Nutritional Guidelines

NAEYC Standards Chapter Links

- #1 a, b, and c: Promoting child development and learning
- #2 a and c: Building family and community relationships
- #3 a, b, c, and d: Observing, documenting, and assessing to support young children and families
- #6 b, c, and e: Becoming a professional

Learning Objectives

After studying this chapter, you should be able to:

- Outline the steps for evaluating the nutrient content of a meal or meals.
- Use the Dietary Guidelines for Americans to achieve your personal nutritional goals.
- Classify foods according to the Food Guide Pyramid and identify the nutrient strengths of each major food group.
- Evaluate the nutritional quality of a food item from its package label.

Diet has a direct effect on the quality of a person's health and well-being. It is also important to note that all persons throughout life require the same nutrients, but in varying amounts. Young children have a significant need for nutrients that support growth and provide energy; older children and adults require nutrients to maintain and repair body tissue and to provide energy.

To teach healthy food habits, teachers and families must first set a good example. Children typically model the eating behaviors of adults they love and admire. To set a positive example, adults must be knowledgeable about basic nutrition and understand how to maintain healthy eating habits. The ability to apply this knowledge to the care of children will, it is hoped, follow.

Nutrition is the study of food and how it is used by the body. Nutritionists study foods because foods contain nutrients, which are chemical substances that serve specific purposes. Nutrients meet the body’s need for:

- sources of energy
- materials for growth and maintenance of body tissue
- regulation of body processes

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nutrition – the study of food and how it is used by the body.
nutrients – the components or substances that are found in food.
Table 12–1 shows the relationship between nutrients and their functions. Note that most nutrients serve one or two primary functions; however, protein plays a critical role in all three.

Nutrients are needed in adequate amounts for normal body function to take place. An inadequate supply or poor utilization of nutrients may lead to malnutrition or undernutrition and result in abnormal body function and poor general health. Malnutrition may also result from excessive intake of one or more nutrients to the exclusion of others. This, too, may interfere with normal body functions and contribute to health problems. For example, there is currently much concern about excessive consumption of dietary fats and cholesterol and of self-supplementation with specific minerals and vitamins.

Approximately 50 nutrients are known to be essential for humans. An essential nutrient is one that must be provided by food substances, as the body is unable to manufacture it in adequate amounts. Persons of all ages require the same essential nutrients, only in different amounts. Factors such as age, activity, gender, health status, and lifestyle determine how much of a particular nutrient is required. Information regarding the amounts of nutrients found in specific foods can be found online (http://www.nal.usda.gov/fnic/foodcomp/search) and in many books.

A healthful diet is based on a daily intake of nutritious foods and meals. What should we eat? What should we not eat? How much should we eat? The answers to these important questions have led to the development of a number of nutritional tools and guidelines. Each provides information that will promote healthful eating habits; the choice lies with the individual and may depend on the time available, the ease of use, and personal interest.

Regardless of the guideline selected, the common factor necessary for optimum nutrition is the inclusion of a wide variety of foods. Some foods contain many nutrients, while others yield only a few. No single food includes enough of all nutrients to support life. Thus, consuming a diet that includes a variety of foods improves the likelihood that all essential nutrients will be obtained.

**Dietary Reference Intakes (DRIs)**

The “master guideline” for nutrition planning in the United States and Canada is the Dietary Reference Intakes (DRIs). The latest revision of this plan reflects major changes in the format and philosophy of the original 1941 document known as the Recommended Daily Dietary Allowances.
Emphasis is now placed on the relationship between dietary intake, health, and the reduced risk of chronic disease. The updated guideline, released over a period of several years, is presented as four components. Table 12–2 illustrates the first two portions of the document. The DRIs consist of:

- **Recommended Daily Allowance (RDA)**—goals for nutrient intake by individuals.
- **Adequate Intake (AI)**—goals for nutrient intake when an RDA has not been determined.
- **Estimated Average Requirement (EAR)**—amount of a nutrient that is estimated to meet the requirements of 50 percent of the individuals in a given life-stage or gender group; this number is used to establish the RDAs.
- **Tolerable Upper Intake Level (UL)**—the highest intake level that is likely to pose no health risk; exceeding this limit could cause potential toxicity and health risks.

The DRIs are used to set national nutritional policy as well as for assessing the nutrient intakes of individuals/groups and planning diets for individuals/groups (Wiener et al., 2009). They are also used for determining the nutrient information present on food labels (Miller et al., 2009; Taylor, 2009). It is suggested that RDAs, AIs, and ULs be used in planning diets for individuals, while the EAR is more useful in planning for groups. EARs are believed to be important in the nutrient intake assessment of individuals and groups (Clark & Fox, 2009).

For the Dietary Reference Intake guidelines to be meaningful, the nutrient content of foods must be known (see www.nal.usda.gov/fnic/foodcomp/search). To evaluate a diet by means of the Dietary Reference Intake guidelines, the following steps are required:

1. List the amounts of all foods and beverages consumed during one 24-hour period.
2. Use nutrient value tables or a computer software program to determine the nutrient content of each food and beverage consumed.
3. Total the amount of each nutrient consumed during the day.
4. Determine if the amount of nutrients consumed is sufficient by comparing the total amount of each nutrient consumed with the Dietary Reference Intake for the appropriate age and gender group (Table 12–2).

### Dietary Guidelines for Americans

The National Nutrition Monitoring and Related Research Act of 1990 requires the Secretaries of Health and Human Services (HHS) and the U.S. Department of Agriculture (USDA) to issue a joint report, called the **Dietary Guidelines for Americans**, at least every 5 years. The new 2010 Dietary Guidelines for Americans reflect the Advisory Committee's efforts to establish recommendations based on current scientific evidence regarding nutrition's role in health maintenance and disease prevention. This document is available online (http://www.dietaryguidelines.gov).

The **Dietary Guidelines** have come to serve as the basis for nearly all nutrition information in the United States (USDA, 2010). While the Dietary Reference Intakes (DRIs) address only specific nutrients, the Dietary Guidelines focus on eating and activity behaviors and their impact on the health of persons 2 years of age and older. Key recommendations include:

- **Adequate nutrients within calorie needs**—including a wide variety of nutrient-dense foods in one's diet while limiting fats, cholesterol, sugars, salt, and alcohol.
- **Weight management**—maintaining a healthy balance of calories consumed (food and beverages) with calories burned through physical activity to lower the risk of becoming overweight or obese.

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**Dietary Guidelines for Americans** – a report that provides recommendations for daily food choices, to be balanced with physical activity, to promote good health and reduce certain disease risks.
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Table 12–2 Dietary Reference Intakes (DRIs): Recommended Intakes for Individuals
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Note: This table (taken from the DRI reports, see www.nap.edu) presents Recommended Dietary Allowances (RDAs) in bold type and Adequate Intakes (AIs) in ordinary type followed by an asterisk (*). RDAs and AIs may both be used as goals for individual intake. RDAs are set to meet the needs of almost all (97 to 98 percent) individuals in a group. For healthy breastfed infants, the AI is the mean intake. The AI for other life stage and gender groups is believed to cover needs of all individuals in the group, but lack of data or uncertainty in the data prevent being able to specify with confidence the percentage of individuals covered by this intake.

- As retinol activity equivalents (RAEs). 1 RAE = 1 μg retinol, 12 μg β-carotene, 24 μg α-carotene, or 24 μg β-cryptoxanthin. The RAE for dietary provitamin A carotenoids is twofold greater than retinol equivalents (RE), whereas the RAE for performed vitamin A is the same as RE.
- As cholecalciferol, 1 μg cholecalciferol = 40 IU vitamin D.
- In the absence of adequate exposure to sunlight.
- As α-tocopherol. α-Tocopherol includes RRR-α-tocopherol, the only form of α-tocopherol that occurs naturally in foods, and the 2R-stereoisomeric forms of α-tocopherol (RRR-, RSR-, RRS-α-tocopherol) that occur in fortified foods and supplements. It does not include the 2S-stereoisomeric forms of α-tocopherol (SRR-, SSR-, SRS- and SSS-α-tocopherol), also found in fortified foods and supplements.
- As niacin equivalents (NE). 1 mg of niacin = 60 mg of tryptophan; 0–6 months = performed niacin (not NE).
- As dietary folate equivalents (DFE). 1 DFE = 1 μg food folate = 0.6 μg of folic acid from fortified food or as a supplement consumed with food = 0.5 μg of a supplement taken on an empty stomach.
- Although AIs have been set for choline, there are few data to assess whether a dietary supply of choline is needed at all stages of the life cycle, and it may be that the choline requirement can be met by endogenous synthesis at some of these stages.
- Because 10 to 30 percent of older people may malabsorb food-bound B₁₂, it is advisable for those older than 50 years to meet their RDA mainly by consuming foods fortified with B₁₂ or a supplement containing B₁₂.
- In view of evidence linking folate intake with neural tube defects in the fetus, it is recommended that all women capable of becoming pregnant consume 400 μg from supplements or fortified foods in addition to intake of food folate from a varied diet.
- It is assumed that women will continue consuming 400 μg from supplements or fortified food until their pregnancy is confirmed and they enter prenatal care, which ordinarily occurs after the end of the periconceptional period—the critical time for formation of the neural tube.

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Physical activity—participating in some form of physical activity each day. The American Academy of Pediatrics (AAP), National Association for Sport & Physical Education (NASPE), and Canadian Academy of Sport Medicine (CASM) support this recommendation and encourage children of all ages to engage in moderate to vigorous activity daily (AHA, 2009; NASPE, 2009; CDC, 2008) (Figure 12–1). Excess weight and a sedentary lifestyle have been linked to many chronic diseases. Teachers have a responsibility to plan appropriate physical activities for children and to model their own enjoyment and participation in these activities.

Food groups to encourage—consuming more fruits, vegetables, whole grain products, and low-fat dairy products is strongly encouraged. Many children's diets fail to include adequate servings of these foods, which can result in deficiencies of vitamins, minerals, and other nutrients essential for healthy growth and development (Dave et al., 2009; Horodynski et al., 2009). Adults are also encouraged to increase their consumption of fruits, vegetables, whole-grain products and to select fat-free or low-fat dairy products. Whole grains are an excellent source of fiber and other nutrients essential to a balanced diet and are also low in fat. Fruits and vegetables are rich sources of many vitamins and minerals and are also naturally high in fiber.

Fats—high fat intake is associated with the development of some chronic diseases and, when combined with minimal physical activity, can promote obesity. Total fat intake should be limited to no more than 20–30 percent of one's daily calories. Less than 10 percent of these calories should come from saturated (animal) fats. Cholesterol intake should be limited to less than 300 mg per day. Meat and dairy products should be low-fat and trans-fats avoided in all processed foods.

Carbohydrates—are an important source of energy and fiber. However, foods high in added refined sugar should be limited. Adequate servings of fruits, vegetables, and whole grain products should be included each day.

Sodium and potassium—reducing high sodium (salt) and low potassium intake to address the increasing incidence of high blood pressure in this country. Although sodium is essential for life, most people obtain enough from their food without adding extra salt. Sodium intake should be limited to no more than 1500-2000 mg (approximately 3/4 teaspoon) or less each day. Fruits, vegetables, and whole grains in their simplest forms contain little sodium and are ideal for including in one's diet; many are also rich sources of potassium. Most processed foods, canned and fast foods are quite high in sodium and salt and, thus, their consumption should be limited.

Alcoholic beverages—persons who choose to consume alcohol should do so in moderation (one drink/day for women, two drinks/day for men). Women who are pregnant or breast-feeding should avoid alcohol.
Food safety—young children are at a higher risk for food-borne illnesses. Washing hands, keeping food preparation areas clean, cooking food to proper temperatures, storing foods in proper refrigeration, and following instructions on food labels are important steps for reducing the risk of food-borne illness.

Canada has developed similar guidelines, entitled Canada's Food Guide. The newest version of this document was released in 2007 and encourages citizens to follow healthy eating patterns. A companion document, Canada's Physical Activity Guide to Healthy Active Living, stresses the importance of establishing daily activity practices.

Other Nutrition Guidelines

The U.S. Public Health Service continues to update the original Healthy People guidelines. Several statements in the Healthy People 2020 document that specifically address children's nutritional needs are:

- eliminating very low food insecurity among children in U.S. households
- reducing the proportion of children who are overweight or obese
- increasing the contribution of fruits, vegetables, whole grains, and calcium to the diets of children 2 years and older
- reducing the consumption of calories from solid fats and added sugars in the population aged 2 years and older
- increasing the proportion of States and school districts that require regularly scheduled elementary school recess
- increasing the proportion of consumers who follow key food safety practices

Several non-profit organizations, including the American Heart Association and the National Cancer Institute, also advise similar healthy eating and physical activity behaviors. Their guidelines call for reducing fat, cholesterol, sodium, and alcohol in the diet and increasing vegetable, fruit, and whole grain consumption.

The Food Guide Pyramid

The Food Guide Pyramid provides a graphic illustration of the Dietary Guidelines for Americans (Figure 12–2). It emphasizes the importance of consuming a wide variety of foods from each food group and recommends intakes that are flexible for individuals of different ages, gender, and activity levels. The vertical stripes represent each of the essential food groups:

- orange for grains
- green for vegetables
- red for fruits
- yellow for oils
- blue for milk
- purple for meats and beans

The Pyramid conveys the importance of consuming a meal pattern that includes a wide variety of foods (represented by the various color bands) and moderation of eating that is balanced with physical activity. The varying widths of the Pyramid's stripes indicate the...
relative proportion of food from each food group that should be included in one's diet each day. The interactive website (http://www.mypyramid.gov) offers weekly menus and allows individuals to plan, record, and monitor their daily food intake and activity levels (USDA, 2005).

**Grains**

Foods such as breads, breakfast cereals, pastas, and rice make up the Grains group. Food choices from this group provide complex carbohydrates and should be whole grain or enriched grain products. Whole grain products retain all of their original nutrients and are an ideal source of fiber. Enriched breads and cereals are products that have been processed and then fortified with specific amounts of certain vitamins and minerals equivalent to those found in the original whole grain. Nutrients that are commonly added to enriched foods include iron, calcium, thiamin, riboflavin, and niacin. Most grain products today are also fortified with folacin (folic acid), which reduces the incidence of spina bifida, cleft lip, and cleft palate birth defects (Massi et al., 2009; Thompson, Cole, & Ray, 2009).

A typical serving from the Grain group consists of one slice of bread, one cup of dry, ready-to-eat cereal, or one-half cup of cooked rice, cereal, or pasta. As with the other food groups, a child’s serving is approximately one-half the size of the adult serving. The Pyramid plan recommends that adults consume a minimum of 6 ounces of grain products daily; children require 3 to 4 ounces. At least half of the servings should be whole grain.

**Vegetables**

The Vegetable group contributes notable amounts of minerals, vitamins, and fiber to a person's diet and also represents a wide range and variety of color, flavor, and food options. Daily choices should include dark green vegetables such as broccoli and leafy greens as well as orange-colored foods such as sweet potatoes, squash, and carrots, which are rich in vitamin A (Table 12–3). The Pyramid plan recommends that adults consume 2½ cups of vegetables every day (based on a 2,000-calorie intake); children need only 1 to 1½ cups depending on their age.
The health benefits of dietary fiber are receiving increased attention, yet many children fail to consume adequate fiber because their fruit and vegetable intake is often limited (Anderson et al., 2009). However, a child’s diet that includes too much fiber can interfere with the absorption of essential vitamins and minerals. A practical recommendation for fiber intake for children over 2 years of age is the “age plus 5” rule. For example, Tasha, age 3 years, would require 8 grams of fiber/day. A sampling of food sources and their fiber contribution is presented in Table 12–4.

### Fruits

The Fruit group is a major contributor of vitamins, especially vitamins A and C, and fiber. At least one vitamin C-rich and one vitamin A-rich selection should be included in an individual’s diet every day (Table 12–5 and Table 12–3).

### Oils

The thin yellow line on the Pyramid represents the Oils group. This group consists of fats that are liquid at room temperature, such as the vegetable (plant) oils (canola, corn, cottonseed, olive, cantaloupe, carrots, pumpkin, sweet potatoes, spinach, winter squash, greens, apricots, watermelon, broccoli.

*May cause allergic reactions.

<table>
<thead>
<tr>
<th>Table 12–3</th>
<th>Good to Excellent Vitamin A Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>cantaloupe</td>
<td>winter squash</td>
</tr>
<tr>
<td>carrots</td>
<td>greens</td>
</tr>
<tr>
<td>pumpkin</td>
<td>apricots</td>
</tr>
<tr>
<td>sweet potatoes</td>
<td>watermelon*</td>
</tr>
<tr>
<td>spinach</td>
<td>broccoli</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 12–4</th>
<th>Dietary Fiber Content of Some Common Foods</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Food</strong></td>
<td><strong>Amount</strong></td>
</tr>
<tr>
<td>cheerios</td>
<td>1/2 cup</td>
</tr>
<tr>
<td>raisin bran</td>
<td>1/2 cup</td>
</tr>
<tr>
<td>oatmeal</td>
<td>1/4 cup</td>
</tr>
<tr>
<td>macaroni, enriched</td>
<td>1/2 cup</td>
</tr>
<tr>
<td>bread, whole wheat</td>
<td>1/2 slice</td>
</tr>
<tr>
<td>bread, white</td>
<td>1/2 slice</td>
</tr>
<tr>
<td>graham crackers</td>
<td>1 square</td>
</tr>
<tr>
<td>orange sections</td>
<td>1/2 cup</td>
</tr>
<tr>
<td>banana, sliced</td>
<td>1/2 cup</td>
</tr>
<tr>
<td>apple with skin</td>
<td>1/2 cup</td>
</tr>
<tr>
<td>acorn squash</td>
<td>1/4 cup</td>
</tr>
<tr>
<td>green peas</td>
<td>1/4 cup</td>
</tr>
<tr>
<td>corn, frozen</td>
<td>1/4 cup</td>
</tr>
<tr>
<td>pinto beans</td>
<td>1/2 cup</td>
</tr>
<tr>
<td>black beans</td>
<td>1/2 cup</td>
</tr>
</tbody>
</table>
sunflower) used in cooking, as well as the oils from fish. Plant oils contain no cholesterol and are considered beneficial. Foods such as nuts, olives, and avocados also have a naturally high oil content that has many health benefits. Some oils are used mainly as flavorings, such as walnut oil and sesame oil. Mayonnaise, certain salad dressings, and soft (tub or squeeze) margarine with no trans-fats are considered oils. Solid fats are also included in the Oils group. Some food products are made from animal sources (butter) while others (stick and soft margarine) are converted from a liquid to a solid form by a process called hydrogenation. In general, the nutrient contribution of this group is low and the calorie content is high.

**Milk**

This group includes milk and milk-based foods that retain their calcium content, such as home-made puddings, frozen yogurts, and ice creams; hard cheeses such as Swiss and cheddar; soft cheeses such as ricotta and cottage cheese; and all yogurts. Dairy products that provide little or no calcium include butter, cream cheese, and cream and, thus, they are not considered part of the Milk group. Foods that provide calcium equal to that in one cup of milk are:

<table>
<thead>
<tr>
<th>1 1/2 ounces cheddar cheese</th>
<th>1 2/3 cup cottage cheese</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 cup pudding</td>
<td>1 1/4 ounces mozzarella cheese</td>
</tr>
<tr>
<td>1 3/4 cups ice cream</td>
<td>1 cup plain yogurt</td>
</tr>
</tbody>
</table>

The Milk group is a major source of dietary calcium but a poor source of iron and vitamins A and C. Children should consume a daily total of 2 cups of milk or the equivalent from this group; adults should have 3 cups. Servings may be divided into 1/2-cup portions in consideration of children's smaller appetites and stomach capacity. Because foods in the Milk group tend to be high in fat and cholesterol, reduced- and low-fat products are preferred choices. However, children should not be given low-fat milk and dairy products prior to the age of 2. Infants and toddlers require the additional fats and fat-calories for energy and healthy nervous system development.

**Meat and Beans**

Beef, veal, pork, lamb, fish, and poultry are included in the Meat and Beans group. Other foods included in this group are eggs, legumes such as dry peas and beans, nuts, and nut butters such as peanut butter. Cheese may also be substituted for meats; however, it should be remembered that cheeses are high in cholesterol and do not contain iron, which is a nutrient strength of this food group. The Meat and Beans group is also a major source of dietary protein and B-vitamins.

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*May cause allergic reactions.

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**Table 12–5 Good to Excellent Vitamin C Sources**

<table>
<thead>
<tr>
<th>orange*</th>
<th>tomatoes*</th>
</tr>
</thead>
<tbody>
<tr>
<td>orange juice*</td>
<td>grapefruit*</td>
</tr>
<tr>
<td>strawberries*</td>
<td>mustard greens</td>
</tr>
<tr>
<td>cauliflower</td>
<td>spinach</td>
</tr>
<tr>
<td>broccoli</td>
<td>cabbage</td>
</tr>
<tr>
<td>sweet peppers, red or green</td>
<td>tangerine*</td>
</tr>
</tbody>
</table>
The recommended daily intake from the Meat and Beans group, as with the other groups, varies by individual, based on age, gender, and physical activity. Children 2 to 3 years old require approximately 2-ounce equivalents daily; children 4 and older require 3- to 4-ounce equivalents. The following foods contain **protein** that is approximately equal to that in one ounce of meat, poultry, or fish:

- 1 egg
- 1 ounce of cheese
- 1/4 cup cottage cheese
- 1/4 cup cooked dried peas or beans
- 2 tablespoons peanut butter

### Discretionary Calories

Foods consumed from each of the Pyramid groups provide calories for energy. How many calories an individual needs to take in varies according to age, gender, and level of physical activity. The interactive Food Pyramid offers tools that help a person determine how many calories are needed each day (http://www.mypyramid.gov).

Discretionary calories represent the difference between the number of calories a person takes in from the recommended servings in each food group and one's ideal or target caloric goal. They can be compared to discretionary income: Just as your budget contains discretionary or extra income to cover special expenses like vacation trips or DVDs, your diet may contain a small number of discretionary calories that can be “spent” on foods that may be higher in fats, added sugar, and/or alcohol. Persons who are relatively sedentary will have, on the average, between 100–300 discretionary calories each day depending on the foods they have chosen to consume from each of the food groups.

Adding a large number of foods that contain discretionary calories can dilute the healthful quality of a person's diet (Story, 2009; Bachman et al., 2008). For example, the vitamin C and calorie contribution of an apple is altered significantly when sugars, fats, and flour are added, such as when making an apple pie (Table 12–6).

#### Table 12–6  How Added Sugar and Fats Alter a Food’s Calories and Nutrient Contribution

<table>
<thead>
<tr>
<th></th>
<th>Calories</th>
<th>Potassium</th>
<th>Vitamin C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Banana, 1/2 cup sliced</td>
<td>67</td>
<td>268 mg</td>
<td>6.5 mg</td>
</tr>
<tr>
<td>Banana chips, 1 ounce</td>
<td>147</td>
<td>152 mg</td>
<td>1.8 mg</td>
</tr>
<tr>
<td>Banana pudding, 1/2 cup</td>
<td>72</td>
<td>62 mg</td>
<td>0.3 mg</td>
</tr>
<tr>
<td>Banana bread, 1 slice</td>
<td>196</td>
<td>80 mg</td>
<td>1.0 mg</td>
</tr>
<tr>
<td>Banana cream pie, 1/8 pie</td>
<td>387</td>
<td>238 mg</td>
<td>2.3 mg</td>
</tr>
<tr>
<td>Banana waffle, 1 small round</td>
<td>212</td>
<td>140 mg</td>
<td>1.1 mg</td>
</tr>
</tbody>
</table>

**protein** – class of nutrients used primarily for structural and regulatory functions.
Food Labels

The Nutritional Labeling and Education Act, passed in 1990, resulted in significant changes in food product labeling. The food label, regulated by the Food and Drug Administration (FDA) and the U.S. Department of Agriculture (USDA), underwent further revision in 1994 (Figure 12–3), which resulted in the current label format that provides:

- Easy-to-read nutrition information on packaged foods.
- Serving sizes in commonly consumed amounts. This prevents using small serving sizes to make food products that are high in fat, cholesterol, sodium, or calories look better than they are.
- A list of all ingredients (in decreasing order relative to the total amount) on their label.
- Percent Daily Values (%DV) that show how a serving of food fits into a total day’s diet.
- Nutrition claims that mean the same on every product (Figure 12–4).
- Voluntary information for the most commonly eaten fresh fruits and vegetables, raw fish, and cuts of meat. This information may appear on posters or in brochures in the same area as the food is sold.

Food manufacturers are required to list trans-fats (liquid oils that have been converted into solid fats, such as margarine) as well as saturated fats and cholesterol on their labels. Food allergens (milk, eggs, tree nuts [such as almonds, walnuts], peanuts, shellfish [such as shrimp, crab, lobster], fish, wheat, and soy) that could potentially cause life-threatening reactions must also be identified on food labels (U.S. Food & Drug Administration, 2006). Manufacturers are allowed to list health claims on their labels, such as “may reduce the risk of heart disease,” as long as there is scientific evidence to back up the statement.

Calories from Fat

Labels must also disclose the amounts of fat, saturated fat, trans-fats, and the number of calories from fat. With this information present (amount of fat and calories from fat), the percent of calories from fat can easily be determined:

\[
\text{Percent of calories from fat} = \frac{\text{fat calories/serving}}{\text{total calories/serving}} \times 100
\]

To calculate the number of calories from fat, use this formula:

\[
\text{calories from fat} = \text{grams (g) of fat/serving} \times 9 \text{ (cal/g)}
\]
WHAT SOME CLAIMS MEAN

**high-protein:** at least 10 grams (g) high-quality protein per serving

**good source of calcium:** at least 100 milligrams (mg) calcium per serving

**more iron:** at least 1.8 mg more iron per serving than reference food. (Label will say 10 percent more of the Daily Value for iron.)

**fat-free:** less than 0.5 g fat per serving

**low-fat:** 3 g or less fat per serving. (If the serving size is 30 g or less or 2 tablespoons or less, 3 g or less fat per 50 g of the food.)

**reduced or fewer calories:** at least 25 percent fewer calories per serving than the reference food

**sugar-free:** less than 0.5 g sugar per serving

**reduced sugar:** reduced sugar: at least 25% less sugar per serving when compared with a similar food

**sodium-free:** less than 5 mg. of sodium per serving

**light or lite (two meanings):**
- one-third fewer calories or 50% less fat per serving than the reference food. (If more than half of the food’s calories are from fat, the fat must be reduced by 50 percent)
- a “low-calorie” or “low-fat” food whose sodium content has been reduced by 50 percent of the reference food

**low cholesterol:** 20 mg. or less of cholesterol and 2 gm. or less of saturated fat per serving
The following calculations (percent of calories from fat) for some selected foods will show how the fat content reported on labels may sometimes be misleading:

**Cheddar cheese**—1 ounce = 115 calories and 9 g of fat:
Calories from fat = $9 \times 9 = 81$
Percent calories from fat = $81/115 \times 100 = 70\%$

**Eggs**—one egg = 75 calories and 6 g of fat:
Calories from fat = $6 \times 9 = 54$
Percent calories from fat = $54/75 \times 100 = 72\%$

**90% fat-free ground beef**—3 ounces = 185 calories and 10 g of fat:
Calories from fat = $10 \times 9 = 90$
Percent calories from fat = $90/185 \times 100 = 49\%$

For all of these examples, the grams of fat (9, 6, and 10) are low, yet they all presented more than 30 percent of calories from fat.

The recommendation that no more than 30 percent of calories should come from fat does not mean that all healthy food choices must derive less than 30 percent of their calories from fat. This would virtually eliminate all red meat and most dairy products. However, it does mean that if you eat a lean hamburger with 49 percent fat-calories, it might be better to skip the French fries at 47 percent fat-calories and substitute an apple, banana, or orange with less than 10 percent of calories from fat.

The procedure for calculating the percent of fat-calories may seem somewhat tedious at first. However, after completing several of these calculations you will be able to quickly skim a label and estimate a food item's nutrient density or fat-calorie ratio.

---

**Focus On Families**

**Dietary Guidelines for Americans**

- The *Dietary Guidelines for Americans* encourages a diet that is moderate in sugar consumption. Many foods such as milk/dairy products and fruit have naturally occurring sugars. Foods that have sugars added during processing or preparation contribute unnecessary calories and are often low in many vitamins and minerals. Although sugar is not harmful when consumed in limited amounts, it provides no beneficial dietary nutrients.

- Know your food labels: A *reduced sugar* food item contains at least 25 percent less sugar than the reference food. *No added sugar* or *without added sugar* foods indicate that no sugars were added during processing or packaging. *Sugar-free* foods contain less than 0.5 grams sugar per serving.

- The following terms, if listed as the first or second ingredient of a food label, indicate the food is likely high in sugar: Brown sugar, corn sweetener or corn syrup, fructose, fruit juice concentrate, glucose, dextrose, high-fructose corn syrup, honey, lactose, maltose, molasses, raw sugar, table sugar (sucrose), syrup.

- Major food sources of sugar in the United States include sodas, cakes, candy, cookies, pies, fruit drinks and punches, and dairy desserts such as ice cream. Healthy foods that contain added sugar should be limited in the diet: chocolate milk, presweetened cereals, and fruits packed in syrup. If these foods are eaten, do so in moderation and choose smaller serving sizes. (A serving of soda in the 1950s was 6.5 ounces compared to a 20-ounce serving today!)
### Classroom Corner  
**Teacher Activities**

**Tasting a Rainbow...**  
*(PreK–2; National Health Education Standards 1.2.1 and 8.2.1)*

**Concept:** Fruits and vegetables are healthy foods to eat and we should eat a variety of them.

**Learning Objectives**
- Children will learn that fruits and vegetables are healthy foods to eat.
- Children will experience tasting a variety of fruits and vegetables.

**Supplies**
- one red fruit and vegetable (apple, strawberry, tomato, watermelon, red pepper)
- one orange fruit and vegetable (orange, acorn squash, orange pepper, cantaloupe, yam, carrot)
- one green fruit and vegetable (grape, lime, spinach, honeydew, green pepper, apple, pear, broccoli, bean, pea, kiwi)
- one yellow fruit and vegetable (banana, pineapple, lemon, yellow squash, corn)
- one purple fruit and vegetable (purple grape, purple cabbage)
- one blue fruit (blueberry)
- hand wipes, plates, forks

**Learning Activities**
- Read and discuss one of the following books:
  - *Give Me 5 a Day* by Kathy Reeves, Brenda Crosby, Jennifer Hemphill, and Elizabeth Hoffman
  - *I Will Never Not Ever Eat a Tomato* by Lauren Child
- Tell children that bodies need healthy foods, like fruits and vegetables, to stay healthy and help us grow. Show children a picture of a rainbow; explain that fruits and vegetables come in many colors like a rainbow.
- Have all children wash their hands with wipes. Hand each child a plate with fruit, a plate with vegetables, and a fork. Make sure all the fruits and vegetables are cut into bite-sized pieces to prevent choking. Talk about how the colors of the food on their plates are the same colors that make up a rainbow.
- Give children an opportunity to taste each item and talk about how each tastes. Focus the activity on the importance of tasting a variety of fruits and vegetables instead of on children’s likes and dislikes.

**Evaluation**
- Children will name several kinds of fruits and vegetables.
- Children will taste a variety of fruits and vegetables.

*Additional lesson plans for grades 3–5 are available on this text’s Education CourseMate website.*
Chapter 12  Nutritional Guidelines

Summary

- The dietary reference intakes (DRI) are nutrient goals based on gender and age that are considered essential for maintaining health. They are used for policy development, dietary assessment, meal planning, and appear on food labels.
- The Dietary Guidelines for Americans are a set of recommendations that encourage food selections which meet nutrient needs, reduce the known harmful effects of over consumption of some nutrient groups, promote physical activity, and stress food safety.
- The Food Guide Pyramid is the most practical guide for making healthful food choices; foods are grouped by similar characteristics and nutrient strengths. A health-promoting diet is ensured by consuming a variety of foods from all food groups in the amounts recommended.
- Food labels must include a list of all ingredients in a product; nutrient values, fat, and calories present in the item based on serving size; known allergens; and, manufacturer’s contact information.
- Determining the percent of calories from fat in a given food serving is useful for limiting excessive dietary fat intake.

Terms to Know

- nutrition  p. 318
- nutrients  p. 318
- malnutrition  p. 319
- undernutrition  p. 319
- essential nutrient  p. 319
- Dietary Reference Intake (DRI)  p. 319
- Dietary Guidelines for Americans  p. 320
- calcium  p. 327
- protein  p. 328
- Percent Daily Values (%DV)  p. 329
- nutrition claims  p. 329

Chapter Review

A. By Yourself:

1. Match the foods in column I to the appropriate food group in column II. Some foods may include more than one food group.

<table>
<thead>
<tr>
<th>Column I</th>
<th>Column II</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Navy beans</td>
<td>a. Milk group</td>
</tr>
<tr>
<td>2. Rice</td>
<td>b. Meat and Beans group</td>
</tr>
<tr>
<td>3. Spaghetti</td>
<td>c. Grain group</td>
</tr>
<tr>
<td>4. Hamburger pizza</td>
<td>d. Vegetable group</td>
</tr>
<tr>
<td>5. Macaroni and cheese</td>
<td>e. Fruit group</td>
</tr>
<tr>
<td>6. Peanut butter sandwich</td>
<td>f. Oils group</td>
</tr>
<tr>
<td>7. French fries</td>
<td>g. Discretionary calories</td>
</tr>
<tr>
<td>8. Ice cream</td>
<td></td>
</tr>
<tr>
<td>9. Popcorn</td>
<td></td>
</tr>
<tr>
<td>10. Carbonated beverages</td>
<td></td>
</tr>
</tbody>
</table>
UNIT 3  Foods and Nutrients: Basic Concepts

B. As a Group:
1. Describe the energy sources in food. What nutrients yield energy?
2. Discuss how an individual might use the Dietary Guidelines for Americans to improve their personal well-being.
3. Explain what dietary reference intakes are and how they can be used for planning a child's daily diet.
4. Debate the merits and limitations of the current Food Guide Pyramid.
5. Explain how foods labeled low-fat, fat-free, and reduced calories differ.

Case Study

1. Betsy, age 3½, drinks milk to the exclusion of adequate amounts of foods from other food groups. What nutrient is Betsy receiving in excess? What two nutrients are most likely to be deficient?
2. Jason, age 4, refuses to eat fruit. He will occasionally accept a small serving of applesauce and a few bites of banana but little else. What two nutrients are probably deficient in Jason's diet?
3. Jeremy, age 3, is allergic to milk and dairy products. What nutrient is deficient in Jeremy's diet?
4. Tommy, age 2, by choice will eat only high carbohydrate foods, preferably those that are sweet. He rejects high-protein, high-fat foods such as meats and cheese. How would you change his diet to provide adequate protein and fat for normal growth and nerve development without increasing his carbohydrate intake with high-fat pastries, cakes, and so on?
5. Mary, age 4, refuses milk and all milk products; she likes to drink a variety of juices. How would you adjust her diet to ensure that she meets her calcium requirement?

Application Activities

1. Record your personal food intake for the past 24 hours. Go to www.MyPyramid.gov and generate "My Pyramid Plan" by entering your age, gender, and activity level. Analyze the results of your 24-hour food intake by comparing it with the Pyramid Plan recommendations.
2. Plan a day's menu for a 4-year-old girl who does an extra 45 minutes of activity each day. Include the recommended amounts from each food group, the calorie pattern on which the recommendations are based, and the number of oils/discretionary calories recommended per day from My Pyramid Plan.
3. Assume that a child is allergic to citrus fruit and strawberries (common food allergies). What fruit and/or vegetable choices could be substituted to provide adequate vitamin C?
4. The next time you eat pizza, note the amount that you consumed. Use the Pyramid as a guide to evaluate the number of servings you received from each of the different food groups. If you had a green salad with your pizza, what nutrients did it add? Estimate how many 1-cup servings the salad would have yielded.
Chapter 12  Nutritional Guidelines

Helpful Web Resources

Canada's Food Guide  

Federal Citizen Information Center  
http://www.pueblo.gsa.gov

Food and Drug Administration (FDA) (Food labels)  
http://www.fda.gov/Food/default.htm

Food Guide Pyramid for Kids  
http://www.mypyramid.gov/kids

Tufts University Center on Nutrition Science and Policy  
http://nutrition.tufts.edu

United States Department of Agriculture (USDA) News Site  
http://www.usda.gov

United States Department of Agriculture MyPyramid.gov  
http://www.mypyramid.gov

You are just a click away from additional health, safety, and nutrition resources! Go to www.CengageBrain.com to access this text’s Education CourseMate website, where you’ll find:

- glossary flashcards, activities, tutorial quizzes, videos, web links, and more

References


