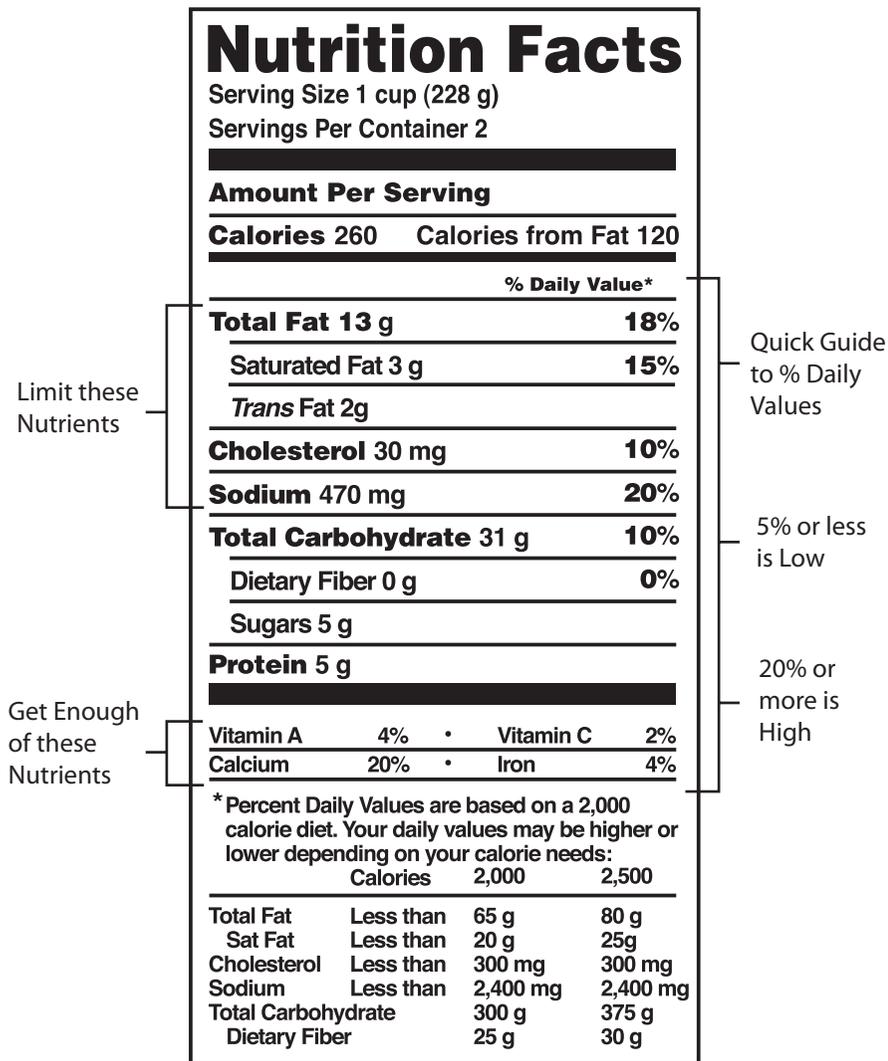
# Recommended Dietary Allowances

The **Recommended Dietary Allowances** (RDAs) are developed by the Food and Nutrition Board of the National Academy of Sciences. The RDA shows the amount of each essential nutrient that will meet the nutritional needs of the majority of healthy Americans for a day. RDAs are updated about every five years.

# Nutrition Labels

The Nutrition Labeling and Education Act of 1990 required that most foods have

**FIGURE 11.6 Nutrition Label Sections**  
**Read the Label** The top section of a nutrition label contains information that varies with each food product. *What does the bottom part of the label contain?*



nutrition labels. A **nutrition label** gives information on serving size, calories, and nutrients in the food. Nutrients are measured in grams and in daily value percentages.

The **daily value** of a nutrient is the amount of that nutrient that a person needs every day. This value is based on a 2,000-calorie diet. This number is only a guide, because each person's calorie needs are different. These daily values would be higher or lower if you eat more or less than 2,000 calories a day.

The nutrients that are listed first on a nutrition label are the ones that most people eat in adequate amounts. The nutrients at the bottom of the label are the nutrients that many people lack in their diets.

## Dietary Guidelines for Americans

The **Dietary Guidelines for Americans** are published by the United States Department of Agriculture (USDA) and the United States Department of Health and Human Services. The Dietary Guidelines for Americans were first published in 1980. They are updated periodically.

The Dietary Guidelines for Americans offer information on proper eating habits for healthy Americans who are two years of age and older. The guidelines are based on scientific knowledge about diet, nutrition, and physical activity. They cover nine general topics: getting enough nutrients within calorie needs; maintaining a healthy weight; being physically active every day; choosing whole grains, fruits, vegetables, and milk; limiting fats and cholesterol; being choosy about carbohydrates; reducing sodium/increasing potassium; avoiding alcohol; and keeping food safe.

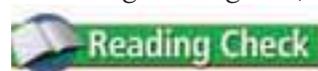
Federal nutrition assistance programs, such as the USDA's School Meal and Food Stamp Programs and the Supplemental Food Program for Women, Infants, and Children (WIC), are built off of the Dietary Guidelines. The Guidelines also form the basis for the MyPyramid food guidance system.

## MyPyramid

The MyPyramid food guidance system was created in 2005, using the 2005 Dietary Guidelines for Americans. It was created to replace the original Food Guide Pyramid. MyPyramid is a visual tool that reminds people age two and older to eat nutritiously and exercise for better health. (See **Figure 11.7**.) The MyPyramid symbol shows the recommended proportion of foods from each food group. These groups are Grains, Vegetables, Fruits, Milk, and Meat & Beans. Oils are also represented in MyPyramid.

MyPyramid shows the importance of:

- **Personalization** MyPyramid can give specific recommendations for individual people about the kinds and amounts of foods they eat every day.
- **Gradual Improvement** Small changes to behavior and eating habits can make a big difference in your health. The slogan, "Steps to a Healthier You" suggests this theme.
- **Physical Activity** The person climbing the steps in the MyPyramid diagram reminds you that everyday activity is important to good nutrition.
- **Variety** You need foods from all of the groups each day for good health. There are six different color bands to remind you about the importance of variety.
- **Moderation** The wide base of the pyramid stands for foods with little or no solid fats, added sugars or caloric sweeteners. These should be chosen more often for good health. The narrow top stands for foods with more solid fats, added sugars, or caloric sweeteners. These foods should be selected less often.
- **The Right Proportions** The different widths of the bands in MyPyramid stand for the amount of food from each food group you should choose. These widths are a general guide, not exact proportions.



### Reading Check

**Describe** How can the Dietary Guidelines, nutrition labels, and MyPyramid help you plan nutritious menus?

# Meet Dietary Needs

The Dietary Guidelines for Americans are a tool for foodservice professionals who want to plan balanced menus for healthy adults. However, foodservice professionals need to know that these guidelines do not apply evenly to everyone. Many factors can influence a person's dietary needs including age, activity level, lifestyle, and health. Religious and cultural factors can also influence dietary needs.

## Age

Nutritional needs will change over a person's entire life span. Different times in that life span, including infancy, childhood, adolescence, and pregnancy, are all periods of growth that require extra nutrients. As people become adults and become elderly, their dietary needs change again.

At each stage of life, it is important to eat nutrient-dense foods, such as fruits and vegetables. A **nutrient-dense food** is a food that is low in calories, but rich in nutrients. Broccoli, carrots, sunflower seeds, and whole-wheat bread are examples of nutrient-dense foods.

## Pregnant Women

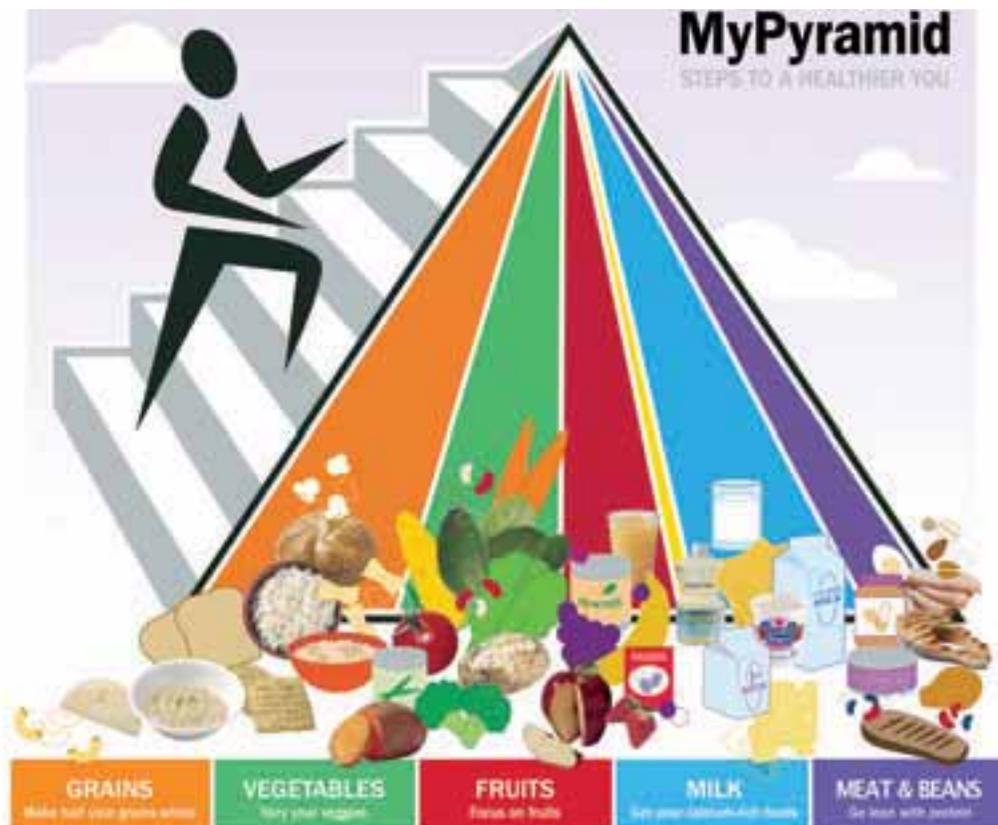
A woman's eating habits before and during pregnancy influence her health and the health of her baby. Pregnant women and mothers of young infants should follow the dietary advice of MyPyramid for Pregnancy and Breastfeeding. MyPyramid for Moms offers the nutritional advice new moms need to stay healthy and provide enough nutrients to their child.

## Infants

Infants grow more during their first year than at any other time of their lives. They need enough nutrients to fuel that growth.

**FIGURE 11.7 MyPyramid**

**Eating Plans** MyPyramid offers personalized eating plans that are right for each individual. *What other nutritional help can you get from MyPyramid?*



Generally, the only food babies need for the first four to six months of their lives is breast milk or formula. Infants then move to iron-fortified cereals, strained vegetables and fruits, and eventually cut-up table foods. New foods are introduced slowly.

## Children

Children over the age of two need a wide variety of foods served in small portions. Because their stomachs cannot hold much food at once, they need frequent snacks and meals to supply all the nutrients their growing bodies need. Nutritious snacks may include fresh fruit, half of a sandwich, or yogurt. It is normal for a child's appetite to vary, and for children to be picky about what they want to eat. Children may eat more than usual during growth spurts. They may eat less than usual during periods of low growth.

## Teenagers

There are many psychological and physical changes that happen during adolescence. Teens grow more quickly than at any other

time of life except infancy. This means that teens need an increase in almost all nutrients.

Teenagers are more susceptible to eating disorders, emotional, complex illnesses that are dangerous to a person's health. Anorexia nervosa, bulimia nervosa, and binge-eating disorder are examples.

## Adults and the Elderly

People lose muscle and bone mass as they age. The function of body organs also drops, and the metabolism moves more slowly. This influences the amount of food and individual nutrients an elderly person needs.

Other factors that can influence the nutritional needs of the elderly include health problems, loss of teeth, a decreased appetite, and an inability to prepare nutritious meals.

## Activity Level

Physical activity requires energy. The type of activity and its **duration**, or the amount of time it lasts, its frequency, and its intensity affect how much energy is needed.



**Life Stages** Nutritional needs change many times over the course of a person's life.  
*What nutritional changes are needed for each of the stages of life shown here?*

## Small Bites

**Dietary Details** To maintain a generally healthy diet, remember these tips:

- **Aim for Fitness** Be physically active every day, but aim for a healthy weight.
- **Choose Sensibly** Choose a diet that is low in saturated fat, salt, and cholesterol and moderate in total fat. Limit your intake of sugars.

The nutrition that an athlete needs is different from the nutrition that a less-active person needs. Each person uses a different amount of energy to fuel his or her body. Your body breaks down carbohydrates into glucose for energy. It changes extra carbohydrates into **glycogen** (ˈɡlī-kə-jən), a storage form of glucose. When you exercise for long periods of time, your body uses part of its glycogen supply for energy. If you eat plenty of complex carbohydrates, your body will have a steady supply of glycogen when it needs it.

It is also important to drink plenty of water before, during, and after exercise. A large amount of water is lost from the body through perspiration. If you do not replace this water, it can lead to dehydration. **Dehydration** (ˌdē-hī-ˈdrā-shən) is a serious fluid imbalance in the body. Dehydration can cause heat stroke or heat exhaustion.

## Lifestyle

Many Americans are trying a vegetarian lifestyle, both as a social statement and for nutrition. Generally, a **vegetarian** (ˌve-jə-ˈter-ē-ən) does not eat meat or other animal-based foods. Vegetarians eat plant-based foods, such as vegetables, grains, fruits, and beans. Vegetarian diets are generally lower in fat, saturated fat, and cholesterol than typical American diets. Most vegetarian diets have enough nutrients if they include a variety of foods. Vegetarians must be careful to combine foods so that they get enough protein.

There are several types of vegetarians:

- A **lacto-vegetarian** eats or drinks some dairy products, such as cheese and milk, but does not eat eggs.
- An **ovo-vegetarian** eats eggs in addition to foods from plant sources.
- A **lacto-ovo-vegetarian** eats both dairy products (lacto) and eggs (ovo).
- A **vegan** (ˈvē-gən) does not eat any meat or animal products.
- A **raw vegan** eats only unprocessed vegan foods that have not been heated above 115°F (46°C).
- **Macrobiotics** is a diet that includes unprocessed foods, and organically grown fruits and vegetables. Some macrobiotics occasionally consume small amounts of fish.

There are many religions and cultures that have special dietary needs as well. For example, Buddhists tend to eat vegetarian diets, while some Jewish people eat only kosher foods.

## Health

Proper nutrition is vital for good health. The right diet can help prevent and treat many health conditions. Some of these conditions include cardiovascular disease, food allergies, diabetes, and cancer.

## Cardiovascular Disease

Over time, cholesterol in the system can block arteries that carry blood. This can cause a stroke or a heart attack. High blood pressure can also **impact**, or have a direct effect upon, the development of cardiovascular disease. Large amounts of salt or sodium over time can increase blood pressure.

The first step in treating high cholesterol or high blood pressure is to modify the person's diet and increase the amount of exercise the person gets. People who have high cholesterol should reduce their fat, saturated fat, and cholesterol intake, and increase their soluble fiber intake. People with high blood pressure need to limit the salt and the number of processed foods they eat. Processed foods tend to be very high in salt.

## A TASTE OF HISTORY

1929

Christiaan Eijkman wins the Nobel Prize in Medicine

1931

Fiberglass is introduced

### Nutrition Pioneers

The connection between diet and health has been studied for many years. In 1757, Scottish physician James Lind found that eating citrus fruit helped prevent scurvy, a disease commonly contracted by sailors. Scurvy was later discovered to be a lack of vitamin C in the sailors' diets. The vitamin C in the citrus fruit prevented the disease.

In the early 1900s, Dutch scientist Christiaan Eijkman found that the inflammatory disease beriberi is also caused by poor diet. He discovered that vitamin B (thiamine) helped prevent and treat beriberi.

### Historical Application

Visit a pharmacy and look at the label on any brand of multivitamin. Research the individual nutrients that are included in one of the multivitamins. Create a three-column chart listing at least five of the nutrients, the nutritional attributes for which they are known, and in which foods they can be found.

**NCSS VIII B Science, Technology, and Society** Make judgments about how science and technology have transformed the physical world and human society.

There are many ways a foodservice operation can help people with high cholesterol and high blood pressure meet their dietary goals. For example, you might plan meals around dishes rich in complex carbohydrates and fiber, such as dry beans and whole grains.

There are other ways to plan nutritious, tasty menu items as well. Use many different types of fruits and vegetables that are cooked with little or no fat or salt in your dishes. Offer moderate portions of lean meats and fish on your menu. Limit the use of fats, especially saturated fats, in your cooking. Use more healthful fat and oil alternatives such as olive oil instead of butter and skim milk instead of whole milk to reduce fat and cholesterol in your dishes. Use seasonings other than salt, such as herbs and spices, that are rich in flavor but low in sodium.

## Food Allergies and Food Intolerances

Foodservice operations need to give information to customers about foods that may cause allergic reactions. A **food allergy** is an allergic reaction triggered by the immune system in response to a particular food. The immune system mistakenly believes that the food is harmful. It produces antibodies to protect itself against the food. The next time a person with a food allergy eats a specific food, the immune system releases the antibodies, and allergic symptoms will occur.

Food allergies can be mild or severe. Severe food allergies can even cause death. The only way to prevent an allergic reaction to a food is to avoid the allergy-causing food.

Symptoms of an allergic reaction can include headaches, hives, difficulty breathing, nasal congestion, facial swelling and/or numbness, and gastrointestinal problems. Symptoms usually show up within minutes to a few hours after the food has been eaten. The most common foods that people are allergic to include fish, shellfish, milk products, eggs, wheat, soy products, tree nuts (such as walnuts and pecans), and peanuts.

A food intolerance is not the same thing as a food allergy. A food intolerance is a reaction to a particular food that does not involve the immune system. Lactose intolerance is an example of a food intolerance.

## Diabetes

Almost 16 million Americans have diabetes. **Diabetes** is an illness that affects the body's ability to convert blood sugar into energy. There are two types of diabetes. Children and young adults usually have Type 1 diabetes. Type 1 diabetics do not produce insulin in their bodies. Insulin is a hormone that converts blood sugar and starches into energy. Type 2 diabetes is the most common type of diabetes. Type 2 diabetics either do not produce enough insulin, or their bodies' cells ignore the insulin.

## FIGURE 11.8 Phytochemicals

**Cancer-Fighting Chemicals** Phytochemicals are thought to have anti-cancer properties. *What phytochemicals are found in citrus fruits?*

Phytochemical	Function in the Body	Food Sources
<b>Flavonoids</b> (ˈflā-və-nōids)	<ul style="list-style-type: none"> <li>• May function as an antioxidant</li> <li>• Lowers the risk of cancer</li> </ul>	• Apples and grapefruit
<b>Resveratrol</b> (rez-ˈvir-ə-,tról)	<ul style="list-style-type: none"> <li>• Can prevent some types of cancer</li> <li>• May lower cholesterol</li> </ul>	• Grapes
<b>Limonene</b> (ˈli-mə-,nēn)	<ul style="list-style-type: none"> <li>• Releases detoxification enzymes in the liver</li> </ul>	• Citrus fruits such as oranges, limes, and lemons
<b>Ellagic Acid</b> (ə-ˈla-jik)	<ul style="list-style-type: none"> <li>• Triggers the production of enzymes that fight carcinogens</li> </ul>	• Blackberries, cranberries, and strawberries
<b>Lycopene</b> (ˈlī-kə-,pēn)	<ul style="list-style-type: none"> <li>• Can function as an antioxidant</li> <li>• May lower the risk of heart disease and cancer</li> </ul>	• Tomatoes and watermelon
<b>Capsaicin</b> (kap-ˈsā-ə-sən)	<ul style="list-style-type: none"> <li>• May prevent certain types of cancer</li> <li>• Diminishes blood clotting</li> </ul>	• Hot peppers
<b>Allyl Sulfide</b> (ˈa-ləl ˈsəl-,fīd)	<ul style="list-style-type: none"> <li>• Facilitates the production of enzymes that combat carcinogens</li> </ul>	• Onions, garlic, leeks, and shallots
<b>Isothiocyanates and Indoles</b> (ˈī-sō-,thī-ō-ˈsī-ə-,nāts) (ˈin-,dōls)	<ul style="list-style-type: none"> <li>• May increase the creation of enzymes that keep carcinogens from harming DNA</li> </ul>	• Broccoli, cauliflower, brussels sprouts, and cabbage

Diabetes can cause long-term problems with healing, eyesight, and circulation. People with diabetes must balance food, portion sizes, exercise, and medication to avoid health problems and keep a healthful lifestyle.

### Cancer

**Cancer** is the uncontrolled division and growth of cells that interferes with normal body functions. It is the second-leading cause of death in the United States.

Research shows that a low-fat diet that is rich in fruits, vegetables, and fiber should be part of people's daily eating habits. This kind of diet may decrease the risk of cancer in some people. Eating too much fat and saturated fat can increase the risk of cancer. Some foods, such as alcohol, may actually increase the risk

of cancer. Obesity is also linked to a higher cancer rate. Irradiated foods, however, have not been shown to increase cancer risk.

**Phytochemicals** Natural chemicals such as those found in plants, fruits, vegetables, grains, and dry beans are called **phytochemicals** (ˌfī-tō-ˈke-mi-kəls). Many phytochemicals seem to have anti-cancer properties. Each type of food seems to have a different mix of phytochemicals. These substances are not vitamins or minerals. Plants produce them to protect themselves against illness and harmful effects of the sun. They are also partially responsible for the color, aroma, and flavor of plant foods. Phytochemicals may help protect the body against some cancers, heart disease, stroke, high blood pressure, and other chronic health conditions. (See **Figure 11.8**.)

## Dieting and Weight Issues

Part of good nutrition is maintaining a healthy weight.

- Being underweight means having too little body fat. Being underweight can cause a person to be tired, and possibly more open to infections.
- Being overweight means having too much body fat. Being overweight can cause health risks for diseases such as diabetes, cardiovascular disease, and some forms of cancer.
- Being obese means that a person is substantially overweight. Obesity can cause many serious health risks, including osteoarthritis, diabetes, cardiovascular disease, and some forms of cancer. As a foodservice professional, you can create menus that will help customers plan their dietary needs in a smart way.

Offering your customers healthful choices can help them maintain a healthy weight. Foodservice professionals should not plan menus by following the latest fad diets. A fad diet is a weight-loss plan that is based on misinformation. Fad diets, especially those that involve eating an excess of a single type of food, do not provide the nutrients and food energy most people need.

The best way to plan a menu is based on choosing cooking techniques and food products that will produce healthful, tasty dishes. It is a smart business plan to allow for substitutions in menu items for people who may have health concerns. Doing this will allow more customers to eat at a foodservice business, and will keep customers coming back.

 **Reading Check** **Explain** How can age, activity level, and lifestyle affect a person's dietary needs?

## SECTION 11.2

### After You Read

### Review Key Concepts

1. **Summarize** the contents of nutrition labels.
2. **Distinguish** between the types of vegetarians.

### Practice Culinary Academics



#### Social Studies

3. Research the history of the Food Guide Pyramid and MyPyramid. Gather information on when they were introduced, how they were developed, and what information they provide. Make a poster that points out differences between the two.

**NCSS II F Time, Continuity, and Change** Apply ideas, theories, and modes of historical inquiry to analyze historical and contemporary developments.



#### English Language Arts

4. Choose a menu from a local foodservice establishment. Write a column for your school newspaper critiquing the menu based on MyPyramid and the Dietary Guidelines. Make recommendations for more nutritious choices.

**NCTE 5** Use different writing process elements to communicate effectively.



### Mathematics

5. Fat has 9 calories per gram. Wesley, a teen male, consumes 2,800 calories per day. If Wesley wants no more than 30% of his calories to come from fat, how many fat grams can he eat per day?

#### Math Concept Finding the Percent of a

**Number** To find a percent of a number, change the percent to a decimal by removing the percent sign and moving the decimal point two places to the left. Multiply this decimal by the number.

**Starting Hint** This is a multi-step problem. First, determine Wesley's total fat calories per day by multiplying 2,800 by 30%. Then, divide that total by 9 to find the total number of fat grams Wesley can eat per day.

**NCTM Problem Solving** Apply and adapt a variety of appropriate strategies to solve problems.



Check your answers at this book's Online Learning Center at [glencoe.com](http://glencoe.com).

# Keep Food Nutritious

## Reading Guide

### Before You Read

**Use Color** As you read this section, try using different colored pens to take notes. This can help you learn new material and study for tests. You could use red for vocabulary words, blue for explanations, and green for examples.

### Read to Learn

#### Key Concepts

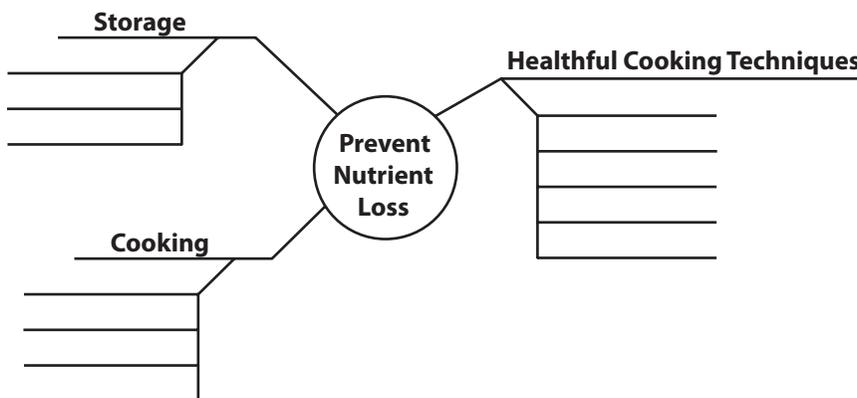
- **Evaluate** cooking methods to prevent nutrient loss.
- **Outline** ways to reduce the amount of fat, cholesterol, and sodium in recipes.

#### Main Idea

Knowing what nutrients are contained in food is just one part of nutritional knowledge. A chef should also know the effect of cooking on the nutrient content of food.

### Graphic Organizer

Use a spider map like this one to illustrate ways to prevent nutrient loss. Fill in tips to prevent nutrient loss on the branches of each line.



 **Graphic Organizer** Go to this book's Online Learning Center at [glencoe.com](http://glencoe.com) for a printable graphic organizer.

### Content Vocabulary

- leach
- batch cooking
- smoking point
- purée

### Academic Vocabulary

- process
- lessen

*Learn to cook foods so that they keep their nutritional value.*

### ACADEMIC STANDARDS

#### English Language Arts

**NCTE 12** Use language to accomplish individual purposes.

#### Mathematics

**NCTM Number and Operations** Compute fluently and make reasonable estimates.

#### Science

**NSES E** Develop understandings about science and technology.

**NCTE** National Council of Teachers of English

**NCTM** National Council of Teachers of Mathematics

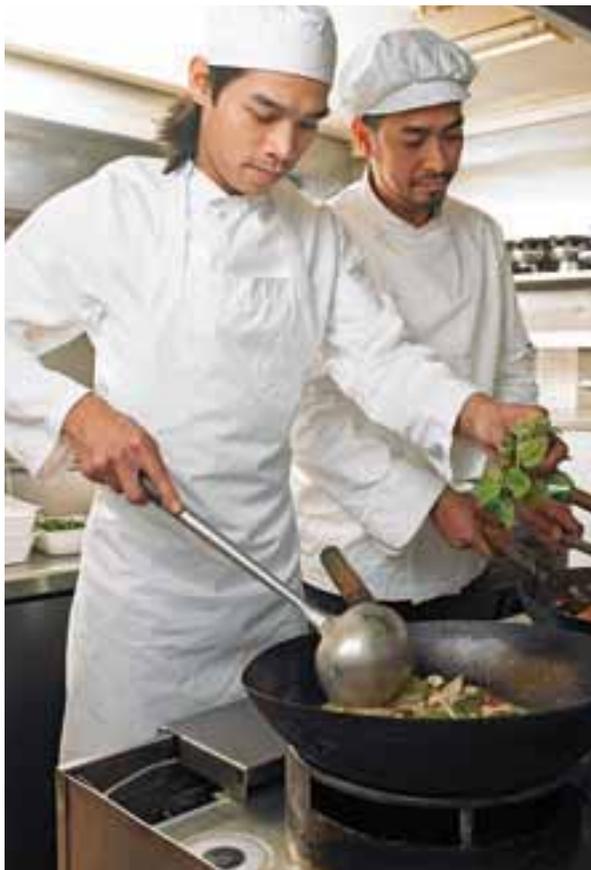
**NSES** National Science Education Standards

**NCSS** National Council for the Social Studies

# Nutrient Loss Prevention

Suppose a pregnant woman dining at a restaurant orders red beans and rice. She knows that beans are an excellent source of iron, which is essential for a healthy pregnancy. What she may not know, however, is that the nutritional value of the beans could vary depending on how they are prepared.

From the time a food product is separated from the land or water, the possibility for nutrient loss begins. However, the way a food is prepared can speed up or slow down this **process**, or series of events or actions. A food's nutrients can be lost through improper preparation, cooking, and storage. The techniques that destroy nutrients can also destroy a food's color, texture, and flavor. You must know how to retain the maximum amount of nutrients in the foods that you cook.



## Cooking

The same elements that can harm food during preparation can harm it as it is being cooked. Follow these general guidelines while cooking to keep more nutrients in food:

- High temperatures can destroy vitamins in foods, such as deep-fried potatoes. Cook foods at the specified temperature.
- Prolonged cooking also causes nutrient loss. Do not overcook food items, such as boiled vegetables.
- Foods lose nutrients with age, so use them as soon as possible. Most foodservice operations use fresh produce and meats within three to four days and fresh ground meats within one to two days of receiving them.
- Nutrients, especially water-soluble vitamins B and C, will leach into the water. To **leach** means to dissolve. For this reason, do not let vegetables rest in water before or after cooking. When you clean produce, do not soak items in water for longer than necessary.

## Healthful Cooking Techniques

It is the responsibility of foodservice operations to provide the public with tasty, healthful food choices. Menus should offer a variety of foods to fit different dietary needs. For example, you might cook using fresh, high-quality foods to provide customers with flavorful, healthful dishes.

Certain cooking techniques are better than others at keeping a food's full nutritional value. These techniques include steaming, grilling, poaching, stir-frying, and microwaving.

- **Steaming** This technique uses steam to cook food. Steaming can be done in a commercial steamer, a steam jacketed kettle or in pots with special steamer inserts.

- ◀ **Keep Nutrients** How well foods maintain their nutrients depends on how the foods are prepared. *Will the food being prepared in this photo keep most of its nutrients?*



◀ **Keep Cool** Once food is received, it should be stored properly. Fresh foods should be kept cool. *How else can cool temperatures be used in cooking?*

Methods such as boiling can cause food to quickly lose vitamins into the liquid. Few nutrients are lost, however, when steaming.

- **Grilling** Foods that are grilled are cooked on a grid-like surface above a heat source. Grilling requires little or no fat and, if done correctly, results in tender foods with a charbroiled flavor.
- **Poaching** Poaching involves gently simmering food in just enough liquid to cover the item. No fat is added, and the small amount of liquid minimizes the effects of leaching. The liquid can also be made into a sauce or soup.
- **Stir-Frying** Stir-frying is a technique that quickly cooks food in a minimum amount of oil. It results in crisp, colorful vegetables with minimal nutrient loss.
- **Microwaving** Microwaving is often used in foodservice operations to reheat foods quickly. Foods can be prepared, stored, and then reheated in a microwave as they are needed. This retains a food's nutrients by eliminating the need to keep the food hot for a long period of time. It is also healthful because no fat is added.

## Storage

When serving food, it is important to remember how to keep foods from losing flavor and nutrients before they are eaten. Nutrients can still be lost after food is cooked. Storage exposes food to the harmful effects of water, light, air, and time. Use cool temperatures, **lessen**, or reduce, holding time, and cook in smaller batches to minimize these effects.

## Temperature

Cool temperatures can slow down the processes that destroy a food's nutrients. One way to do this is to plunge cooked vegetables into cold water to stop the cooking process. Do not leave items in the water because the nutrients will leach out. Also, store covered foods in the refrigerator to slow down nutrient loss.

## Holding

Food should not be held in a steam table for a long period of time. Exposure to heat and water will eventually remove some of the food's nutrients. If possible, continue to move the food around in the pan to avoid overcooking the food on the bottom.

## Batching

One way to lessen food storage problems is to use batch cooking. **Batch cooking** is the process of preparing small amounts of food several times throughout a foodservice period. This decreases the amount of food that will have to be kept warm. It also allows the kitchen to turn out freshly prepared meals for customers to enjoy.

 **Reading Check** Describe How do time and water impact food nutritionally?

## Fats and Oils

Fat plays an important role as both a nutrient and a food. As a nutrient, it helps the body perform many important functions. Fat adds flavor, which is the first concern of most diners. Most vegetable oils have an average smoking point of 400°F (204°C). A **smoking point** is the temperature at which an oil will smoke in a pan. **Figure 11.9** lists the most common cooking oils and their uses.

## Reduce Fat

Reduce fat and cholesterol with these suggestions:

- **Reduce Fat** Choose lean cuts of meat, and trim the fat, and remove skin from poultry. Use nonstick or cast-iron pans so that food can be cooked in less fat.
- **Reduce Total Fat** The total amount of fat and oil in many recipes can be reduced with little effect on flavor.
- **Reduce Saturated Fat** Oils rich in flavor, such as olive oil, can be substituted in smaller amounts for saturated animal fats. Replace part of the butter in a recipe with oil, low-fat sour cream, or yogurt.
- **Replace Fat** Where possible, replace part or all of the whole eggs in a recipe with egg whites or egg substitutes. Use high-quality, reduced-fat dairy products. Replace part of the fat in baking with puréed fruits. A **purée** is a food in which one or more of the ingredients have been ground in a food processor or blender.



 **Cut the Fat** Trimming the fat from cuts of meat is one way to reduce the amount of fat in a recipe. *In what other ways can you reduce fat in a recipe?*

**FIGURE 11.9 Common Cooking Oils**

**Nutrient and Food** Oils play a role in nutrition as both a nutrient and a food. *What body functions do you think these oils helps perform?*

Cooking Oils	Description	Uses
<b>Canola</b> (kə-'nō-lə)	<ul style="list-style-type: none"> <li>• High in monounsaturated fat</li> <li>• Neutral, light-colored oil with little flavor</li> <li>• Also known as rapeseed oil because it comes from the rape plant</li> </ul>	All types of cooking, especially frying and baking
<b>Coconut</b>	<ul style="list-style-type: none"> <li>• High in saturated fat</li> <li>• Little color</li> </ul>	Used in blended oils and shortenings
<b>Corn</b>	<ul style="list-style-type: none"> <li>• High in polyunsaturated fat</li> <li>• Light, amber-colored oil</li> <li>• Slight cornmeal flavor</li> <li>• Sometimes marketed as salad oil</li> </ul>	Frying, salad dressing
<b>Cottonseed</b>	<ul style="list-style-type: none"> <li>• High in polyunsaturated fat</li> <li>• Pale yellow oil with sweet flavor</li> <li>• Extracted from cotton plant seeds</li> <li>• Quality depends on the season, type of fertilizer used, and the way it was extracted</li> </ul>	Shortening, salad dressing
<b>Olive</b>	<ul style="list-style-type: none"> <li>• High in monounsaturated fat</li> <li>• Quality depends on soil, growing conditions, olive type, and the way it was extracted</li> <li>• Extra-virgin olive oil, meaning it was made from the first pressing of olives, is the highest quality</li> <li>• Ranges in color from deep green to pale yellow</li> </ul>	All types of cooking, salad dressing
<b>Peanut</b>	<ul style="list-style-type: none"> <li>• High in monounsaturated fat</li> <li>• Amber-colored oil with a very mild to nutty flavor</li> </ul>	Frying, deep-frying, salad dressing
<b>Safflower</b>	<ul style="list-style-type: none"> <li>• Very high in polyunsaturated fat</li> <li>• Golden-colored oil</li> </ul>	Margarine, mayonnaise, salad dressing
<b>Sesame Seed</b>	<ul style="list-style-type: none"> <li>• High in polyunsaturated fat</li> <li>• Two types: Middle Eastern, which is light with a mild flavor, and Asian, which is dark with a distinct, nutty flavor</li> </ul>	All types of cooking
<b>Soybean</b>	<ul style="list-style-type: none"> <li>• High in polyunsaturated fat</li> <li>• Yellow oil</li> <li>• Quality affected by season, climate, soil, and the way it was extracted</li> </ul>	Margarine, salad dressing, shortening
<b>Sunflower</b>	<ul style="list-style-type: none"> <li>• Very high in polyunsaturated fat</li> <li>• Pale yellow oil with little flavor or odor</li> </ul>	All types of cooking, salad dressing, margarine, shortening
<b>Vegetable</b>	<ul style="list-style-type: none"> <li>• Polyunsaturated fat</li> <li>• Products labeled vegetable oil are blended from many sources</li> <li>• Other types of vegetable oil are corn, soybean, and cottonseed</li> </ul>	All types of cooking, salad dressing

## Other Low-Fat Options

Try these other options to cook with less fat:

- **Offer Plant-Based Foods** In addition to lean meats, offer menu items based on pasta, rice, grains, and legumes. Also, increase the amounts of fruits and vegetables served with or included as part of an entrée. Plant-based foods appeal to vegetarians and people who want low-fat, high-fiber meals.
- **Change Cooking Techniques** Roasting, steaming, and baking require little or no added fat. They are more healthful than methods like deep-frying and pan-frying.
- **Use Seasonings and Flavorings** Season foods with herbs and spices instead of butter. Use low-fat marinades

with meats and seafood. Replace high-fat sauces with salsas or relishes.

- **Use Special Equipment** Specially made equipment can make low-fat cooking easier. For example, nonstick pans and cast-iron pans allow food to be browned in a minimal amount of fat.
- **Reduce Portion Size** Limit portion sizes of meat, poultry, and seafood to three to four ounces (precooked weight). Three ounces of meat is about the size of a deck of cards. Increase portion sizes of vegetables, grains, beans, and pasta.

 **Reading Check** **List** What are three ways that you can reduce the amount of fat in a recipe?

## SECTION 11.3 After You Read

### Review Key Concepts

1. **Outline** healthful cooking techniques.
2. **Explain** how to replace fat in a dish.

### Practice Culinary Academics



#### Science

3. **Procedure** Research one food product that was created using science and technology to meet special health needs, such as artificial sweeteners and fat substitutes.

**Analysis** Write an analysis of the product and its benefits and drawbacks. Use scientific language to compare it to the food product for which it is a substitute.

**NSES E** Develop understandings about science and technology.



#### English Language Arts

4. Imagine that you are a nutrition expert hired to demonstrate to cooks how to prepare foods to conserve nutrients. Prepare a five-minute oral presentation, and give it to your class.

**NCTE 12** Use language to accomplish individual purposes.



### Mathematics

5. An oat cereal has 3.5 grams of fat per  $\frac{3}{4}$  cup serving, while a puffed cereal has 5 grams of fat per  $1\frac{1}{4}$  cup serving. Given identical-size portions of each cereal, which one has more fat?

**Math Concept** **Comparing Fat Content** To compare nutritional values of products with unequal serving sizes on their labels, use proportions to recalculate the values based on equal serving sizes, such as 1 cup.

**Starting Hint** Convert the serving sizes to decimals. For each cereal, find out how many fat grams are in 1 cup by setting up a proportion (for example,  $3.5 \text{ grams} / 0.75 \text{ cups} = x / 1 \text{ cup}$ ) and solving for  $x$ .

**NCTM Number and Operations** Compute fluently and make reasonable estimates.



Check your answers at this book's Online Learning Center at [glencoe.com](http://glencoe.com).

### Chapter Summary

There are six categories of nutrients: carbohydrates, proteins, fats, vitamins, minerals, and water. Each are essential to the body in different ways. Foodservice operations have many options to offer healthful meals, such as cook-

ing with less saturated fat. Age, activity level, lifestyle, and health can all affect a person's dietary needs. How foods are prepared, cooked, and stored affects nutritional content. Use the proper techniques to preserve nutrients.

### Content and Academic Vocabulary Review

1. Use at least 10 of these vocabulary terms in a brochure about personal nutrition.

#### Content Vocabulary

- nutrient (p. 280)
- carbohydrate (p. 280)
- legume (p. 280)
- glucose (p. 280)
- fiber (p. 280)
- protein (p. 281)
- amino acids (p. 281)
- complete protein (p. 281)
- incomplete protein (p. 281)
- fat (p. 282)
- hydrogenation (p. 282)
- trans fatty acid (p.282)
- cholesterol (p. 282)
- lipoprotein (p. 282)
- cardiovascular (p. 282)
- saturated fat (p. 283)
- monounsaturated fat (p. 283)
- polyunsaturated fat (p. 285)
- vitamin (p. 285)
- minerals (p. 286)
- additive (p. 287)
- Recommended Dietary Allowances (RDA) (p. 289)
- nutrition label (p. 290)
- daily value (p. 290)
- Dietary Guidelines for Americans (p. 290)
- nutrient-dense food (p. 291)
- glycogen (p. 293)
- dehydration (p. 293)
- vegetarian (p. 293)
- lacto-vegetarian (p. 293)
- ovo-vegetarian (p. 293)
- lacto-ovo-vegetarian (p. 293)
- vegan (p. 293)
- raw vegan (p. 293)
- macrobiotics (p. 293)
- food allergy (p. 294)
- diabetes (p. 294)
- cancer (p. 295)
- phytochemicals (p. 295)
- leach (p. 298)
- batch cooking (p. 300)
- smoking point (p. 300)
- purée (p. 300)

#### Academic Vocabulary

- role (p. 282)
- regulate (p. 285)
- duration (p. 292)
- impact (p. 293)
- process (p. 298)
- lessen (p. 299)

### Review Key Concepts

2. **Summarize** the six categories of nutrients.
3. **List** the types and uses of food additives.
4. **Explain** the purpose of the Dietary Guidelines for Americans, nutrition labels, and MyPyramid.
5. **Analyze** how age, activity level, lifestyle, and health influence dietary needs.
6. **Evaluate** cooking methods to prevent nutrient loss.
7. **Outline** ways to reduce the amount of fat, cholesterol, and sodium in recipes.

### Critical Thinking

8. **Evaluate** menu nutrition. Why should the dietary needs of people with health problems be considered when planning a restaurant menu?
9. **Explain** how you think requiring nutrition labeling on foods has affected consumers.
10. **Analyze** nutrition for customers. What are four questions a restaurant customer might ask about nutrition? How would you instruct servers to answer these questions?

## Academic Skills

**English Language Arts**

- 11. Create a Life Plan** Imagine that you are a nutritionist working with a healthy adult who has a history of heart disease in his or her family. Create a life plan for the adult that includes nutritional advice for both adulthood and elder years. Organize and write the life plan so that your client can understand and use the plan. Create your plan in the form of a booklet for your client to read. Once you have written the life plan, give it to another student. Did the student find the information useful?

**NCTE 5** Use different writing process elements to communicate effectively.

**Social Studies**

- 12. Nutritional Technology** There are many ways for people to keep track of the nutrients and calories that they eat throughout the day to stay healthy. Investigate the types of technology, such as computer programs, that are available to help consumers and professionals locate food and nutrition information. How do these technologies help people to lead more healthy lifestyles? Write a short summary of your research.

**NCSS VIII C Science, Technology, and Society** Analyze how science and technology influence the core values, beliefs, and attitudes of society.

**Mathematics**

- 13. Work with Large Numbers** The amount of the phytochemical capsaicin found in a chili pepper is measured in heat units on the Scoville scale. Items with no capsaicin rate a 0 on the scale, while pure capsaicin rates about 16 million Scoville heat units. Chili peppers fall somewhere in between that range, but higher numbers indicate spicier peppers. A habanero pepper can rate up to 580,000 Scoville heat units. Write this number in scientific notation.

**Math Concept Scientific Notation** Scientific notation uses powers of 10 as shorthand for writing very large numbers. Start by moving the decimal point so that just one digit is to the left of the decimal. Count the number of places you moved the decimal. Remove all of the ending zeros, and write the number multiplied by 10 to the power of the number of decimal places moved.

**Starting Hint** For example, to write 6,250,000 in scientific notation, move the decimal point so that just one digit is to its left, resulting in 6.250000. Remove all trailing zeros to get 6.25. Since we moved the decimal point six places to the left, we rewrite the number as  $6.25 \times 10^6$ . Perform the same process for 580,000.

**NCTM Number and Operations** Understand numbers, ways of representing numbers, relationships among numbers, and number systems.

## Certification Prep

**Directions** Read the questions. Then, read the answer choices and choose the best possible answer for each.

- 14.** What does RDA mean?
- Registered Dieticians of America
  - Rational Dietary Advice
  - Recommended Dietary Allowances
  - Restricted Diet Allowances
- 15.** What is the nationally recognized method for selecting foods that promote health?
- Government Food Handbook
  - Dietary Guidelines
  - President's Nutrition Checklist
  - MyPyramid

*Sharpen your test-taking skills to improve your kitchen certification program score.*

**Test-Taking Tip**

In a multiple-choice test, the answers should be specific and precise. Read the questions first, and then read all the answer choices before you choose. Eliminate answers that you know are incorrect.

## Real-World Skills and Applications

## Research Skills

- 16. Farm to Kitchen** It is important to understand where your food comes from. Choose one protein food and research the process of how it got from the farm to your table. Determine how scientific and technical advances have impacted its nutrition, safety, and availability. Create a poster to show your research.

## Critical Thinking Skills

- 17. Nutritious Substitutions** Substitutions must be made carefully when creating baked goods. Imagine you have a recipe for a pie crust that calls for solid shortening as the fat. What do you think would be the result of the recipe if you made it with liquid oil, rather than solid fat? Write a paragraph explaining your theory.

## Technology Applications

- 18. Design a Spreadsheet** Find a recipe that you like. Create a spreadsheet to show the original ingredients and cooking techniques for the recipe, alongside suggestions for making the recipe lower in fat and sodium. Give suggestions for ingredients and cooking techniques that you have learned from this chapter.

## Financial Literacy

- 19. Calculate Percentage of Costs** Imagine that you will be making a chicken salad for a catered picnic. The ingredients that you need for a healthful recipe for chicken salad cost \$6.75 total. The chicken for the recipe costs \$3.50. What percentage of the total cost of the ingredients is the cost of the chicken?

## Culinary Lab



*Use the culinary skills you have learned in this chapter.*

## Plan Nutritious Meals

- 20. Plan a Daily Menu** Working in teams, you will plan a daily menu for an average, healthy adult that meets MyPyramid recommendations.
- A. Plan a healthful meal.** Divide into teams at the direction of your teacher. Working with your team, plan a nutritious breakfast, lunch, dinner, and two snacks for an average healthy adult.
- B. Understand food servings.** Assume the adult does an average amount of physical activity and requires a 2,000 calorie diet. Describe the serving size for each item, using the chart below as a guide.

Grain Group	3 oz to 8 oz
Fruit Group	1 c to 2 c
Vegetable Group	1 c to 3 c
Milk Group	2 c to 3 c
Meat and Bean Group	2 oz to 6 oz

- C. Make the food appealing.** Describe the overall appeal of each meal and snack, including the variety of colors, textures, and flavors.
- D. Describe cooking techniques.** Describe the ways that you would prepare, cook, and store each meal and snack so that nutrients are retained.
- E. Make modifications.** Describe what modifications you will make to cooking methods or ingredients to help you keep nutritional content high and fat and sodium low.

## Create Your Evaluation

When you have finished your meal plan, trade menus with another team. Create an evaluation form with the following categories: nutritional value, variety, and appeal. Evaluate the other team's menu in each of those categories. Discuss your evaluation with the other team and suggest additional foods that could be substituted or modified to help reduce the amount of fat and cholesterol.