# *Nutrition Concepts and Controversies 14th edition Sizer Solutions Manual*

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# Chapter 2: Nutrition Tools—Standards and Guidelines

## *Quick List: IM Resources for Chapter 2*

- **Class preparation resources:** Chapter Learning Objectives and Key Points, Chapter Lecture Outline, Learning Activities & Project Ideas,
- **Assignment materials:** **Related LO**
  - Critical thinking questions (with answers) ..... 2.1, 2.3, 2.4
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  - Worksheet 2-1: Breakfast Cereal Label Analysis ..... 2.5
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  - Worksheet 2-7: Homemade or On-the-Go? ..... 2.6
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- **Enrichment materials:** Handout 2-1: Most Frequently Eaten Raw Fruits, Vegetables, and Fish/Shellfish ..... 2.3

## *Chapter Learning Objectives and Key Points*

2.1 State the significance of Dietary Reference Intakes (DRI) and Daily Values as nutrient standards.

- The Dietary Reference Intakes are U.S. and Canadian nutrient intake standards.
- The Daily Values are U.S. standards used on food labels.
- The DRI set nutrient intake goals for individuals, standards for researchers and public policy makers, and tolerable upper limits.
- RDA, AI, EAR, and UL are all DRI standards, along with AMDR ranges for energy-yielding nutrients.
- The DRI set separate recommendations for specific groups of people at different ages. The DRI intake recommendations (RDA and AI) are up-to-date, optimal, and safe nutrient intakes for healthy people in the United States and Canada.
- The DRI are based on scientific data and generously cover the needs of virtually all healthy people in the United States and Canada.
- Estimated Energy Requirements are predicted to maintain body weight and to discourage unhealthy weight gain.
- The Daily Values are standards used solely on food labels to enable consumers to compare the nutrient values of foods.

2.2 Specify how the Dietary Guidelines for Americans work as part of an overall U.S. dietary guidance system.

- The Dietary Guidelines for Americans address problems of undernutrition and overnutrition.
- They recommend following a healthful eating pattern and being physically active.
- Key nutrients of concern are lacking in many U.S. diets; others are oversupplied.

2.3 Explain the use of the USDA Eating Patterns to plan a nutritious diet.

- The USDA Eating Patterns divide foods into food groups based on key nutrient contents.
- People who consume the specified amounts of foods from each group and subgroup achieve dietary adequacy, balance, and variety.
- Following the USDA Eating Patterns requires choosing nutrient-dense foods most often.
- Solid fats, added sugars, and alcohol should be limited.

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2.4 Given the required number of calories, discuss a healthful diet plan by applying the USDA Eating Patterns.

- The USDA Eating Patterns for various calorie levels can guide food choices in diet planning.
- The concepts of the USDA Eating Patterns are demonstrated in the MyPlate online educational tools.
- The USDA Eating Patterns can be used with flexibility by people with different eating styles.
- The Food Lists for Diabetes group foods that are similar in carbohydrate, fat, and protein to facilitate control of energy nutrient and calorie consumption.

2.5 Discuss the information included on food labels.

- Food labels may contain reliable nutrient claims and approved health claims but may also contain structure-function claims of varying reliability.
- Front-of-package icons speed consumers' comprehension of nutrient information.

2.6 Estimate the benefits of a nutrient-dense meal plan through comparison with a meal plan that does not take nutrient density into account.

2.7 Summarize the potential health effects of phytochemicals from both food sources and supplements.

## *Answers to Global Nutrition Watch Activities*

1. b
2. b
3. d

## *Critical Thinking Questions*

1. *The RDA values for essential nutrients are intended to meet the needs of 97-98% of the healthy population. The EER values, in contrast, are much less generous. Why is there such a difference between the proportion of the population whose needs are met by the RDA versus the EER?*

   If the RDA values were adequate for only 50% of healthy adults, then only 50% or fewer of all people adhering to these recommendations would get enough of these micronutrients for their bodies' needs. The remainder of the people would be deficient in them. Instead, RDA values are generous enough to be adequate for almost all healthy people and thus prevent deficiencies.

   The EER values are set mid-way along the population curve because, unlike consuming slightly more micronutrients than required, which is safe, consistently taking in too much food energy can be harmful. This is because small excesses can result in unnecessary weight gains with risk to health. The DRI committee has purposefully set the EER value at a less generous level so that most people adhering to them do not exceed their energy needs for the day.

2. *You wish to increase your intake of whole grains without taking in excessive amounts of calories. How would you utilize the USDA Eating Plans to incorporate whole-grain foods into your diet?*

   First, you would ask yourself whether you are currently in energy balance; that is, are you maintaining a healthy weight over time with your current eating habits? If so, then you likely just need to replace refined grain choices with whole-grain equivalents. However, to confirm you are eating the right amount of grains in the first place, you would compare the quantities of each food group you currently eat with the USDA Eating Plan for a person with your estimated calorie requirement. You could use the food group information in the text (Figure 2-5) or available online from www.choosemyplate.gov to learn to recognize and select whole-grain foods.

3. *To which of the following people does the RDA for vitamin D not apply? Why? (a) A middle-aged active woman; (b) a growing child; (c) an elderly man; or (d) an adolescent male with cystic fibrosis, a serious, inherited chronic illness.*

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The correct choice is d. The RDA values are designed to meet the nutritional needs of the healthier people at various life stages. The RDAs may not apply to people with chronic diseases due to their condition or the impact of their condition on nutrient needs and tolerances.

4. *In addition to the AMDR for protein, the DRI also include an RDA for protein that is calculated based on healthy body weight (i.e., grams protein needed per kilogram of weight). It is possible for an individual's protein intake to fall within the AMDR but below his or her RDA. How could this happen?*

   For comparison with the AMDR, the person's protein intake is calculated as a percentage of his or her actual calorie intake (calories from protein divided by total calories). If the person's total calorie intake is too low, then the grams of protein eaten might account for 10-35% of calories but still be fewer than the grams required for the person's mass (kilograms of weight). The AMDR indicate appropriate macronutrient intakes for people whose total energy intakes are adequate.

5. *Describe any two reasons why it is important to have flexible guidelines for food groups and food sources of nutrients when considering daily meal planning.*

   People have different food preferences and may not eat a given food group. Vegetarians may not eat meats but will eat beans and nuts, which are part of the protein foods group. Some vegetarians may not eat dairy products or eggs and will need to get calcium from other sources. Some people cannot tolerate wheat gluten and need to find gluten-free alternatives. Many people may be allergic to dairy products as well. People also eat different types of foods based on their native cultures.

   Some people are more active than others and may need more carbohydrates or proteins than others. One key point is that these guidelines are designed for healthy people. People with health conditions should work with their healthcare team, which hopefully will include a registered dietitian.

6. *How can a nutrient-dense food be changed into an empty-calorie food?*

   See Figure 2-6 in the textbook. Nutrient density is reduced when calories from simple sugars or solid fats are increased, either by failing to remove unneeded fat or by adding sugars or fats during processing or preparation. For example, a potato that provides 117 calories when baked provides 258 calories plus added solid fats when fried in fat. One could look up a whole food that is nutrient dense using Appendix A in the textbook or the MyPlate website and then compare that food's calorie, vitamin, and mineral contents to a similar food that is prepared with added fat or sugar.

## *Controversy Discussion Questions*

1. *Describe what the term "oxidative stress" means in terms of the body tissues. How can you protect your cells from oxidative stress?*

   Oxidative stress refers to damage to DNA and other cellular compounds that results from oxidation (reacting with oxygen). Because oxidation is an effect of normal cell chemistry, it cannot be eliminated. However, cells can be protected from oxidative stress by antioxidants, compounds that react with oxygen and thus prevent it from reacting with and damaging other compounds. Many of the phytochemicals found in plant-based foods—the flavonoids in blueberries and chocolate and the lycopene in tomatoes, for example—act as antioxidants in the body. Therefore, eating a variety of produce in the context of an overall healthy diet can help protect cells from oxidative stress.

2. a. *What is a phytoestrogen?*

   A phytoestrogen is a chemical compound found in plants that is similar in structure to estrogen made in the body. The phytoestrogens may act in similar ways to the actual hormone in the body.

   b. *List any 2 foods that are a major source of compounds that can become phytoestrogens.*

   Soybeans contain phytoestrogens such as genistein. Flaxseeds contain lignans that can be converted into phytoestrogens by the intestinal bacteria.

   c. *Why should people NOT take phytoestrogens in the form of supplements?*

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Supplements may contain phytoestrogens in much higher concentrations than are found in foods. There is a lot of research examining the effects of phytoestrogens in the body. Low doses of the soy phytoestrogen genistein appear to speed up division of breast cancer cells in laboratory cultures and in mice, whereas high doses seemed to do the opposite. Breast cancer survivors and people being treated for breast cancer are advised to avoid supplemental soy phytoestrogens.

3. *Why would people want to ingest probiotics or foods with prebiotics when their colons already contain bacteria?*

   Probiotics are live bacteria that are found in yogurt cultures, such as *Lactobacillus*. These organisms do not harm the body and may actually help the digestive system in the long run. The types and ratios of organisms that colonize a person's intestine may have roles in some diseases, so changing the population by introducing more "friendly" bacteria is thought to be health promoting. *Lactobacillus* and other microbes can also help alleviate the diarrhea that often results from taking antibiotics.

   Prebiotics are nutrients found in foods that feed the probiotic bacteria such that they continue to grow and help aid in the digestive process.

   People with depressed immune systems or pancreatic diseases should not take in large amounts of probiotic-containing foods.

4. a. *Give any one example of a functional food.*

   Cranberries or garlic would be an example of a natural functional food. Margarines that contain phytosterols are an example of a manufactured functional food. This type of margarine is consumed with the intention of lowering blood cholesterol values such as low-density lipoprotein (LDL) levels.

   b. *Should this food be considered a drug? Why or why not?*

   If the functional food is consumed in large quantities with the intent to treat a condition in the body, it could be considered a drug. This would certainly hold true if the functional food were used in place of more conventional medicine to treat a condition.

   If the functional food is consumed in moderation along with other foods and combined with other lifestyle changes, in addition to medical treatment, it would not be considered a drug.

## *Worksheet Answer Key*

**Worksheet 2-1: Breakfast Cereal Label Analysis**

1. Marshmallow Magician lists that it contains 12 vitamins and minerals and 110 kilocalories per serving of cereal, and is a good source of calcium and whole grain. Zen-Tastic lists high fiber, low fat, low sodium, whole grain, vegetarian, and lack of *trans* fats.

2. a. Zen-Tastic does with 9 grams of fiber.
   b. The sources of fiber in this cereal include brown rice flour, rolled oats, wheat bran, and dried cranberries.

3. a. Marshmallow Magician does, with 10% for both vitamins.
   b. Yes—Marshmallow Magician would usually be considered a high-sugar cereal.
   c. Marshmallow Magician could provide some extra vitamins and minerals for a person who eats a lot of fast food or processed food, which may not have a lot of vitamins or minerals.

4. a. Added to the cereal as pyridoxine hydrochloride
   b. Probably not in significant amounts, since it has been added to the cereal
   c. Vitamin $B_6$ is listed further down on the ingredients list.

5. a. *Open answer (answers will vary)* [it's a marketing term with no legal definition]
   b. Perhaps this cereal promotes regularity and energy that may help a person feel better overall.

6. a. Skim milk
   b. *Open answer*

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**Worksheet 2-2: Intake Analysis—More Diet Planning**

1. Biscuits, melted butter, sweetened iced tea, vanilla ice cream
2. They do not contribute a lot of nutrients such as vitamins or minerals but they do contribute calories.
3. Vitamin C, vitamin A; lots of fruits and vegetables, including deep orange ones
4. To reduce vitamin C, less strawberries or replace the orange with a whole-grain snack. To reduce vitamin A, reduce the amount of apricots or replace them with another snack item.
5. Very strict vegetarian (vegan) diet of fruits and vegetables
6. Nuts and whole grains could be added to increase protein and minerals.

**Worksheet 2-3: Dietary Reference Intakes and Food Composition Tables**

1. RDA – the recommended average daily nutrient intake level that meets the needs of nearly all of healthy people in a particular life stage and gender group. RDA values are used whenever available to assess the nutrient needs of healthy individuals. These values will be used to evaluate a person's food intake or they may be used to plan meals for large groups of people.
2. AI – the recommended average daily nutrient intake level based on intakes of healthy people in a particular life stage and gender group and assumed to be adequate. AI values are used for assessing nutrient needs of healthy individuals when scientific data are insufficient to allow establishment of an RDA value.
3. EAR – the average daily nutrient intake estimated to meet the requirement of half of the healthy individuals in a particular life stage and gender group. EAR values are used in nutrition research and for making public policies, and as the basis of the RDA values.
4. UL – the highest average daily nutrient intake level that is likely to pose no risk of toxicity to almost all healthy individuals of a particular life stage and gender group. The UL values are used to determine when an individual's intake of a nutrient is too high and could result in toxicity. These values can be used to evaluate vitamin and mineral supplements.
5. 1300 mg
6. 1000 mg
7. 1200 mg
8. Calcium needs are greater during youth, while the body is growing and bone mass is increasing. Adults need less calcium than teens since the adolescent growth spurt has been completed. Calcium is still important to maintain adult bone health. During the older adult or senior years, calcium needs are increased again as a way to further protect bones. [Note: This is an excellent opportunity to briefly introduce students to the concept of osteoporosis and the possible resulting bone fractures.]
9. 45%-65%
10. 20%-35%
11. 10%-35%

12.

| | Calories | Iron (mg) | Vitamin A (RAE µg) |
|---|---|---|---|
| 1 cup 2% milk (with nonfat milk solids) | *125* | *0.12* | *137.2* |
| 3 oz. ground beef, lean, broiled well (plain hamburger without bun) | *214* | *2.21* | *0* |
| 8 raw baby carrots | *28* | *0.71* | *552.0* |
| **Totals** | *367* | *3.04* | *689.2* |

*[Note: When reviewing this calculation, another topic that could be briefly discussed by an instructor would be milk anemia. Discuss the iron content of meat versus milk. Since carrots are a source of vitamin A, it could be reinforced that vitamin A (in the form of beta-carotene) is found in deep orange-colored fruits and vegetables.]*

13. 18 mg iron and 700 µg RAE vitamin A
14. Although there is no UL for thiamin, this supplement contains nearly 3 times Molly's RDA, and is therefore unnecessarily high in thiamin (excess thiamin is merely excreted in urine, and so is a waste of money). The

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vitamin C supplement is dangerously high in vitamin C. The UL for vitamin C is 2000 mg, which equals 2 grams. Molly is taking 5 grams of vitamin C which is 2.5 times the UL. She may experience vitamin C toxicity symptoms.

**Worksheet 2-8: Chapter 2 Review Crossword Puzzle**

1. sodium
2. flavonoids
3. A: probiotics, D: protein
4. macronutrient
5. UL
6. MyPlate
7. lycopene
8. density
9. solid fats
10. adequate
11. serving

## *Learning Activities & Project Ideas*

**Activity 2-1: Do It Yourself—Crafting Consumer Tips Project**[3] LO 2.2

Imagine that you are to create a marketing campaign selling the Dietary Guidelines (Table 2-1) to consumers. Develop a list of specific tips to guide and motivate your audience into complying with each of the recommendations. Create your own tips customized to the needs, likes, and dislikes of your particular audience. The more focused and individualized your messages are, the more likely consumers will act on them.

Boost the effectiveness of your tips by using these guidelines:

- Keep tips positive, short, and simple.
- Be specific; describe an action (where appropriate). As a supporting tip for the message, "Meet the *Physical Activity Guidelines for Americans*," you might write, "Walk the dog; don't just watch the dog walk."
- Don't assume consumers always know the payoff or benefit of incorporating changes from the Dietary Guidelines. Consider continuing the tip with, "You'll feel good and have more energy, too" or "You could reduce your risk of heart disease," which people can easily relate to.
- Make it manageable. For instance, the tip, "Try one new fruit or vegetable each month" has been well received by consumers in the past, and supports the recommendations related to dietary variety.
- Don't over-promise results; show realistic outcomes that can result when people make small changes in their daily eating plan.
- Include examples of foods and activities that reflect the lifestyle, preferences, and culture of your audience.
- Use humor when possible and appropriate.
- Incorporate time-saving tips whenever possible, since consumers cite "lack of time" as one of the biggest barriers to good health. For instance, consumers could be encouraged to break up physical activity into several short sessions to accommodate busy schedules.

**Activity 2-2: Estimating Amounts**[4] LO 2.3, 2.4

As an assignment, have students walk past a display and estimate the portion sizes of various foods to complete Worksheet 2-4. They should write down their estimates before the lecture about portions; you can post the answers near the display for self-checking, and also review answers later in class. This activity is not graded. The display can be made available all day, in a wide hallway outside the classroom.

Prior to the assignment, you will need to set up the display, which will include the following food items: McDonald's Big Mac, large order of McDonald's French fries, a potato, a Taco Bell bean burrito, a pouch of fruit drink, an apple, green beans, ice cream, single-serving milk bottle, Teriyaki Stix rice bowl, peanut butter, bread, fat-free salad dressing, and regular salad dressing.

The ice cream is a Nasco food model. On the milk and fruit drink containers, the amount is covered with masking tape. The burger, fries, burrito, and rice bowl are all freshly purchased. You can also use 2 apples and 2 potatoes—a small and a large of each. To make the "key," measure the volume of the apples and potatoes by displacement. (Volume is used with the MyPlate recommendations.) Students are usually surprised at how large the "normal" apple and potato actually are.

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[3] Source: Dietary Guidelines Alliance, Chicago, IL.

[4] Contributed by Lora Beth Brown, Ed.D., R.D., C.D., Brigham Young University

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**Activity 2-3: Estimating Amounts (with Instructor-Chosen Foods)** LO 2.3, 2.4

Before class, make copies of Worksheet 2-5 for students, and set up the classroom for the activity by staging pre-measured amounts of foods of your choice. Each food should be displayed with a card listing the name and unit of measure students should use to estimate the portion sizes. When students arrive, have them complete items 1-4 at the top of the worksheet; then, debrief students by revealing the actual quantities and calorie contributions of the food samples. An excellent resource for a class discussion of portion sizes is the www.choosemyplate.gov website. If you have computer projection equipment and Internet access available, you can show pictures of portion sizes from the "Food Gallery" (URLs where you can link to the gallery are listed below). You can have students complete the questions at the bottom of the worksheet as a homework assignment if desired.

| | |
|---|---|
| Grains Food Gallery: | http://www.choosemyplate.gov/foodgallery-grains |
| Vegetables Food Gallery: | http://www.choosemyplate.gov/foodgallery-vegetables |
| Fruits Food Gallery: | http://www.choosemyplate.gov/foodgallery-fruits |
| Dairy Food Gallery: | http://www.choosemyplate.gov/foodgallery-dairy |
| Protein Foods Gallery: | http://www.choosemyplate.gov/foodgallery-protein-foods |

**Activity 2-4: Perceived vs. Standard Grain Portion Sizes[5]** LO 2.3, 2.4

Just before class on the day you plan to teach portions, invite several students (males and females) to pour out some dry cereal into a bowl (a wide variety of sizes are available) or spoon out some pasta (freeze dried so it looks more like what they would eat) onto a plate. Don't identify who served what. Quantify how much they have served for the whole class to see. The range is often quite broad—from ½ to 1 ¼ cups of grape nuts (¼ c = 1 oz. grain for "dense" cereals), from about 1 ½ cups to 3 cups of corn flakes (~1 c = 1 oz. grain for flaky, puffy cereals), and from 1 to 4 cups of macaroni (½ c cooked = 1 oz. grain). Remind students that a portion size of cereal, on a food label, can also vary in amount.

**Activity 2-5: Beverage Portion Sizes**5 LO 2.3, 2.4

While discussing milk or other beverage portions, show several glasses and tell how much each holds (from 1 cup—which looks extremely small—to 20 ounces—which looks "normal" to many students). In one of the large glasses we have poured wax to show how miniscule 1 cup looks in a large glass. Since it is hard to find 1-cup glasses for sale, most students probably have 12- to 20-oz. glasses in their apartments. Using large glasses might easily lead to consuming more than one expects, because most people fill up a glass when they pour a beverage.

**Activity 2-6: Models of MyPlate Portion Sizes**5 LO 2.3, 2.4

As you discuss the MyPlate groups, pass around Nasco food models so students can see close up what specific portions look like—they can compare them with their hand, finger, thumb, or whatever as a frame of reference. (Research by an MS student several years ago established that handling the food models resulted in the greater accuracy in estimating portions, compared to using 2-D representations.)

**Activity 2-7: Compare Your Food Intake to the USDA Eating Patterns** LO 2.3, 2.4

Provide students with a copy of Worksheet 2-6 (Compare Your Food Intake to Recommended Daily Amounts from Each Group). Instruct them to record everything they ate on the previous day, including beverages and snacks. Assist them with estimating food portions and translating their food selections into food groups. Have them complete their total food group intakes for the entire day and compare this to the recommended eating patterns. Students could be instructed to enter both their profile information and their daily intake information into the Super Tracker tool at www.supertracker.usda.gov as a means of assessment. They will be able to see how their daily intake compared with the recommended amounts of servings or nutrients based on their profile at the Super Tracker website. Discuss ways that they can improve their dietary habits.

**Activity 2-8: Voluntary Food Labeling of Fresh Foods** LO 2.5

Take a quick poll by asking students what their favorite raw fruit, raw vegetable, or fish species is (choose the food category you would like to emphasize). Mark responses on the board or overhead projection and take a quick tally to see what the favorites are in the class. Explain that the FDA has a voluntary nutrition labeling program for the 20 most frequently consumed raw fruits, vegetables, and fish, in addition to the required labeling for processed foods, in order to help consumers choose healthful fresh and whole foods. You can also discuss the students' choices of

[5] Contributed by Lora Beth Brown, Ed.D., R.D., C.D., Brigham Young University

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fresh foods in terms of nutrient density and their places in the USDA Eating Patterns/MyPlate. If desired, distribute Handout 2-1, which lists the FDA's lists used for the voluntary labeling program.

**Activity 2-9: Review—USDA Eating Patterns Jeopardy![6]** LO 2.3

Create a "Jeopardy!" game board with six category columns. Each column should have a category name (i.e. fruits, vegetables, etc.). Under each category name have 5 game cards, each with a different question that is relevant to the particular category of interest. Have the game cards increase in "point" value. Each game card should contain an answer. The students are required to state their answer in the form of a question. If this process is too involved for your class, you can write the questions on the cards and allow the students to provide the simple answer. This activity can be conducted in large classes in which teams compete or in small groups. This activity can also be adapted for other nutrition, wellness, and activity topics. Try this game with the *Physical Activity Guidelines for Americans* and food groups combined. It creates an atmosphere for application and fun!

**Activity 2-10: Phytochemical Commercials Project[7]** LO 2.7

Assign the students to research a specific phytochemical (organosulfur compounds in onions, lycopene in tomatoes, etc.) and find the benefits of this compound to health. The students will then do a short presentation as if they are doing a TV commercial, trying to sell a product (food) that contains the phytochemical and to convince the audience to consume it. They can also bring samples of foods rich in the phytochemical to class, and students will taste them. This is a way to expose students to healthy foods.

## *Chapter Lecture Outline*

I. Introduction
   A. Eating well is easy in theory:
      1. Just choose a selection of foods that supplies appropriate amounts of the essential nutrients, fiber, phytochemicals, and energy, without excess intakes of unhealthy fats, sugar, and salt.
      2. Be sure to get enough exercise to balance the foods you eat.
   B. In practice, eating well proves harder than it appears.
      1. Many people are malnourished.
      2. For example, overweight, undernourished, or suffer from nutrient excesses or deficiencies that impair their health.

II. Nutrient Recommendations
   A. Dietary Reference Intakes
      1. The Dietary Reference Intakes are nutrient intake standards set for people living in the United States and Canada.
      2. The Daily Values are U.S. standards used on food labels that allow consumers to compare the nutrient content of two foods.
      3. The DRI committee has set values for vitamins, minerals, carbohydrates, fiber, lipids, protein, water, and energy.
   B. The DRI Lists and Purposes
      1. RDA and AI—Recommended Nutrient Intakes
         a) Both are nutrient goals.
         b) RDA (Recommended Dietary Allowances) are based on solid experimental evidence.
         c) AI (Adequate Intake) values are set up if there is not enough information to establish an RDA value for a given nutrient.
      2. EAR—Nutrition Research and Policy
         a) The EAR (Estimated Average Requirements) establish the average nutrient requirements for given life stages and gender groups.
         b) EAR values form the scientific basis from which the RDA values are derived.
      3. UL—Safety

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a) The UL (Tolerable Upper Intake Levels) identifies potentially hazardous levels of nutrient intakes.
b) Beneficial to those who take supplements or who consume foods with added vitamins or minerals.
c) Not all nutrients have an established UL value.

4. AMDR—Calorie Percentage Ranges
   a) AMDR (Acceptable Macronutrient Distribution Ranges) sets healthy ranges of intake for carbohydrate, fat, and protein.
   b) A diet consisting of the macronutrients in the proportions set by the AMDR will help ensure nutritional adequacy with a reduced risk of developing chronic diseases.
   c) 45 to 65 percent of calories from carbohydrates
   d) 20 to 35 percent of calories from fat
   e) 10 to 35 percent of calories from protein

C. Understanding the DRI Recommended Intakes
   1. DRI for Population Groups
      a) Different recommendations are set for men, women, pregnant or lactating women, infants, and children, as well as for specific age ranges.
      b) Meeting the RDA or AI for specific nutrients is recommendations for most healthy people.
   2. Other Characteristics of the DRI Recommended Intakes
      a) The values are based on available scientific research and updated periodically in light of new knowledge.
      b) The values are based on the concepts of probability and risk.
      c) The values are recommendations for optimal intakes, not minimum requirements. They include a generous margin of safety.
      d) The values are set in reference to specific indicators of nutrient adequacy such as blood nutrient concentrations or reduction of particular chronic conditions, rather than prevention of deficiency symptoms alone.
      e) The values reflect daily intakes to be achieved, on average, over time. The values are set high enough to ensure that body stores will meet nutrient needs during periods of inadequate intakes.
   3. The DRI Apply to Healthy People Only
      a) DRI are recommended for health maintenance and disease prevention in healthy individuals, not for restoration of health or repletion of nutrients in individuals with deficiencies.
      b) A person who is ill may require a higher intake of certain nutrients or may not be able to tolerate the DRI recommendations.

D. How the Committee Establishes DRI Values—An RDA Example
   1. Determine how much of a given nutrient is required by various healthy individuals.
   2. Use valid data to set the RDA value.

E. Determining Individual Requirements
   1. For determining RDA, a balance study is performed, which determines a person's requirement to achieve balance (intake vs. excretion) for nutrient X.
   2. Accounting for the Needs of the Population
      a) If the value is set at the EAR (the mean for the entire population), half of the population will develop deficiencies in nutrient X if this recommendation was followed.
      b) If the value is set at the highest level, this would be too high for many in the population.
   3. The Decision
      a) The RDA value is set such that 97-98% of the population receives enough nutrient X for optimal functioning.
      b) The RDA is not set so high as to be excessive.

F. Setting Energy Requirements
   1. In contrast to the RDA for nutrients, the value set for energy, the Estimated Energy Requirement (EER), is not generous.

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2. It is set at an average value so as to maintain body weight and to discourage unhealthy weight gain.

G. Why Are Daily Values Used on Labels?
1. One set of values that applies to everyone found only on food labels.
2. Daily Values reflect the highest level of nutrient need among all population groups (age 4+).
3. They enable consumers to compare the nutrient values among foods.
4. The Daily Values do not serve as nutrient intake goals for individuals.

III. Dietary Guidelines for Americans
A. The *Dietary Guidelines for Americans* offer food-based strategies for achieving nutrient intake goals.
B. The Guidelines Promote Health (see Table 2-1)
1. Dietary Guidelines
a) Follow a healthy eating pattern across the lifespan.
b) Focus on variety, nutrient density, and amount.
c) Limit calories from added sugars and saturated fats and reduce sodium intake.
d) Shift to healthier food and beverage choices.
e) Support healthy eating patterns for all.
2. Key Recommendations
a) A healthy eating pattern includes a variety of vegetables from all subgroups, fruits (especially whole), grains (at least half whole), fat-free/low-fat dairy, a variety of protein foods, and oils.
b) A healthy eating pattern limits saturated fats (to <10% of total calories), *trans* fats, added sugars (to <10% of total calories), sodium (to <2300 mg/day); and moderates alcohol intake.
C. How Does the U.S. Diet Compare with the Guidelines?
1. Vitamins A, C, D, E, folate, calcium, iron, magnesium, fiber, and potassium are undersupplied.
2. Saturated fat and sodium are overconsumed.
3. Figure 2-4 shows that we eat too few nutritious foods from most food groups.
4. We consume too many calories, and too much red and processed meats, refined grains, added sugars, sodium, and saturated fats.
D. Our Two Cents' Worth
1. Choose carefully.
2. Enjoy your food.

IV. Diet Planning with the USDA Eating Patterns
A. Introduction
1. A major recommendation of the Dietary Guidelines for Americans is to choose a diet based on the food group plan concept.
2. If you design your diet around the USDA Eating Patterns, you will achieve adequacy, balance, moderation, and variety.
B. The Food Groups and Subgroups
1. Vegetables Subgroups and Protein Foods Subgroups
a) Not every vegetable supplies nutrients attributed to the vegetables group.
b) Vegetables are divided into red and orange, dark green, starchy, and legumes based on their content of various nutrients.
c) The saturated fat content of protein foods can vary widely.
d) Meats tend to have higher saturated fat content while seafood, nuts, seeds, and soy foods have less saturated fats and enough essential fatty acids.
2. Grains Subgroups and Other Foods
a) The nutrient contents of foods in the grains group vary widely.
b) Refined grains usually lack fiber and other beneficial nutrients but supply energy.
c) Whole grains should represent at least half the grains in each day's intakes.
d) Spices, herbs, and coffee provide few nutrients but may contain beneficial phytochemicals.
3. Variety among and within Food Groups

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a) Select a variety of foods between food groups and within each food group.
b) Ensures nutritional adequacy.

C. Choosing Nutrient-Dense Foods
1. Choose the most nutrient-dense foods from each group to prevent overweight or obesity.
2. Solid Fats, Added Sugars, and Alcohol Reduce Nutrient Density
a) Solid fats, added sugars, and alcohol reduce the nutrient density of foods.
b) Add empty calories to foods.

V. Diet Planning Application
A. Plan a day's meals to follow the USDA Eating Patterns within a given calorie budget.
1. Use Table 2-3 to determine the daily calorie budget for a given group of people, as well as the quantities of foods needed from each major food group.
2. See Table 2-4 to determine the amounts of vegetable and protein food subgroups needed for the week.
3. Table 2-5 demonstrates a sample diet plan that shows how the food groups are broken up among the day's meals.

B. MyPlate Educational Tool
1. The concepts of the USDA Eating Patterns are conveyed to the consumer through the MyPlate educational tool.
2. More information at www.choosemyplate.gov.

C. Flexibility of the USDA Eating Patterns
1. Allows for substitutions according to personal preferences, as well as national and cultural food choices, as shown in Figure 2-8.
2. Vegetarians can use the USDA Eating Patterns for meal planning as well. They can choose among the plant protein foods and count legumes (also in the vegetables group) as protein foods.

D. Food Lists for Diabetes and Weight Management
1. The Food Lists for Diabetes facilitate calorie control by providing an understanding of how much carbohydrate, fat, and protein are in standardized portions of foods from each group.
2. Appendix D describes the foods within the food lists, as well as their associated macronutrient contents.

E. The Last Word on Diet Planning
1. Small changes each day can add up to substantial changes over time.
2. These changes may help reduce the risk of developing chronic diseases.

F. A Consumer's Guide to Controlling Portion Sizes at Home and Away
1. Pay attention to portion sizes to control calories.
2. How Big Is Your Bagel?
a) Most college students overestimate the portion size of a "medium-sized" food.
b) Be aware of large portion sizes
3. Practice with Weights and Measures
a) Be able to recognize actual portion sizes as recommended by the USDA Eating Patterns.
b) Relate actual portion sizes to common objects.
4. Buy New Bowls
a) People tend to eat more from larger containers than from smaller ones.
b) Try buying smaller bowls, spoons, and plates.
5. Colossal Cuisine in Restaurants
a) The percentage of food budgets spent away from home has doubled over the last 40 years (see Figure 2-9).
b) Food portions also grew larger (more caloric), and people's body weights increased to new, unhealthy levels.
c) Devise strategies for decreasing the amount of food consumed at restaurants.
6. Moving Ahead
a) Make portion control a habit to avoid overeating.
b) Control portion size at home and when eating out.

VI. Checking Out Food Labels

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A. What Food Labels Must Include
    1. Introduction
        a) The Nutrition Education and Labeling Act of 1990 sets labeling requirements.
        b) Every packaged food must state:
            (1) The common name of the product.
            (2) The name and address of the manufacturer, packer, or distributor.
            (3) The net contents in terms of weight, measure, or count.
            (4) The nutrient contents of the product (Nutrition Facts panel).
            (5) The ingredients, in descending order of predominance by weight.
            (6) Essential warnings, such as alerts about ingredients that often cause allergic reactions or other problems.
        c) Small items like candy may only have a telephone number on the label.
        d) Small labels, e.g., can of tuna fish, will have abbreviated information.
    2. The Nutrition Facts Panel
        a) The following are found on all labels:
            (1) Serving size, servings per container, and calories from fat
            (2) Nutrient amounts and percentages of Daily Values for total fat, cholesterol, sodium, total carbohydrate/sugars/dietary fiber, and protein.
            (3) The label must state the contents of these nutrients expressed as percentages of the Daily Values for other nutrients present in significant amounts
            (4) The labels also have a "calories per gram" reminder as a handy reference.
    3. The FDA's New Nutrition Facts Panel
        a) Serving sizes will better reflect typical portion sizes
        b) Figure 2-12 highlights other important changes, which include addition of added sugars and the requirement to list %DV and amounts for vitamin D, calcium, iron, and potassium.
    4. Ingredients List
        a) This may seem straightforward, but sugar can have many other names.
        b) Ingredients are listed in descending order by weight.
        c) This can help consumers spot ingredients that they are allergic to, drinks that are made of juice versus water and sugar, and whole-grain foods versus refined grains.
    5. More About Percentages of Daily Values
        a) The calculations used to determine the "% Daily Value" figures for nutrient contributions from a serving of food are based on a 2,000-calorie diet.
        b) Example: If a food contributes 13 milligrams of vitamin C per serving, and the DV is 60 milligrams, then a serving of that food provides about 22 percent of the DV for vitamin C.

B. What Food Labels *May* Include
    1. Nutrient Claims: Reliable Information
        a) If a food meets specific criteria, the label may display certain approved nutrient claims, as shown in Table 2-7.
        b) The term "good source" means that the product will contain 10-19% of the Daily Value per serving.
    2. Health Claims: Reliable and Not So Reliable
        a) The FDA allows health claims that are supported by weak evidence as well as those with a high degree of scientific evidence to appear on labels.
        b) "Qualified" claims must contain statements that describe the extent to which studies back up a given claim.
    3. Structure-Function Claims: Best Ignored
        a) No prior approval is needed from the FDA.
        b) Structure-function claims can appear on a food or supplement.
        c) For claims on a supplement, the manufacturer must notify the FDA after marketing, and the label has to have a disclaimer stating that the FDA has not evaluated the claim.
    4. Front-of-Package Short Cuts
        a) Consumers may prefer easy-to-read icons of abbreviated data on the front of food packages.

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b) Food industry groups are working to develop a standardized set of icons (see Figure 2-14).

VII. Food Feature: Getting A Feel for the Nutrients in Foods
- A. Comparing the Nutrients
  1. Compare a food's nutrient values to a standard (e.g., DRI)
  2. Compare the total amounts of foods consumed in one day with the recommended amounts from each food group.
  3. See Figures 2-15 and 2-16.
- B. Monday's Meals in Detail
  1. Monday's meals are clearly more nutrient dense than Tuesday's meals.
  2. Monday's meals provide the necessary servings from each food group.
- C. Tuesday's Meals in Detail
  1. No fruit or whole grains, little vegetables or dairy.
  2. Too much energy and unhealthful food components.
- D. Using Programs and Apps—Or Not
  1. People use the computer or smartphone with diet analysis programs for diet planning and analysis to save time.
  2. But people who use pen and paper for diet planning and analysis, or who study their computer diet analysis, learn to quickly assess food options and make informed choices at mealtimes without electronic assistance.

VIII. Controversy: Are Some Foods Superfoods for Health?
- A. A Scientist's View of Phytochemicals
  1. Some phytochemicals are thought to be bioactive food components.
  2. Phytochemicals, such as flavonoids, may reduce inflammation in the body and serve as antioxidants (see Table C2-2).
  3. Only a few phytochemicals have been studies for health effects.
  4. Blueberries and the Brain
     a) Blueberries provide flavonoids that may reduce oxidative damage in brain tissue.
     b) But best to consume a variety of fruits and vegetables.
  5. Chocolate, Heart, and Mood
     a) Flavonoids in chocolate accumulate in the blood, and may be associated with a decrease in potentially harmful oxidizing compounds.
     b) Flavonoids from chocolate may enhance blood vessel function and reduce the risk of diabetes and heart disease.
     c) There are no conclusions as to whether chocolate affects mood.
  6. Flaxseed
     a) Flaxseed provides lignans, which are converted into phytoestrogens that may lower the risk of intestinal cancer, breast cancer, prostate cancer, and heart disease.
     b) Flaxseed contains linolenic acid.
     c) Flaxseed must be ground, otherwise the seeds will pass through the digestive tract.
  7. Garlic
     a) Garlic contains organosulfur compounds that may reduce the risks of some cancers, heart disease, and some infections.
     b) Organosulfur compounds are antioxidants.
  8. Soybeans and Soy Products
     a) Soy products contain phytoestrogens that may reduce the risks of some cancers, reduce hot flashes, and help reduce blood cholesterol.
     b) Health benefits seen in people who live in Asia and consume more soy products than Americans.
  9. Soy's Potential Downsides
     a) ACS recommends moderation for those with a history of breast cancer.
     b) Avoid supplements.
  10. Tomatoes
     a) Tomatoes contain lycopene.

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b) Lycopene may help reduce the risk of some cancers.

11. Tea
    a) Green tea contains the antioxidants polyphenols.
        (1) May reduce oxidative stress.
        (2) May reduce blood lipids and blood pressure.
    b) Black tea contains flavonoids
    c) High-dose supplements of green tea extract have been linked with liver toxicity.
    d) Flavonoids from tea may affect absorption of some medications.
12. Grapes and Wine
    a) Wine contains resveratrol, a compound that may exhibit anticancer properties and extend the lifespan of some cells.
    b) People who regularly consume red wine, grapes and their products, and other fruits and vegetables have a lower incidence of cardiovascular disease.
13. Yogurt
    a) Yogurt contains beneficial bacteria called probiotics.
    b) May help regulate digestion and help reduce allergies in some people.

B. Phytochemical Supplements
1. Foods deliver thousands of phytochemicals in addition to nutrients.
2. Most isolated supplements fail to actually prevent diseases when administered in research.
3. Some may interfere with standard medical treatments such as drugs.
4. Supporters note that people have been eating them for ages and so they must be safe to consume as supplements.
5. Detractors say the body is not used to handling them in large concentrations.

C. The Concept of Functional Foods
1. Manufactured functional foods consist of processed foods that are fortified with nutrients or enhanced with phytochemicals or herbs.
2. What is the better choice: snack foods sprinkled with phytochemicals or whole foods?
3. Are smoothies that contain medicinal herbs safe for everyone to consume?

D. The Final Word
1. Moderation of intake of any one superfood is very important.
2. It is important to consume a variety of grains, beans, fruits, and vegetables.

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***Figures/Tables from the 13th Edition***

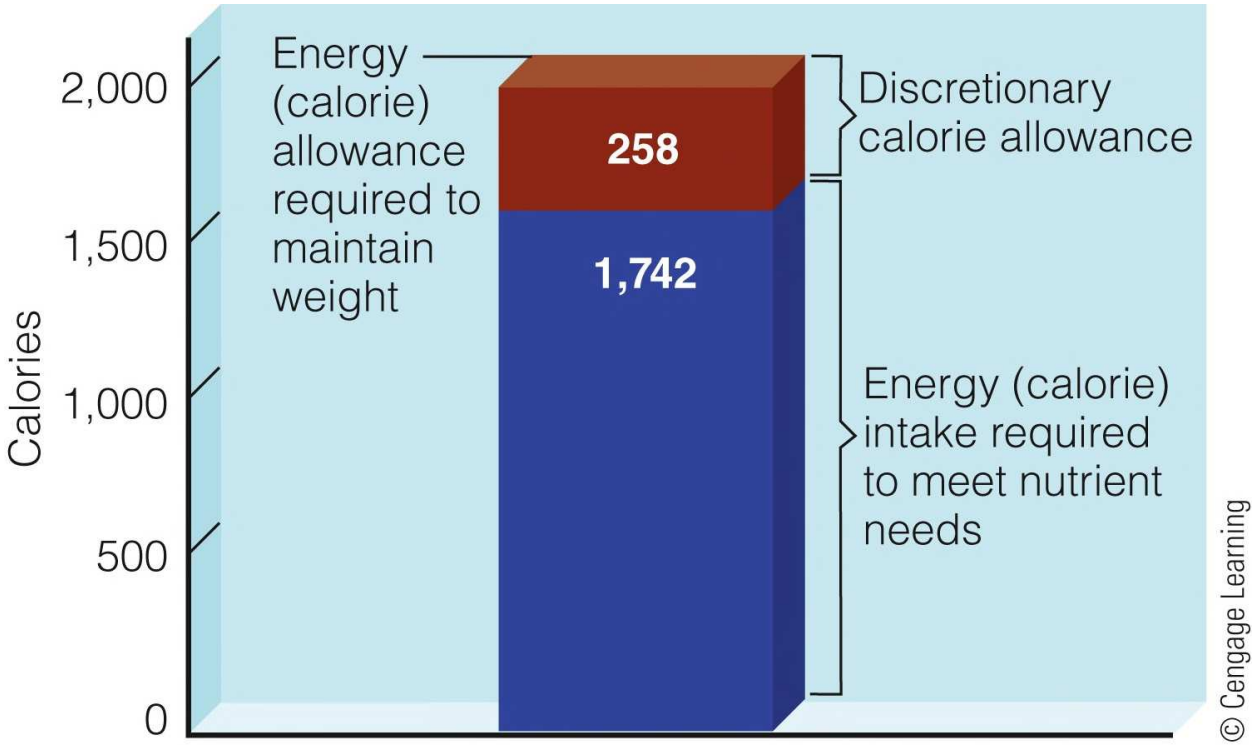



Figure 2-7
Discretionary Calorie Concept
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## Table 2–7

## Reliable Health Claims on Labels

These claims of potential health benefits are well-supported by research, but other similar-sounding claims may not be.

- Calcium and reduced risk of osteoporosis
- Sodium and reduced risk of hypertension
- Dietary saturated fat and cholesterol and reduced risk of coronary heart disease
- Dietary fat and reduced risk of cancer
- Fiber-containing grain products, fruits, and vegetables and reduced risk of cancer
- Fruits, vegetables, and grain products that contain fiber, particularly soluble fiber, and reduced risk of coronary heart disease
- Fruits and vegetables and reduced risk of cancer
- Folate and reduced risk of neural tube defects
- Sugar alcohols and reduced risk of tooth decay
- Soluble fiber from whole oats and from psyllium seed husk and reduced risk of coronary heart disease
- Soy protein and reduced risk of coronary heart disease
- Whole grains and reduced risk of coronary heart disease and certain cancers
- Plant sterol and plant stanol esters and reduced risk of coronary heart disease
- Potassium and reduced risk of hypertension and stroke

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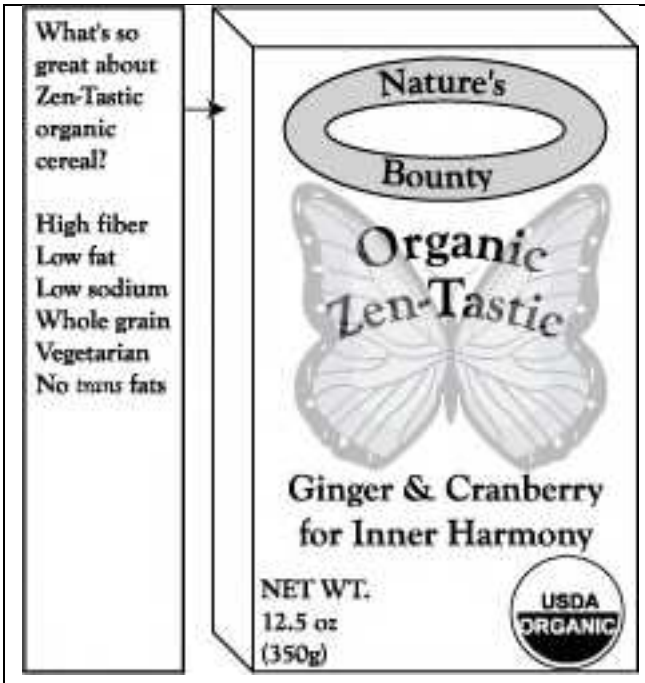
Table 2-7
Reliable Health Claims on Labels
pg 56

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# Worksheet 2-1: Breakfast Cereal Label Analysis

**Instructions:** Compare the "Zen-Tastic" and "Marshmallow Magician" cereals and answer the questions that follow.




INGREDIENTS:
Organic brown rice flour, organic evaporated cane juice, organic rolled oats, organic wheat bran, organic sweetened dried cranberries (organic cranberries, organic evaporated cane juice), organic whole wheat meal, organic soy flour, organic whole oat flour, organic oat bran, inulin, organic soy oil, organic soy fiber, organic molasses, organic barley malt extract, organic yellow corn flour, organic whole millet, organic oat syrup solids, sea salt, organic quinoa, organic ginger, organic buckwheat flour, organic barley flour, organic rice bran extract, organic cinnamon, tocopherols (natural vitamin E), organic cloves, organic nutmeg.

*Produced in a facility that contains peanuts, tree nuts & soy.*

# Nutrition Facts

Serving Size 3/4 cup (55g)
Servings Per Container about 6

| Amount Per Serving | Cereal | Cereal + 125 ml fortified skim milk |
|---|---|---|
| **Calories** | 190 | 230 |
| Calories from Fat | 25 | 25 |
| | **% Daily Value**** | |
| **Total Fat** 2.5g* | **4%** | **4%** |
| Saturated Fat 0g | **0%** | **0%** |
| *Trans* Fat 0g | | |
| **Cholesterol** 0mg | **0%** | **0%** |
| **Sodium** 95mg | **4%** | **7%** |
| **Total Carbohydrate** 41g | **14%** | **16%** |
| Dietary Fiber 9g | **36%** | **36%** |
| Sugars 13g | | |
| **Protein** 5g | | |
| Vitamin A | 0% | 6% |
| Vitamin C | 0% | 0% |
| Calcium | 2% | 15% |
| Iron | 10% | 10% |

* Amount in cereal. One half cup skim milk contributes an additional 40 calories, 65mg sodium, 6g total carbohydrate (6g sugars), and 4g protein.
**Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.

| | Calories | 2,000 | 2,500 |
|---|---|---|---|
| Total Fat | Less than | 65g | 80g |
| Sat Fat | Less than | 20g | 25g |
| Cholesterol | Less than | 300mg | 300mg |
| Sodium | Less than | 2400mg | 2400mg |
| Total Carbohydrate | | 300g | 375g |
| Dietary Fiber | | 25g | 30g |

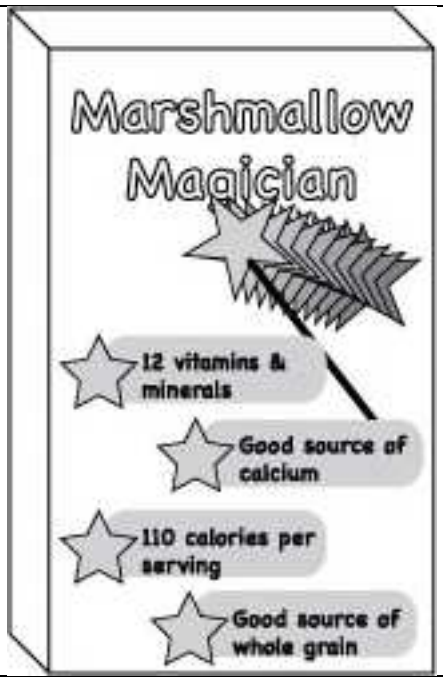
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# Nutrition Facts

Serving Size 3/4 cup (27g)
Servings Per Container about 12

| Amount Per Serving | Cereal | with 1/2 cup skim milk |
|---|---|---|
| **Calories** | 110 | 150 |
| Calories from Fat | 10 | 10 |
| | **% Daily Value**** | |
| **Total Fat** 1g* | **1**% | **1**% |
| Saturated Fat 0g | **0**% | **0**% |
| *Trans* Fat 0g | | |
| Polyunsaturated Fat 0g | | |
| Monounsaturated Fat 0g | | |
| **Cholesterol** 0mg | **0**% | **1**% |
| **Sodium** 190mg | **8**% | **10**% |
| **Total Carbohydrate** 22g | **7**% | **9**% |
| Dietary Fiber 1g | **5**% | **5**% |
| Sugars 11g | | |
| Other Carbohydrate 9g | | |
| **Protein** 2g | | |
| Vitamin A | 10% | 15% |
| Vitamin C | 10% | 10% |
| Calcium | 10% | 25% |
| Iron | 25% | 25% |
| Vitamin D | 10% | 25% |
| Thiamin | 25% | 30% |
| Riboflavin | 25% | 35% |
| Niacin | 25% | 25% |
| Vitamin $B_6$ | 25% | 35% |
| Folic Acid | 50% | 50% |
| Vitamin $B_{12}$ | 25% | 35% |
| Phosphorus | 4% | 15% |
| Magnesium | 2% | 6% |
| Zinc | 25% | 30% |

* Amount in cereal. A serving of cereal plus skim milk provides 1g total fat, less than 5mg cholesterol, 250mg sodium, 250mg potassium, 28g total carbohydrate (16g sugars) and 6g protein.
**Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.




**INGREDIENTS:** WHOLE GRAIN OATS, MARSHMALLOWS (SUGAR, MODIFIED CORN STARCH, CORN SYRUP, DEXTROSE, GELATIN, CALCIUM CARBONATE, YELLOW 5&6, BLUE 1, RED 40, ARTIFICIAL FLAVOR), SUGAR, OAT FLOUR, CORN SYRUP, CORN STARCH, SALT, CALCIUM CARBONATE, TRISODIUM PHOSPHATE, COLOR ADDED, ZINC AND IRON (MINTERAL NUTRIENTS), VITAMIN C (SODIUM ASCORBATE), A B VITAMIN (NIACINAMIDE), ARTIFICIAL FLAVOR, VITAMIN $B_6$ (PYRIDOXINE HYDROCHLORIDE), VITAMIN $B_2$ (RIBOFLAVIN), VITAMIN $B_1$ (THIAMIN MONONITRATE), VITAMIN A (PALMITATE), A B VITAMIN (FOLIC ACID), VITAMIN $B_{12}$, VITAMIN D, VITAMIN E (MIXED TOCOPHEROLS) ADDED TO PRESERVE FRESHNESS.

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1. What are the nutritional claims of each cereal?

2. a. Which cereal has a higher level of fiber?

   b. What is the source of fiber in this cereal?

3. a. Which cereal has a higher % Daily Value of vitamins A and C?

   b. Does this surprise you? Why or why not?

   c. When can the addition of this cereal to a morning meal help add to the overall nutrition for a person during the course of a day?

4. a. What is the source of vitamin $B_6$ in the Marshmallow Magician cereal?

   b. Is it a naturally occurring ingredient?

   c. How can you tell?

5. a. What is "inner harmony" (from the Zen-Tastic package)?

   b. How does this cereal contribute to inner harmony?

6. a. What type of milk is listed in the right side of the Nutrition Facts panel of the Marshmallow Magician cereal?

   b. Does this seem like a reasonable choice for this cereal?

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# Worksheet 2-2: Intake Analysis—More Diet Planning

| **Eating Plan G (1 Day's Intake)** | **Eating Plan H (1 Meal)** |
|---|---|
| 1 cup honey dew melon<br>1 cup fresh strawberries<br>1 large apple<br>½ avocado<br>½ cup sweet green peppers<br>½ cup sweet red peppers<br>¼ cup black olives<br>1 medium orange<br>1 medium banana<br>1 cup boiled green beans<br>10 cooked asparagus spears<br>1 cup sautéed mushrooms<br>1 cup kidney beans<br>¼ cup dried apricots<br>¼ cup dried Craisins<br>5 dried, pitted dates | 1 cup New England clam chowder<br>1 2-ounce cheesy biscuit<br>4 ounces broiled lobster tail<br>4 ounces broiled scallops<br>3 Tbsp. drawn, melted butter<br>1 cup rice pilaf<br>1 cup boiled carrot and green beans<br>12 ounces sweetened ice tea<br>1 cup vanilla ice cream |

**Look at Eating Plan H:**

1. Name the foods that would contribute empty calories to the daily intakes of the person eating this meal.

2. Why are these foods classified as low in nutrient density?

**Look at Eating Plan G:**

3. Which key nutrients are present in very large amounts, and how would you know this?

4. What food choice substitutions would you suggest to reduce these nutrients?

5. What type of diet is represented here?

6. What types of foods could be added to ensure enough minerals and protein?

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# Worksheet 2-3: Dietary Reference Intakes and Food Composition Tables

The **Dietary Reference Intakes** are a collection of 4 nutrient values used for different purposes. Provide the definitions for the abbreviations in your own words. When or why would these values be used?

1. RDA –

2. AI –

3. EAR –

4. UL –

Find the DRI tables in your textbook.

5. How much calcium would a 15-year-old girl need each day? _____

6. How much calcium would a 35-year-old man need? _____

7. How much calcium would a 60-year-old woman need? _____

8. Why do you think these individuals require different amounts of calcium? Think about the body and bone health throughout the lifecycle.

The Dietary Reference Intakes also provide a percentage of carbohydrate, protein, and fat necessary for a balanced diet. These are called the AMDR or Acceptable Macronutrient Distribution Ranges. Fill in the numbers for the ranges.

9. Carbohydrate _____

10. Fat _____

11. Protein _____

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**Food Composition Tables:** Appendix A of the textbook has a food composition table. This will provide detailed information about the nutrient content of foods and beverages. In the next section, you will look up the values for three food items. At the top of each right-hand page in Appendix A, there is a key to locate the various types of foods. Within each section, the foods are listed in alphabetical order. The caloric value is listed as "Ener (cal)." This process could be very tedious and time consuming! Today, we have computer programs that will perform these calculations of an individual's food intake.

12. Case Study: Molly ate the following meal. Total the amount of calories, iron, and vitamin A in her meal. *Hint: Use the food composition table at the end of your textbook.*

| | **Calories** | **Iron (mg)** | **Vitamin A (RAE µg)** |
|---|---|---|---|
| 1 cup 2% milk (with nonfat milk solids) | | | |
| 3 oz. ground beef, lean, broiled well (plain hamburger without bun) | | | |
| 8 raw baby carrots | | | |
| **Totals** | | | |

13. Molly is a 22-year-old female. How much iron and vitamin A are recommended for her? Look in the DRI tables.

14. Molly takes a thiamin supplement that provides 3 mg of thiamin per day. She also takes a vitamin C supplement that contains 5 grams of vitamin C per day. What do you think about this?

    *(Hint #1: Look up the UL values for these nutrients. Some nutrients do not have a UL value. It may be that sufficient research has not been completed to set a UL value. In that case, compare the supplement to the value listed in the main DRI table.)*

    *(Hint #2: Be careful with the measuring units for vitamin C. She is taking 5 GRAMS. The UL for vitamin C is listed in milligrams.)*

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# Worksheet 2-4: Estimating Amounts

**Instructions:** Visually estimate the amounts and USDA Eating Patterns cup/ounce equivalents. Also estimate calories and nutrient density of each food. Guessing is OK!

| | | Nutrient Density (circle) |
|---|---|---|
| McDonald's Big Mac | Ounces of cooked meat: _____<br>Equivalent ounces of grains: _____<br>Calories for the Big Mac: _____<br>Cup(s) of vegetables: _____ | High or Low |
| McDonald's French fries (large) | Cup(s) of vegetables: _____<br>Calories: _____ | High or Low |
| Potato | Approximate volume: _____ cup(s)<br>Calories if baked: _____ | High or Low |
| Taco Bell Bean Burrito | Cup(s) of beans (legumes): _____<br>Equivalent to _____ ounce(s) protein foods or _____ cup(s) vegetables<br>Equivalent ounces of grains: _____<br>Calories for the burrito: _____ | High or Low |
| Fruit drink | Cup(s): _____ | High or Low |
| Apple | Approximate volume: _____ cup(s) | High or Low |
| Green beans | Cup(s): _____ | High or Low |
| Ice cream | Cup(s): _____<br>Equivalent cup(s) of milk: _____ | High or Low |
| Single-serving milk bottle | Cup(s): _____<br>Equivalent cup(s) of milk: _____ | High or Low |
| Teriyaki Stix Rice Bowl | Cup(s): _____<br>Equivalent ounces of grain: _____ | High or Low |
| Peanut butter | Tbsp. peanut butter: _____<br>Equivalent to _____ ounces of meat | High or Low |
| Wheat bread | Ounces of grain: _____<br>The bread is (circle): whole grain or refined grain | High or Low |
| Fat-free salad dressing | Calories in packet: _____<br>tsp.: _____ | High or Low |
| Regular salad dressing | Calories in packet: _____<br>tsp.: _____ | High or Low |

After you have estimated portions, check your responses with the answer key. Think about what you learned by trying to estimate amounts. Write down your new insights:

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# Worksheet 2-5: Guessing Portion Sizes—How Well Can You Do It?

1. Your instructor will set up food at stations around the classroom. You will be told what the food is but you will not be provided with the size or calories of the food shown.
2. You will be asked to estimate the size of the portions of food that you see at each station. There will be a card at each station that will specify the unit of measurement such as ounces (oz.) as fluid or weight, tablespoons, or cups.
3. Estimate the portion on your own to the best of your abilities. Fill in the Estimated Size column of the table.
4. Take a guess at the number of calories for the food at each station as well. Record this in the Estimated Calories column of the table.

| Food Item | Estimated Size | Actual Size | Estimated Calories | Actual Calories |
|---|---|---|---|---|
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5. Your instructor can supply the actual size and calories for you to copy onto your table. Or, given the actual size, you can use an online food composition database, a diet analysis program, or Appendix A in your textbook to find the calorie value of each food.
6. Answer the following questions based on your individual findings. Your answers do not need to be lengthy. Attach your answers to your filled-in table. You may be asked to hand in your answers in written form or your instructor may have you discuss your findings as a group.

**Questions to Consider:**

1. How did you decide on a portion size?
2. What type of visual aids in your everyday life may help you to estimate the portion size?
3. Did you overestimate or underestimate the portion sizes more often?
4. Which types of food did you overestimate? Which ones did you underestimate?
5. Did you have more difficulty measuring liquid or solid volumes?
6. Give an example of how your ability to estimate food portions affects your present diet.
7. What type of foods do you have difficulty estimating in your own diet? Why?

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# Worksheet 2-6: Compare Your Food Intake to Recommended Daily Amounts from Each Group

| List food item and amount. | Indicate amount consumed from each food group, using the appropriate unit of measurement (in parentheses). | | | | | | Estimate values. |
|---|---|---|---|---|---|---|---|
| **Food Item** | **Fruits (cups)** | **Vegetables (cups)** | **Grains (oz.)** | **Protein foods (oz.)** | **Milk (cups)** | **Oils (tsp.)** | **Empty kcalories** |
| *Breakfast:* | | | | | | | |
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| *Snack:* | | | | | | | |
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| *Lunch:* | | | | | | | |
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| | | | | | | | |
| *Snack:* | | | | | | | |
| | | | | | | | |
| *Dinner:* | | | | | | | |
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| | | | | | | | |
| *Snack:* | | | | | | | |
| | | | | | | | |
| **Total consumed** | | | | | | | |
| **Recommended based on EER** | | | | | | | |

Record your eating and drinking intakes for one day. Use the website www.supertracker.usda.gov to enter your intakes. You can see how your diet compares to the latest guidelines.

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# Worksheet 2-7: Homemade or On-the-Go?

Do you have any idea how many calories are in a homemade hamburger versus a hamburger from McDonald's or Wendy's? You can find out! Fast-food restaurants have websites that describe the nutritional content of their popular meals or sides. The following table contains the list for common fast-food establishments and their websites. You can generally click on the "Food," "Menu," or "Nutrition" tab or link within the website to find the nutritional content of all of their items.

| Name | Website URL |
|---|---|
| Arby's | http://arbys.com/ |
| Burger King | http://www.bk.com |
| McDonald's | http://www.mcdonalds.com |
| Pizza Hut | http://www.pizzahut.com/nutrition.html |
| Subway | http://www.subway.com |
| Taco Bell | https://www.tacobell.com/food/nutrition |
| Wendy's | https://www.wendys.com/en-us/nutrition-info |
| KFC (Kentucky Fried Chicken) | http://www.kfc.com |

You can also use Appendix A of your textbook to find the nutritional content of many foods that you can prepare at home. The appendix also lists many brands of frozen, prepared foods that can be warmed at home. If you want to closely examine the nutritional content of your food, you can also consult the USDA database at http://ndb.nal.usda.gov/ndb/search/list.

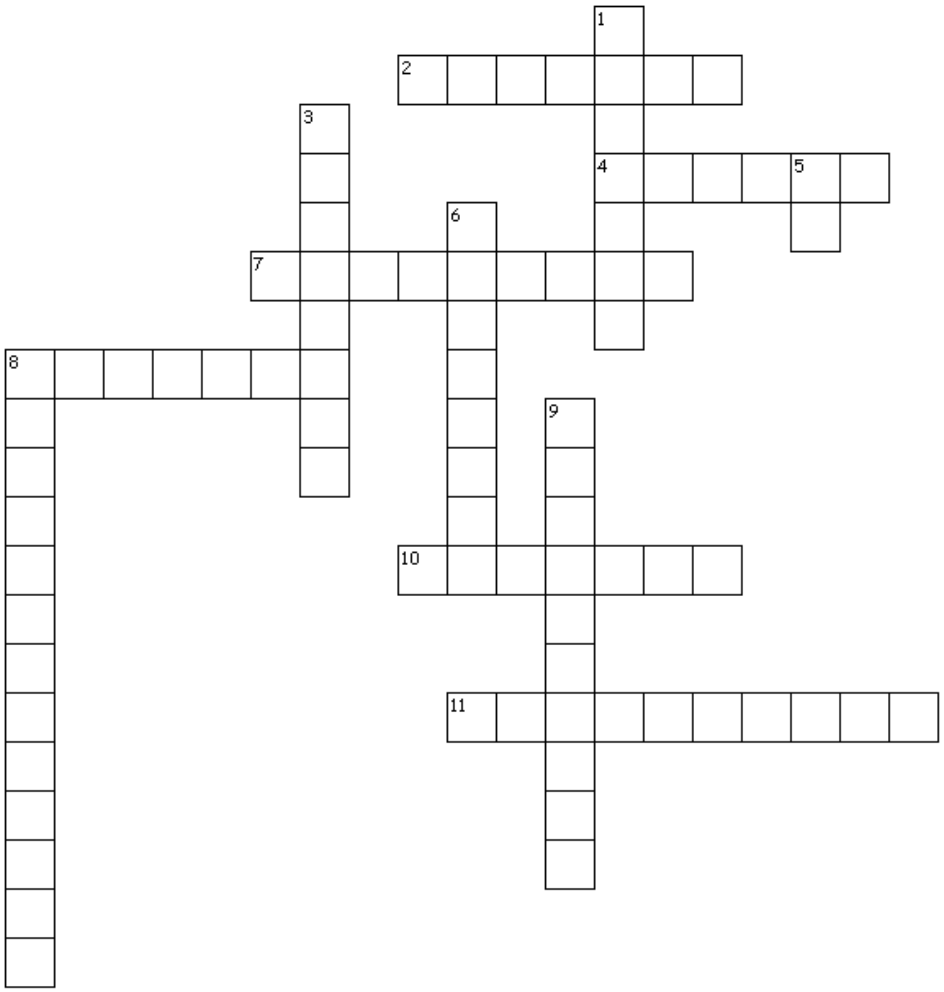
| Food | Source of Food | Total Calories | Total Fat (g) | Total Carbohydrate (g) |
|---|---|---|---|---|
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You can fill out the table to compare foods to each other for calorie, fat, or carbohydrate content. You can also compare the protein, vitamin, or mineral content of foods as well.

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# Worksheet 2-8: Chapter 2 Review Crossword Puzzle[8]




| Across | Down |
|---|---|
| 2. The AMDR for ____ is set between 10% and 35% of total calories.<br>4. The Dietary Guidelines for Americans recommend restricting ____ intakes to 2300 mg per day or less.<br>7. ____, found in butter and steaks, are high in saturated fat and usually not liquid at room temperature.<br>8. The USDA's interactive meal planning/diet analysis tool.<br>10. The information on the Nutrition Facts panel of a food label is based on a specified ____ size.<br>11. Bacteria found in yogurt that may aid digestive tract health | 1. A food's nutrient ____ is a measure of the nutrients it provides per calorie.<br>3. Substance found in tomatoes with anti-cancer properties.<br>5. The nutrition guideline that is useful for those who take supplements safely.<br>6. The intake value set for a nutrient that does not have sufficient data to establish an RDA is called the ____ Intake.<br>8. Healthy ranges for intakes of proteins, carbohydrates, and fats are known as Acceptable ____ Distribution Ranges.<br>9. Antioxidants in blueberries that help protect the brain |

[8] Created with Puzzlemaker at DiscoveryEducation.com

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# Handout 2-1: Most Frequently Eaten Raw Fruits, Vegetables, and Fish/Shellfish[9]

| Fruits | Vegetables | Fish |
|---|---|---|
| Apple | Asparagus | Blue crab |
| Avocado (California) | Bell pepper | Catfish |
| Banana | Broccoli | Clams |
| Cantaloupe | Carrot | Cod |
| Grapefruit | Cauliflower | Flounder/sole |
| Grapes | Celery | Haddock |
| Honeydew melon | Cucumber | Halibut |
| Kiwifruit | Green (snap) beans | Lobster |
| Lemon | Green cabbage | Ocean perch |
| Lime | Green onion | Orange roughy |
| Nectarine | Iceberg lettuce | Oysters |
| Orange | Leaf lettuce | Pollock |
| Peach | Mushrooms | Rainbow trout |
| Pear | Onion | Rockfish |
| Pineapple | Potato | Salmon |
| Plums | Radishes | Scallops |
| Strawberries | Summer squash | Shrimp |
| Sweet cherries | Sweet corn | Swordfish |
| Tangerine | Sweet potato | Tilapia |
| Watermelon | Tomato | Tuna |

[9] Source: FDA, http://www.ecfr.gov/cgi-bin/text-idx?SID=376603691f1f0a4ab5b91be76e7eeb55&mc=true&node=pt21.2.101&rgn=div5#se21.2.101_144 (accessed 2-17-2016)

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