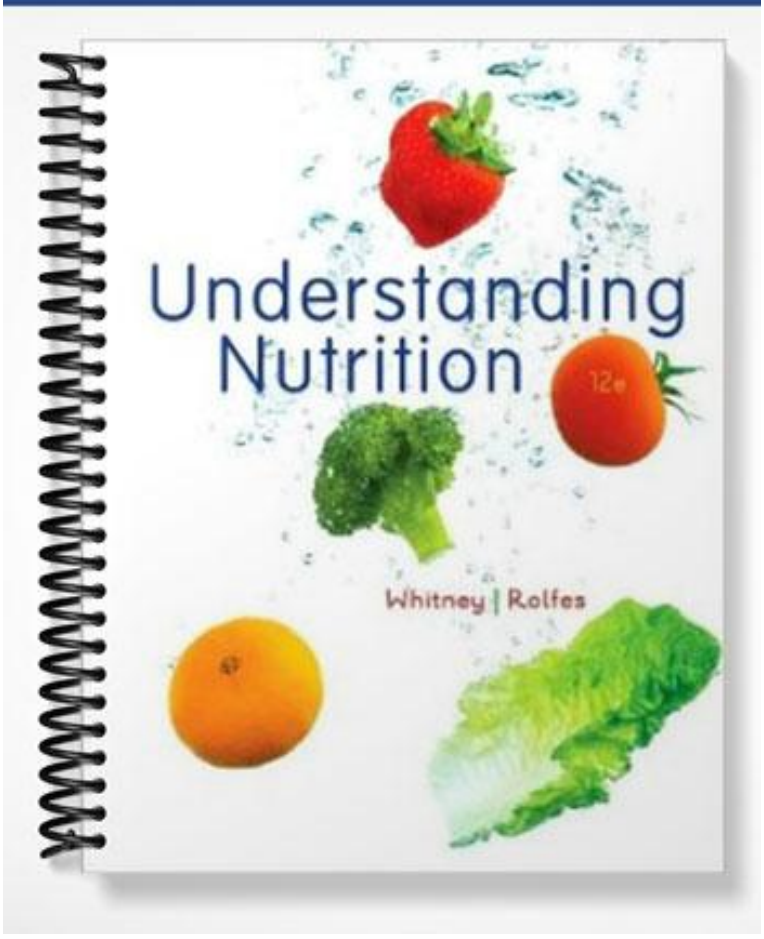
SOLUTIONS MANUAL



Chapter 2 – Planning a Healthy Diet

Learning Objectives

After completing Chapter 2, the student will be able to:

1. List and apply the six principles of diet-planning.
2. Apply the *2005 Dietary Guidelines for Americans* to promote health and prevent chronic disease.
3. Plan a balanced meal using the USDA Food Guide.
4. Identify foods that have a high nutrient density.
5. Explain the uses of the exchange lists.
6. Identify the information required on the food label.
7. Identify the information required on the Nutrition Facts panel.
8. Explain Daily Values and calculate percent Daily Values.
9. Recognize reliable health claims on food labels.
10. List the benefits of a vegetarian diet.
11. Plan a balanced vegetarian diet using the USDA Food Guide and MyPyramid.

Assignments and Other Instructional Materials

The following ready-to-use assignments are available in this chapter of the instructor's manual:

- **New!** Case study
- Worksheet 2-1: Daily Calorie Evaluation[1]
- Worksheet 2-2: Supermarket Worksheet
- Worksheet 2-3: Compare Your Food Intake to Recommended Daily Amounts from Each Group
- Worksheet 2-4: Chapter 2 Crossword Puzzle[2]
- **New!** Worksheet 2-5: Interpreting Food Labels (Internet Exercise)
- **New!** Critical thinking questions with answers

Other instructional materials in this chapter of the instructor's manual include:

- Answer key for How To (pp. 37, 56) activities
- Classroom activities
- Worksheet answer keys (as appropriate)

Visit the book's website (www.cengage.com/nutrition/whitney/understandingnutrition12e) to download:

- Handout 2-1: *Dietary Guidelines for Americans*, 1980 to 2005
- Handout 2-2: A World Tour of Pyramids, Pagodas, and Plates[3]
- Handout 2-3: Healthy Eating Index Components

Lecture Presentation Outline[4]

"Of special interest to..." symbol key: = Hot Topic; = Personal Health; = Health Care Professionals; = Science Majors

Key to instructor resource annotations (shown to the right of or below outline topics):

PL = Available on Power Lecture DVD-ROM (ISBN 0538797592): V = video
TRA = Transparency acetates: 12e TRA = 12th edition, 11e TRA = 11th edition, 10e TRA = 10th edition
Website = Available for download from book companion website: HN = student handout
IM = Included in this instructor's manual: WS = worksheet, CA = classroom activity, CI = Canadian information

[1] Worksheets 2-1, 2-2, and 2-5 contributed by Daryle Wane.

[2] Contributed by Mary A. Wyandt, Ph.D., CHES

[3] Handouts 2-2 and 2-3 contributed by Sharon Rady Rolfes

[4] Contributed by Melissa Langone.

Introductory/whole chapter resources: PL figure JPEGs; Test Bank; IM WS 2-4, CA 2-1, 2-12

I. Principles and Guidelines

Diet planning guides and dietary guidelines are tools that apply principles of good eating and offer practical advice on healthy habits. Using the diet planning tools together allows individuals to plan nutrient-dense, well-balanced diets that provide variety and moderation without excessive energy. Consuming food wisely and practicing healthy habits support overall health.

A. Diet-Planning Principles

1. **Adequacy**—providing sufficient energy and essential nutrients for healthy people.
2. **Balance**—consuming the right proportion of foods.
3. **kCalorie control**—balancing the amount of foods and energy to sustain physical activities and metabolic needs.
4. **Nutrient density**—measuring the nutrient content of a food relative to its energy content.
   a. **Empty-kcalorie foods** denote foods that contribute energy but lack nutrients.
   b. **Nutrition profiling** involves ranking foods based on the nutrients they provide.
5. **Moderation**—providing enough but not too much of a food or nutrient.
6. **Variety**—eating a wide selection of foods within and among the major food groups.

B. *Dietary Guidelines for Americans* PL V "New Dietary Guidelines"; 11e TRA 2; Web HN 2-1, CA 2-6

1. Adequate nutrients within energy needs IM WS 2-1
   a. Consume foods from all food groups and limit foods that can be detrimental to health.
   b. Consume a balanced diet.
2. Weight management
   a. Maintain a healthy body weight.
   b. Prevention of weight gain.
3. Physical activity
   a. Increase energy expenditure and decrease sedentary activities.
   b. Include cardiovascular conditioning, stretching, and resistance exercises.
4. Food groups to encourage – Choose a variety of fruits, vegetables, milk and milk products, and whole grains.
5. Fats
   a. Limit saturated fat, dietary cholesterol, and *trans* fats.
   b. Choose monounsaturated and polyunsaturated fat sources.
   c. Choose lean, low-fat, or fat-free foods.
6. Carbohydrates
   a. Choose those that are high in fiber.
   b. Choose products with a minimal amount of added sugar.
   c. Decrease the risk of dental caries.
7. Sodium and potassium
   a. Choose foods that are low in salt and high in potassium.
8. Alcoholic beverages
   a. Drink in moderation.
   b. Some should not consume alcohol.
9. Food safety
   a. Wash and cook foods thoroughly and keep cooking surfaces clean.
   b. Avoid raw, undercooked, or unpasteurized products.

II. Diet-Planning Guides Website HN 2-2

Food group plans sort foods into groups based on nutrient content. These guides are important in selecting foods for a nutritious diet providing balance, variety, adequacy, and moderation. A combination of whole grains, vegetables, legumes, fruits, meats or meat alternates, and milk products is essential to a healthy diet. Following diet-planning guides can help to meet nutrition and health goals.

A. The **USDA Food Guide** assigns foods to the five major food groups of fruits, vegetables, grains, meat and **legumes**, and milk. PL V "New Food Pyramid"; 11e TRA 3, 4, 5, 6, 7, 8, 9; IM CI 2.1

1. Recommended Amounts
   a. The recommended intake of each food group depends upon how many kcalories are required.
   b. There are different kcalorie requirements for those who are sedentary compared to those who are active.
   c. There are five subgroups of vegetables including dark green vegetables, orange and deep yellow vegetables, legumes, starchy vegetables, and others.
   d. Variety should be a goal when choosing vegetables.
2. Notable Nutrients
   a. Key nutrients for each group.
   b. Allows for food substitutions within a group.
   c. Legumes may be considered a vegetable or a meat alternative.
   d. The typical American diet requires an increased intake of vegetables, fruits, whole grains, and milk and a decrease in refined grains, fat, and sugar.
3. Nutrient-Dense Choices
   PL V "Fast-Food Breakfast Choices," "Choosing Nutrient-Dense Snacks"; IM CA 2-4
   a. Foods can be of high, medium, or low nutrient density.
   b. Must consider energy needs when choosing these foods.
4. **Discretionary KCalorie Allowance** 11e TRA 10
   a. Calculated by subtracting the amount of energy required to meet nutrient needs from the total energy allowance.
   b. Those with discretionary kcalories may eat additional servings, consume foods with slightly more fat or added sugar, or consume alcohol.
   c. For weight loss, a person should avoid consuming discretionary kcalories.
5. Serving Equivalents IM CA 2-5
   a. Cups are used to measure servings of fruits, vegetables, and milk.
   b. Ounces are used to measure servings of grains and meats.
   c. Visualization with common objects can be used to estimate portion sizes.
6. Mixtures of Foods
   a. Foods that fall into two or more groups.
   b. Examples are casseroles, soups, and sandwiches.
7. Vegetarian Food Guide
   a. Reliance on plant foods such as grains, vegetables, legumes, fruits, nuts, and seeds.
   b. Similar food groups and servings sizes.
8. Ethnic food choices fit into the food pyramid IM CA 2-3
   a. Asian examples
   b. Mediterranean examples
   c. Mexican examples
9. My Pyramid – Steps to a Healthier You 11e TRA 11; Website HN 2-3, CA 2-7, 2-9
   a. www.mypyramid.gov
   b. The width of the bands represents the amount that should be consumed.
   c. The pyramid can be individualized for each person.
   d. Web site provides consumer education about making food choices
10. Recommendations vs. Actual Intakes 12e TRA 1
    a. Most consumers do not choose nutrient-dense foods.
    b. The **Healthy Eating Index** measures how well an individual's diet meets the *Dietary Guidelines for Americans* and MyPyramid recommendations.
11. Pyramid Shortcomings
    a. Fails to provide enough information.
    b. Dependent upon website for consumer information.
    c. Overemphasizes and underemphasizes some foods.

B. **Exchange Lists** help to achieve kcalorie control and moderation. IM CI 2.2

1. Foods are sorted by energy-nutrient content.

2. Originally developed for those with diabetes.
3. Portion sizes vary within a group.
4. Food groupings may not be logical.

C. Putting the Plan into Action 11e TRA 12; IM WS 2-3, CA 2-8

1. Choose the number of servings needed from each group.
2. Assign food groups to daily meals and snacks.

D. From Guidelines to Groceries - **Processed foods** have been treated, thus changing their properties. **Fortified** foods have improved nutrition. IM WS 2-2, CA 2-11

1. Grains 10e TRA 18, 19
   a. **Refined** foods lose nutrients during processing.
   b. **Enriched** foods have nutrients added back, including iron, thiamin, riboflavin, niacin, and folate.
   c. **Whole-grain** products are not refined. Examples include brown rice and oatmeal.
   d. Fortified foods have nutrients added that were not part of the original food. IM CI 2.3
2. Vegetables IM CA 2-2
   a. Choose fresh vegetables often.
   b. Dark green leafy and yellow-orange vegetables are important.
   c. Good sources of vitamins, minerals, and fiber.
   d. Be careful to control added fat and salt.
   e. Legumes
      1. Variety is important
      2. Economical
      3. Low-fat, nutrient-rich, and fiber-rich
3. Fruit
   a. Choose citrus and yellow-orange fruits.
   b. Processed fruits are acceptable alternatives to fresh.
   c. Provides vitamins, minerals, fibers, and phytochemicals.
   d. Fruit juices lack fiber but are healthy beverages.
   e. Watch energy intakes and fruit "drinks."
4. Meat, fish, and poultry
   a. Provides minerals, protein, and B vitamins.
   b. Choose lean cuts.
   c. **Textured vegetable protein** is a processed soybean protein and can be used in recipes.
   d. Weighing can be used to determine portion sizes.
   e. Use low-fat cooking methods, and trim and drain fat to reduce fat intake.
5. Milk
   a. Dairy foods are often fortified with vitamins A and D.
   b. **Imitation foods** that resemble other foods are nutritionally inferior.
   c. **Food substitutes** are designed to replace other foods.
   d. Many lower-fat dairy products are available, including **fat-free, non-fat, skim, zero-fat, no-fat, low-fat, reduced-fat,** and **less-fat milk**.

III. Food Labels PL V "Are Food Labels Accurate?"; 10e TRA 20, 21; IM WS 2-5, CA 2-10, CI 2.4

Food labeling is required on almost all packaged foods. Posters or brochures provide nutrition information for fresh meats and produce. The Daily Values (DV) are based on a 2000-kcalorie reference diet. There are requirements and guidelines for ingredient lists, serving sizes, and nutrition facts. Health and nutrient claims must follow FDA-specified criteria. Structure-function claims do not require FDA approval. Consumer education is an important component of the FDA labeling plan.

A. The Ingredient List
   1. All ingredients listed.
   2. Descending order of predominance by weight.
B. Serving Sizes
   1. Facilitate comparisons among foods.
   2. Need to compare to quantity of food actually eaten.
   3. Do not necessarily match the USDA Food Guide.

C. Nutrition Facts
1. Listed by quantity and percentage standards per serving, called **Daily Values**.
2. **Percent Daily Values** for the following are listed on the Nutrition Facts panel:
   a. kCalories listed as total kcalories and kcalories from fat
   b. Fat listed by total fat, saturated fat, and *trans* fat
   c. Cholesterol
   d. Sodium
   e. Total carbohydrate (which includes starch), sugars, and fiber
   f. Protein
   g. Vitamin A, vitamin C, iron, and calcium are listed in % DV only.

D. **The Daily Values (DV)**
1. Estimate of individual foods' contribution to total diet.
2. Based on 2000-kcalorie diet.
3. Can also calculate personal daily values.
4. Ease in comparing foods.

E. **Nutrient Claims**
1. Must meet FDA definitions and include conditions of use.
2. No implied claims.
3. General terms include **free, good source of, healthy, high, less, light** or **lite, low, more,** and **organic**.
4. Energy terms include **kcalorie-free, low kcalorie,** and **reduced calorie**.
5. Fat and cholesterol terms include **percent fat-free, fat-free, low fat, less fat, saturated fat-free, low saturated fat, less saturated fat, *trans* fat-free, cholesterol-free, low cholesterol, less cholesterol, extra lean,** and **lean**.
6. Carbohydrate terms include **high fiber** and **sugar-free**.
7. Sodium terms include **sodium-free** and **salt-free, low sodium,** and **very low sodium**.

F. **Health Claims**
1. Reliable health claims on the FDA "A" list represent clear links between a nutrient and a disease or health-related condition.
2. "B" list health claims have supportive evidence but are not conclusive.
3. "C" list health claims have limited evidence and are not conclusive.
4. "D" list health claims have little scientific evidence to support the claim.

G. **Structure-Function Claims**
1. Claims made without FDA approval.
2. Cannot make statements about diseases.

H. Consumer Education
1. Government education programs.
2. "Healthier US Initiative" Program.

IV. Highlight: **Vegetarian** Diets IM CI Highlight

Vegetarian diets that include a variety of whole grains, vegetables, legumes, and fruits characterize current dietary recommendations. There are many health benefits but also potential problems. With knowledge and careful planning these diets can support growth and good health.

A. Health Benefits of Vegetarian Diets - Lifestyle practices are often different from those of **omnivores.**
1. Healthy body weights are common due to high intakes of fiber and low intakes of fat.
2. Blood pressure is often lower due to lower body weights, low-fat and high-fiber diets, and plenty of fruits and vegetables.
3. Lower incidence of heart disease due to high-fiber diets, eating monounsaturated and polyunsaturated fats, and low intakes of dietary cholesterol.
   a. Inclusion of soy products like **tofu** and tempeh
4. Lower incidence of cancer due to high intakes of fruits and vegetables.
5. Other diseases

B. Vegetarian Diet Planning - Specific information for planning a vegetarian diet can be found at mypyramid.gov.
   1. Those who do not consume milk products or eggs can consume legume, nut, and seed products such as peanut butter, **tempeh,** and tofu. Soymilk can be used as a substitute for cow's milk. 12e TRA 2
   2. Protein
      a. **Lacto-ovo-vegetarians** consume animal-derived products and thus high-quality protein.
      b. **Meat replacements** and **textured vegetable protein** can be used.
   3. Iron - Iron-rich vegetables and fortified grain products consumed with foods that are high in vitamin C can help vegetarians meet iron needs.
   4. Zinc - Consuming legumes, whole grains, and nuts can provide zinc to those who do not consume meat.
   5. Calcium
      a. Calcium is not an issue for the **lactovegetarian**.
      b. Calcium-rich foods should be consumed.
   6. Vitamin B_{12}
      a. **Vegans** may not receive enough B_{12} from the diet.
      b. Consumption of fortified products or supplementation may be necessary.
   7. Vitamin D can come from sunlight exposure or fortified foods.
   8. Omega-3 Fatty Acids - Food sources include flaxseed, walnuts, soybeans, and their oils.

C. Healthy Food Choices
   1. A variety of food is the key to adequacy. Be careful of **macrobiotic diets**.
   2. Meal patterns are changed.
   3. Diet and other lifestyle habits need to be healthy.

Case Study[5]

Sarah T. is a 20-year-old college student who is ovo-vegetarian. She is 5 feet 7 inches tall, weighs 140 pounds, and is physically active most days, riding her bike to and from her apartment off campus. Sarah's mother is concerned she is not getting the nutrients she needs to support her health and energy needs. Her usual daily diet includes toast or cereal with soy milk for breakfast, peanut butter sandwich for lunch, and pasta or vegetable pizza with for dinner. She snacks frequently on chips or cookies and drinks one or two diet sodas each day.

1. Using information from Table H2-1, what key nutrients are likely to be inadequate in Sarah's diet?
2. What additions to her diet would you recommend to increase her intake of these key nutrients?
3. What food planning tool would be useful to help Sarah select a diet that provides all the necessary nutrients for her growth and development?
4. Using information from this chapter, estimate Sarah's daily kcalorie needs and recommended daily amounts of foods that she needs from each food group. Include discretionary kcalories.
5. What key concept does Sarah need to remember when selecting reasonable alternatives to milk?
6. Write a sample one-day meal plan for Sarah that provides meals and snacks that meet her nutrient needs.

Answer Key

1. Protein, iron, zinc, calcium, vitamin B_{12}, vitamin D, and omega-3 fatty acids.
2. Add dark green leafy vegetables (iron and calcium), whole-grain or fortified bread and cereal (protein, iron, zinc); snack on dried fruit and nuts or seeds (iron, calcium); use flaxseed, walnuts, and soybeans or these oils (omega-3).
3. USDA MyPyramid with tips for planning a vegetarian diet.
4. Estimated daily kcalorie needs (Table 2-3): 2400. Recommended daily amounts for 2400 kcal: 2 cups fruit, 3 cups vegetables, 8 ounces grains, 6 ½ ounces meat and legumes, 3 cups milk, 7 teaspoons oil. Discretionary kcalories: 362.

[5] Contributed by Barbara Quinn.

5. Choose products that provide similar nutrients to milk, i.e., those that are fortified with calcium, vitamin D, and vitamin B_{12}.
6. Breakfast: whole-grain cereal with soy milk and fresh fruit. Lunch: whole-grain bread with peanut butter and banana, soy milk. Snack: walnuts and raisins. Dinner: scrambled egg with grilled spinach and other vegetables. Snack: soy yogurt.

Suggested Classroom Activities

The material presented in this chapter provides a great opportunity for classroom discussion. Applying the principles presented in meal planning can be a valuable teaching tool.

Classroom Activity 2-1: Chapter Opening Quiz
Key concept: Introduction to chapter Class size: Any
Instructions: As a way of introducing any new chapter, give a quiz to the class. This is a quiz designed to be projected on an overhead projector. For details, please see Chapter 1, Classroom Activity 1-7.

Classroom Activity 2-2: Exotic Fruit and Vegetable Tasting[6]
Key concepts: Identification of healthy foods, food habits Class size: Any
Materials needed: Assorted fruits/vegetables, cut into small pieces; information about cultivation of these foods
Instructions: Offer bite-size samples of common and unusual fruits and vegetables. You may include kiwi, star fruit and other less common selections. Set up a display featuring information about where the foods are grown and how they are prepared.

Classroom Activity 2-3: An International Luncheon[7]
Key concept: Cultural influences on food habits Class size: Any
Instructions: Try an international luncheon to teach students about food habits of populations outside the United States. Have students research the food habits of a foreign country of particular interest to them and present an oral report to the class. In addition, students should bring a food prepared at home to a potluck luncheon. This activity introduces native foods and traditional customs of countries around the world. Everyone is encouraged to sample all foods.

Classroom Activity 2-4: Discuss Nutrient Density
Key concept: Nutrient density Class size: Any
Instructions: Reinforce the concept of nutrient density by using the comparison of selected nutrients of equal kcalorie amounts of orange juice and oranges. There is considerably more fiber, calcium, iron, and riboflavin in oranges than in orange juice.

Classroom Activity 2-5: Estimation of Food Portions and Serving Sizes[8]
Key concept: Estimation of portion sizes Class size: Any
Materials needed: Pre-measured portions of assorted foods; bowls, cups, and plates of various sizes
Instructions: Students often have difficulty with accurately estimating portion sizes of foods. To overcome this, have students estimate actual food portions in class. Bring pre-measured portions of commonly consumed foods and various-sized bowls, cups, plates, etc. Examples of foods to bring: cooked beef patty, salad, various vegetables, pasta, rice, ready-to-eat cereal, chips, popcorn, margarine, peanut butter, jam. Place these around the room and have students walk around the room and try to estimate the portion sizes. At the same time, discuss how to record food portions, i.e. ounces versus cups, weight versus volume, etc. Then discuss the portion sizes.

Since so many students lack education in food preparation or practical cooking experience, this activity seems to help them estimate portions more accurately.

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[6] Activity provided by: Preventure: Innovative Health Solutions

[7] Activity provided by: Ruth Thornley of West Shore Community College

[8] Activity provided by: Caroline Roberts, Nutrition Education Specialist, California Department of Education, and Instructor, Sierra College, Rocklin

Classroom Activity 2-6: A Nutrition Fair to Promote the *Dietary Guidelines*[9]
Key concepts: application of *Dietary Guidelines for Americans*, USDA Food Guide, and MyPyramid system
Class size: Any
Materials needed: Tables/chairs for booths, large public space in which to present the "fair"
Instructions: Most effective nutrition educational presentations are those that involve active participation. According to Confucius: "I hear and I forget, I see and I remember, I do and I understand." Have students develop a nutrition fair using the *Dietary Guidelines* as a theme. Select a date and location and instruct students to organize activities and materials for different booths that teach each guideline. Each booth must have an activity. Some suggestions for activities include: an exercise quiz, a healthy eating quiz board, a MyPyramid puzzle, an alcohol trivia quiz, and a saturated or *trans* fat reduction program. This activity is beneficial in that it incorporates active participation, self-assessment, and intention to change.

Classroom Activity 2-7: Using MyPyramid.gov
Key concept: Application of diet planning principles using a food group eating plan
Class size: Any
Instructions: Instruct students to go online to MyPyramid.gov. Have them enter their age, gender and activity level and receive their recommended kcalorie intake and food group intakes. Instruct them to access the meal tracking section and use the form to monitor their food intake for 1 to 3 days. You may instruct them to write a 1-2 page discussion regarding what they learned about their food behaviors and any changes they intend to make.

Classroom Activity 2-8: Compare Your Food Intake to Recommended Daily Amounts of Each Food Group
Key concepts: Estimation of portion sizes; food groups Class size: Any
Materials needed: 1 copy of Worksheet 2-3 per student
Instructions: Provide students with a copy of Worksheet 2-3. Instruct them to calculate their estimated energy requirement (EER). 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 daily amounts of each food group based on their EER (see text Table 2-3 for recommendations). Discuss ways that they can improve their dietary habits.

Classroom Activity 2-9: MyPyramid Jeopardy![10]
Key concepts: Food groups from MyPyramid/the USDA Food Guide
Class size: Any
Materials needed: Jeopardy! game board; cards with questions prepared by instructor
Instructions: Create a Jeopardy! game board with six category columns. Each column should have a category name (i.e. grains, discretionary kcalories, 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. It creates an atmosphere for application and fun!

Classroom Activity 2-10: Label Analysis[11]
Key concept: Reading/interpreting food labels Class size: Any
Instructions: Have students bring in boxes, cans, or any package with a label. Examine and discuss the Nutrition Facts panel and ingredients. This activity helps students become more aware of the terms on labels. For example, on the label for Breyers Mint Chocolate Clip Double Churned ice cream, the ingredients are:

[9] Adapted from: M. Link-Mullison, and N. L. Anderson, Hands-on activities to increased learning about the Dietary Guidelines, *Journal of Nutrition Education*, (1995) p.27.

[10] Activity provided by: Don Simpson, University of Arkansas, Fayetteville

[11] Activity provided by: Pat Rogers, Allan Hancock College

Milk, skim milk, sugar, chocolate flavored chips (sugar, coconut oil, cocoa (processed with alkali), milk fat, soy lecithin (as an emulsifier), natural flavor), cream, corn syrup, natural flavor, cellulose gel, mono & diglycerides, guar gum, carob bean gum, cellulose gum, carrageenan, vitamin A palmitate.

You can talk about guar gum being made up of non-ionic polydisperse rod-shaped polymers. Guar gum is an economical thickener and stabilizer.

When students bring in the labels, they usually become more involved in learning. Also, many times they bring in new products that the instructor may not have seen yet, which facilitates learning for the instructor as well as the student.

Classroom Activity 2-11: Discuss How Advertisements Influence Food Choices
Key concept: Media influences on food habits Class size: any
Instructions: The campaign to enhance the public image of milk (Got Milk, the milk mustache) is an example of a successful image campaign. Encourage students to name other food campaigns and discuss their nutrition merits.

Classroom Activity 2-12: Newspaper Articles[12]
Key concept: Evaluation of nutrition information from the media Class size: Any
Instructions: Have students collect current newspaper articles about nutrition and post them on the classroom bulletin board. This activity encourages discussion of current nutrition topics, which helps bring the lectures and readings into the students' lives. The county nutritionist is also an excellent resource for nutrition information. Ask him or her to discuss various county nutrition programs or conduct a food demonstration for the class.

How To "Try It!" Activities Answer Key

How to Compare Foods Based on Nutrient Density
The steak has a nutrient density of only 0.000517 mg thiamin per kcal, whereas the broccoli has a nutrient density of 0.00185 mg thiamin per kcal, making it 3 ½ times as nutrient dense with respect to thiamin.

How to Calculate Personal Daily Values
% DV for food label (p. 54) based on 1800-kcal diet: total fat = 2% (1.67%), saturated fat = 0%, *trans* fat = 0%, cholesterol = 0%, sodium = 10%, total carbohydrate = 9% (8.52%), and dietary fiber = 7% (7.25%).

Critical Thinking Questions[13]

These questions will also be posted to the book's website so that students can complete them online and e-mail their answers to you.

1. Clients will often approach the RD, bewildered as to how to select, plan, and prepare a healthy diet for themselves or their families. Using yourself as an example, discuss the six basic principles of diet planning and how they apply to your dietary intake.

   Answer: The six diet planning principles are adequacy, balance, kcalorie (energy) control, nutrient density, moderation, and variety. In allowing the student to use their dietary habits as an example in conjunction with these principles, the feedback will be individualized. However, this is an opportunity for the instructor to examine any irregularities in the students' eating patterns, given that some nutrition students at one time or another suffer from eating disorders.

   Within the discussion of each principle, the student should address the following:

   Adequacy: The diet provides a sufficient quantity of calories for energy and macro- as well as micronutrients to meet the needs of the individual and all individuals consuming the dietary plan.

   Balance: The diet retains a sufficient balance of foods from each food category, which again serves to provide a broad spectrum of nutrients for growth and health as well as calories for energy.

[12] Activity provided by: Cathy M. Pippin of Northeast Mississippi Junior College

[13] Contributed by Kathleen Rourke.

kCalorie (Energy) Control: Dietary planning for one individual is quite different than planning for a group. When discussing this category, we are discussing calories or energy to sustain one's body needs as well as physical activity. When controlled, the individual will maintain a consistent body weight; when out of control, one will either gain or lose weight. Students should distinguish between planning for an individual vs. planning for a group of people.

Nutrient Density: This term refers to the significance of the nutrient quality and quantity relative to the amount of energy. The greater the nutrient quality and quantity for the lesser number of calories, the greater the nutrient density. For example, the nutrient density of a baked potato is greater than that of French fries. When developing a dietary plan, the greater the selection of nutrient-dense foods in the diet, the greater the likelihood that the diet will also retain the principles of adequacy, balance, and calorie control.

Moderation: This is a key phrase of the American Dietetic Association and one that all individuals can benefit from. Individuals who undergo a "diet" often feel deprived because they will (or a specific diet plan will) exclude certain foods such as cakes, cookies, etc. These are special foods that individuals particularly enjoy for a special occasion or event. If an individual's mindset is that they should not have that food, then often one taste of any special food will lead to "binging" or overeating and a cycle of denial and overeating.

The approach that "all foods fit" allows individuals to recognize that it is not any particular food that is a problem but the amount of the food that becomes a problem. The RD works with clients to help them to understand that they can enjoy all the foods that they have always enjoyed (except if there are medical issues requiring restrictions); moderation is the key!

Variety: This term again echoes the above terms of balance and adequacy. An individual that emphasizes a variety of foods in the diet has, in general, a greater assurance that there is enough balance and adequacy of types of foods to provide for a diet rich in all macro- and micronutrients. A diet that is varied is also a diet that is colorful, retains many types of textures and flavors, and sparks curiosity in the individual about new food customs, cultures, and cooking methods.

As the student and the client will see, using these six principles of diet planning can serve to make the process of meal planning fun, exciting, and interesting and add to many new cooking techniques in the kitchen! Enjoy.

2. Discuss the key recommendations of the *Dietary Guidelines for Americans 2005* and differentiate these guidelines from the *Canadian Guidelines for Healthy Eating*. Do you have a preference as to which one you would use with clients?

Answer: The recommendations of the *Dietary Guidelines for Americans 2005* are similar to those of the Canadian guidelines; however, the American guidelines are much more detailed and specific. The American guidelines do emphasize two areas that are quite different from the Canadian guidelines: Adequate Nutrients within Energy Needs and Food Safety.

More specifically, the American guidelines include the following categories with specific details outlined in each category:

Adequate Nutrients within Energy Needs – Consume a variety of nutrient-dense foods, think back to basics, and use moderation. Discourage *trans* and saturated fats, cholesterol, added sugars, salt, and alcohol.

Weight Management – Maintain body weight. Prevent gradual weight gain by decreasing food and beverage kcalories and increasing physical activity.

Physical Activity – Maintain regular physical activity to promote health and psychological well being. Also include cardiovascular conditioning, strength training, and stretching exercises for flexibility.

Food Groups to Encourage – Fruits, vegetables, and whole grains.

Fats – Consume less than 10% of kcalories from saturated fats and less than 300 mg of cholesterol per day. Keep total fat intake to less the 35% of kcalories. Choose monounsaturated and polyunsaturated fats.

Carbohydrates – Choose fiber-rich fruits, vegetables, and whole grains. Add little sugar. Reduce dental caries by regular visits to a dentist and good oral hygiene.

Sodium and Potassium – Select and prepare foods with little salt and consume potassium-rich foods.

Alcoholic Beverages – If you drink, do so in moderation. Some people should not drink.

Food Safety – Keep foods safe; clean hands; and separate raw, cooked, and ready-to-eat foods. Cook foods to safe internal temperatures. Chill perishable food promptly. Avoid unpasteurized milk and products made from it, and raw or undercooked eggs, meat, poultry, fish, and shellfish.

The Canadian guidelines, while simple, do cover most of these areas without the specific detail:

- Enjoy a variety of foods.
- Emphasize cereals, breads, other grain products, vegetables, and fruits.
- Choose lower-fat dairy products, leaner meats, and foods prepared with little or no fat.
- Achieve and maintain a healthy body weight by enjoying regular physical activity and health eating.
- Limit salt, alcohol, and caffeine.

Depending on how much detail you as the instructor are looking for, I would suggest that if the student can recall the broad categories and some of the other more detailed information in each category for the American guidelines, the answer would be credit worthy. Also, it is always good to have a dietetics student be able to address their preferences as to use of a particular product or instrument and to give some evidence-based rationale for their answer. This is the rationale for the final question.

3. MyPyramid is a popular graphic source for nutrition information. In fact, it is so popular that it has been duplicated as a graphic for exercise information, vegetarian diets, etc. Given its popularity, it would appear that MyPyramid is the best pictorial to teach consumers nutritional information. Would you agree or disagree? Why? After you have stated your own personal argument, consider the other perspective and discuss why someone would take this perspective.

   Answer: Pros: Here, I have asked the students to discuss the pros and cons of MyPyramid from a slightly different approach. Moreover, this should help the student understand another's thoughts when the student does not generally agree with another person (perhaps a client). In the discussion, the student can simply use the discussion from the text or the student can expand much further into the politics and environmental issues as well as other issues that influenced the final outcome of MyPyramid. The following are acceptable:

   MyPyramid is a quick and easy tool that can be used by a wide variety of practitioners to help teach clients about the basic principles of diet and dietary planning. As noted, it has been duplicated to be used in a variety of areas related to diet such as exercise, children's nutrition, ethnic foods, etc. This versatility is particularly helpful if there are language barriers. It is also a colorful and attractive presentation that can be used as a poster for motivational purposes in a gym, kitchen, etc. Because of its simplicity, pocket cards with some detail on the back can be used for grocery shopping as well.

   Simplicity is also important for individuals that may have difficulty in a variety of different concepts. Even the smartest individual can have difficulty understanding some of the basic principles of nutrition; therefore, this simple guide is helpful as a teaching tool for clients/patients. As opposed to the prior Food Pyramid (for individuals that had seen it), this one does not put foods in a hierarchy, which was confusing to many individuals. Therefore, this aspect of MyPyramid is also much easier for the average consumer to understand and/or relate to.

   Cons: The simplicity of MyPyramid has its benefits and its disadvantages! Very little information is conveyed by MyPyramid, leaving much education work to the dietitian. This may be fine, but what happens when a consumer decides not to go to the RD and to try to make sense of MyPyramid on their own? Then putting all the key information together with the schematic is much more difficult and leaves much room for poor dietary decisions. A good pictorial must come with specific and consistent information that consumers can understand and rely on as accurate information.

   The text points out that some foods are "underemphasized and others overemphasized." For the student that follows the politics of the making of MyPyramid, one understands that much debate and political lobbying goes into the process prior to the final decision. While the overall goal is to assist the U.S. population in advancing their health status through nutrition, there are many roads to accomplish that goal. The federal government must be cognizant and open to all of these venues and ferret out the roads that are unacceptable. Therefore, while whole grains might deserve more attention, beef growers in America get more attention because of their political role in the American marketplace. It is helpful for the instructor to point out these factors to nutrition

students while they are studying these concepts, as during their careers political forces will always be factors that the students will have to work with to advance their careers and their cause.

The role of MyPyramid is to address the dietary needs for health of the majority of the population. Therefore, any nuances in one's diet are not addressed. Again, for an uninformed consumer, this pictorial can be confusing and problematic because it lacks any detailed information. Some general areas here would be food allergies or intolerances, specific micronutrient needs, etc.

4. Food manufacturing and technology continue to grow in sophistication. While one can certainly debate about the pros and cons of such growth, there is no doubt that consumers are often confused about the different labels given to the different types of processed foods! (a) In a few sentences, describe each of the following: fortified, refined, enriched, whole grain, and textured vegetable protein. (b) What are your thoughts on how these types of foods fit into the diet of the American consumer?

Answer: (a) Fortified: This process adds nutrients to improve the nutrient content of the product. Processing depletes some of the nutrients from the grains used for bread, etc. (water-soluble vitamins are very heat sensitive); therefore, the product is fortified with the nutrients lost in the processing. *Fortified* means that the food products would receive not only those nutrients lost but other nutrients as well.

Refined: This indicates that the nutrients lost during the processing are not added back to the product. Foods are refined to aid in their "shelf life" or for storage capacity at the grocer or market.

Enriched: This indicates that nutrients lost during food processing are added back. Individuals frequently use *enriched* and *fortified* interchangeably, but fortified foods do have additional nutrients other than those lost added into the food product.

Whole grain: These products *must* be rich in fiber and retain all the nutrients found in the original grain.

Textured vegetable protein: This is a soybean product that generally tastes like a meat product and is used for soy burgers, etc.

(b) This question is searching for the student to understand the concept that "all foods fit." Regardless of anyone's personal belief system, the RD will still come into contact with many types of consumers and their goal should be to move that consumer into a direction of healthy food choices and moderation of processed food products, when possible. Therefore, the instructor should be looking for the student to discuss a consumer diet that is full of fruits and vegetables, lean meats, dairy products, and whole grains as well as processed foods for busy days (variations for vegetarians and medical therapeutic diets should also be considered). When processed foods are used in combination with other foods, and the student creates a diet with variety and healthful choices, that is nutrient dense.

5. To fully gain command of their dietary intake, consumers should know how to read food labels. Many find reading food labels very confusing. Why do you personally believe that consumers find food labels hard to read? Describe how you, if you were an RD, would educate your client on reading a food label. What do you think would be your priority point of education for your client?

Answer: Here, the student is about to take a variety of approaches to the same end. The first question concerning why they think consumers find reading food labels confusing or difficult is posed to get the student thinking about how their clients will approach a task as opposed to them as the student. There are of course many factors, such as many foreign terms, many terms that sound like math (which many individuals instantly "turn off to"), all sorts of numbers that appear to have no relationship to each other, and servings that are difficult to picture. The student can probably present many more factors.

Again, here the students' approach will be variable. However, their approach should be systematic. The student should begin with gaining a full understanding of the client's ability to comprehend the terms, calculate simple equations, read, and write. It is important for students to know that we continue to retain a significant problem with illiteracy in our country. The more the student understands the client's basic abilities, the greater their chance in being able to educate the client. The student would also want to have assessed the client's caloric needs and any medical nutrition therapy necessary. Then, it is very important that the client has a very clear understanding of what a serving size is for each food group and type of food. This may be a session or more in

itself before the student can begin to help the client to understand each term and its importance. Much of this can also be done with the serving sizes and food models and then duplicated again for better recall. The student might use MyPyramid or the Exchange System to help the client understand each food group, its serving size, and the nutrients acquired from that food group. Finally, the student can move into working with the client on calculating their personal Daily Values. For some clients, the student may only want to give some examples or estimates or what the client should be looking for on the food label, as the client may not be able to calculate their daily needs. This is why it is very important that one be very familiar with the client prior to undergoing this educational session.

This final question may be a bit variable but I believe that knowing the serving size for each different food item is extremely important. It is very clear from the literature that most Americans do not know appropriate portion sizes for food groups, particularly with the advent of the "biggie size" generation. This has been an area that has led to the dramatic rise in obesity.

6. As noted in your readings, describing a vegetarian diet is somewhat like describing a typical American diet; there are many varieties. Please describe the types of vegetarian diets one might come into contact with and provide a short synopsis on the food plan that would be followed.

   Answer: Vegetarian diets fall into the following categories:

   Lacto-ovo-vegetarian: Use plant foods as well as milk and eggs in their diet. This diet is best able to supply protein and nutrient needs among the vegetarian dietary groups.

   Lactovegetarian: This group uses no milk products and therefore must use milk replacement products such as soy milk, rice milk, etc. and requires regular assessment of their calcium nutrition. Soy products are a good supplement for this group.

   Vegans: This group consumes no animal products of any type, including eggs and milk. Vegans must be watched for deficiency of vitamin B_{12} in addition to calcium.

   Macrobiotic diet: There are many versions of this diet, some that can be quite extreme, including nothing but rice and water. As outlined in your text, the macrobiotic diet is part of a spiritual journey that does include a better-rounded dietary plan of fish, fruit, nuts, and seeds, and its present-day version does support better health than its prior versions.

7. Discuss the rationale why consumers/clients select to pursue a vegetarian dietary plan as well as the health benefits of following a vegetarian diet.

   Answer: While there can be many personal or philosophical as well as religious reasons why an individual may select a vegetarian dietary plan, the majority of rationales fall into the following categories:
   - Sustainable agriculture or ecological responsibility
   - Animal rights or philosophical concerns
   - Physical health or lower-fat and higher-fiber diet
   - Financial or cost of meat and processed foods
   - Diet followed by one's spiritual belief system

   Significant literature has demonstrated that a well-balanced vegetarian diet can result in better weight control, lower blood pressure, and reduction of heart disease for the individual following the diet. In addition, a reduction in the incidence of cancer, most specifically the colon, has been noted in individuals following a vegetarian diet. Dietary benefits have also been noted in diseases such as diabetes, osteoporosis, diverticular disease, gallstones, and rheumatoid arthritis.

8. Discuss nutrients that an RD should be careful to assess for and discuss with a client pursuing a vegetarian program to ensure that their dietary plan allows for sufficient quantities of that nutrient.

   Answer: When working with a vegetarian client, the RD should be particularly attentive to their sources of food that provide for sufficient intake of the following nutrients:

Protein, iron, calcium, zinc, vitamin B_{12}, vitamin D, and omega-3 fatty acids. For the most part, well-planned vegetarian diets can provide these nutrients in sufficient supply.

Iron and calcium are two nutrients that can bind to other nutrients and can be difficult to obtain in the lactovegetarian and vegan diets, respectively. However, both nutrients are absorbed by the body in greater quantity when the body reservoir is lower and absorption can be enhanced by other nutrients (in the case of iron, vitamin C, and in the case of calcium, phosphorus balance, lack of binders, and need). This, in addition to careful selection of iron- and calcium-dense foods, can support a healthy diet.

Zinc is in plentiful supply in most plant sources, including legumes.

Vitamin D is readily available or activated by sunlight. Given that most vegetarians are very active, vitamin D should not become a problem but should be assessed, particularly in the northern climates and homebound individuals.

Omega-3 fatty acids found in algae, flaxseed, walnuts, and soybeans should be included in a vegetarian diet. Pay particular attention to dietary intake of these food products if the individual is not taking a dietary supplement.

IM Worksheet Answer Key

Worksheets 2-1, 2-2, and 2-3 – Answers will vary.

Worksheet 2-4: Chapter 2 Crossword Puzzle

1.	variety	4.	moderation	7.	balance	10.	Exchange Lists
2.	Daily Values	5.	enriched	8.	refined		
3.	health claims	6.	adequacy	9.	fortified		

Worksheet 2-5: Interpreting Food Labels (Internet Exercise)

1.	True	3.	True	5.	False	7.	True
2.	False	4.	False	6.	False		

8. a. 570 calories; b. low calorie food source; c. moderate calorie food source; d. high calorie food source; e. low nutrient food source; f. high nutrient food source; g. high fiber content; h. low in saturated fat content; i. high in calcium content; j. 420 calories; k. low in calories, saturated fat, high in fiber and calcium compared with meatloaf

Canadian Information[14]

2.1 Eating Well with Canada's Food Guide[15]

In 2007, after considerable research and consultation with key stakeholders, non-government organizations, academics, health professionals, government, industry, and consumers, Health Canada released a new food guide, *Eating Well with Canada's Food Guide*. A discussion of your students' perspectives on the broad range of stakeholders who contributed comments to development of the new food guide may be of interest to your students. Background information on the range of evidence and process used in revising the Food Guide, as well as a history of the Food Guide, is provided on Health Canada's web site.[15]

Eating Well with Canada's Food Guide is found in Appendix I of the textbook. You will find the familiar rainbow design handy for emphasizing the Vegetables and Fruit and Grain Products food groups. This is particularly useful for athletes with higher energy needs who should include good sources of complex carbohydrate. If you have plastic food models available, use them to teach the concept of serving size. Alternatively, you can bring in common measuring utensils (e.g., teaspoon, tablespoon, measuring cup) along with some foods (e.g., a variety of breakfast cereals, beverages), and have the students bring in some of their favourite dishes (mugs, glasses, plates, bowls). Use

[14] Contributed by Gail Hammond.

[15] Health Canada. *Eating Well with Canada's Food Guide*. Available at: www.hc-sc.gc.ca/fn-an/food-guide-aliment/index-eng.php.

both the standard measures and the dishes to estimate serving sizes. The number of servings recommended for the food groups in the Food Guide often seem large until students realize the amount of different foods that they normally eat in a meal may be equal to two or three Food Guide servings. Before the term begins, you can order colour hardcopies of *Eating Well with Canada's Food Guide,* enough to give each student at least one copy (some students may want additional copies to give to family, friends, or roommates). You can order directly from Health Canada (www.hc-sc.gc.ca/home-accueil/contact/pubs-eng.php) or request copies through your local health unit. Alternatively, you can request that your students download a PDF version of *Eating Well with Canada's Food Guide* (www.hc-sc.gc.ca/fn-an/food-guide-aliment/order-commander/index-eng.php#3) to bring to class for discussion.

In 2007, Health Canada published *Eating Well with Canada's Food Guide – First Nations, Inuit and Métis*. This national food guide was created to reflect the values, traditions, and food choices of Aboriginal populations. It includes both traditional foods and store-bought foods that are generally available, affordable, and accessible across Canada and provides unique images and content. A ready-to-use PowerPoint presentation with speaker's notes is available for educators at: www.hc-sc.gc.ca/fn-an/food-guide-aliment/educ-comm/_fnim_pnim/ppt-eng.php.

Eating Well with Canada's Food Guide: A Resource for Educators and Communicators (www.hc-sc.gc.ca/fn-an/food-guide-aliment/educ-comm/index-eng.php) is one of several useful print and interactive web-based tools from Health Canada on the Food Guide. This booklet provides background information, tips, and tools for learning about the recommendations presented in the Food Guide. Of particular interest to your students may be the "Tips for Consumers" sections that help Canadians follow the recommendations in Canada's Food Guide to eat well and be active every day. You can direct your students to access and read the booklet online in order to gain a strong understanding about the food guide.

From the *Eating Well with Canada's Food Guide* web site[15] you can learn the basics about the Food Guide—for example, the number of daily servings recommended for each food group, typical serving sizes, how to make the most of your food choices, how to read food labels, and ideas for incorporating physical activity in your day; students can use the "My Food Guide" tool to prepare their own personalized version of the Food Guide, a resource they may want to put up on their fridge at home; you can find ideas for planning meals, going shopping, eating out, and managing other influences on your food choices; and the "Frequently Asked Questions" section covers a broad range of topics about the Food Guide. You can also take a guided tour through the Food Guide.

Students may find interest in linking their Food Guide learning with the EATracker[16] dietary and activity assessment program offered by Dietitians of Canada.

Key healthy eating messages were incorporated to a greater degree in the new food guide, *Eating Well with Canada's Food Guide.* As a result of consultations between the Federal/Provincial/Territorial Group on Nutrition (this group includes representation from each provincial and territorial health department or departments responsible for health with responsibility for nutrition) and the Network on Healthy Eating (this network includes representatives from national organizations/associations, advocacy groups, industry, marketing boards, and health charitable organizations with an interest in nutrition), and release of basic food guidance included in *Eating Well with Canada's Food Guide*, Health Canada decided not to update *Canada's Guidelines for Healthy Eating* and *Nutrition Recommendations for Canadians (1990).* These two resources formed a foundation and supported the messages in the previous food guide, *Canada's Food Guide for Healthy Eating (1992)*.

Activities

Your students can compare *Eating Well with Canada's Food Guide* and the personalized version, *My Food Guide,* to the USDA Food Guide and the personalized version, MyPyramid, found in the textbook. They should note differences between the Canadian and American food guidance systems. The Canadian food guide has a single food group for vegetables and fruit, whereas the American food guide separates vegetables and fruit into two food groups. Of further note, *Eating Well with Canada's Food Guide* and *My Food Guide* use food group servings defined by weight and/or volume, whereas cups and ounces are used to define amounts of foods to choose from each food group in MyPyramid. Students will also note there is a recommendation to include 2-3 Tbsp of oils in *Eating Well with Canada's Food Guide* whereas oils are a category found with the 5 food groups in the six coloured bands of

[16] Dietitians of Canada. *EATracker*, an eating and activity tracker tool. Available at: www.dietitians.ca/public/content/eat_well_live_well/english/eatracker.

MyPyramid. Students can also compare their food intake for one day to the various recommendations found in *Eating Well with Canada's Food Guide* and use the *My Food Guide* feature to create their own daily food guide.

Print a variety of food guides from different countries around the world. Ask students to discuss the similarities and differences between the various food guides. Is there a common theme of food choice among different countries? What are some striking differences between the food guides?

Diet Planning Using *Eating Well with Canada's Food Guide*

Canadian instructors who teach diet planning should use Tables 2.1 and 2.2 below, instead of Table 2-2 on page 42 of the textbook. Table 2.1 provides a plan for the number of servings recommended in each of the four food groups for a female between 19 and 50 years of age. Table 2.2 provides a plan for the number of servings recommended in each of the four food groups for a male aged between 19 and 50 years.

Table 2.1 Diet Planning for a 19- to 50-Year-Old Female Using *Eating Well with Canada's Food Guide***

Food Group & Servings	Breakfast	Lunch	Dinner	Snack
Vegetables and Fruit – Choose 7–8 servings per day.	1	2	3	1
Grain Products – Choose 6–7 servings per day.	2	1	2	1
Milk and Alternatives – Choose 2 servings per day.	1		1	
Meat and Alternatives – Choose 2 servings per day.		1	1	

*Include 2-3 Tbsp of oil in your food choices each day.

Table 2.2 Diet Planning for a 19- to 50-Year-Old Male Using *Eating Well with Canada's Food Guide***

Food Group & Servings	Breakfast	Lunch	Dinner	Snack
Vegetables and Fruit – Choose 8–10 servings per day.	2	2	3	2
Grain Products – Choose 8 servings per day.	2	2	2	2
Milk and Alternatives – Choose 2 servings per day.	1		1	
Meat and Alternatives – Choose 3 servings per day.	1	1	1	

*Include 2-3 Tbsp of oil in your food choices each day.

2.2 Exchange Lists for Diet Planning

On page 47 and in Appendix G, the textbook refers to the use of exchange lists for planning diets in the United States. *Beyond the Basics: Meal Planning for Healthy Eating, Diabetes Prevention and Management* is the current meal planning guide used in Canada in place of exchange lists. This guide was developed to align with *Canada's Food Guide to Healthy Eating* by the Canadian Diabetes Association (CDA) in consultation with health care professionals representing a wide variety of expertise. *Beyond the Basics* updates the CDA resource, *Just the Basics: Meal Planning for Healthy Eating, Diabetes Prevention and Management. Beyond the Basics* is found in Appendix I and can be ordered through the Canadian Diabetes Association at: www.diabetes.ca/for-professionals/resources/nutrition/beyond-basics.

2.3 Food Fortification in Canada

"From Guidelines to Groceries" notes the nutrient enrichment of foods in the United States. Notable examples of enriched food groups are grains and milk, on pages 48-51 and 53, respectively. Before calculating food intakes or reading food labels, you should alert students to the differences between Canadian and American policies on the addition of nutrients to foods. You may want to refer to this information when teaching individual vitamins and minerals in Chapters 10, 11, 12, and 13 or consumer issues in Chapter 19.

Sections B (Foods) and D (Vitamins, Minerals and Amino Acids) of Canada's *Food and Drug Regulations* specify the foods to which nutrients may or must be added and the amounts that may be added. A summary of this information is available from the Canadian Food Inspection Agency (CFIA).[17] In 2005, following an extensive review of food fortification policy and practices in Canada, Health Canada released its final document outlining policy and implementation plans for the addition of vitamins and minerals to foods.[18] The policies proposed bring greater trade harmonization between food fortification policies in Canada and the United States for different food categories. The policies allow food manufacturers discretionary, but regulated, use of nutrient fortification in a wider range of food products. The proposed policy attempts to protect consumers from inadequate and excessive nutrient intakes while providing consumers with a choice of a variety of fortified foods. Vitamin and mineral addition to foods is permitted under the following broad categories:

1. Vitamin and mineral addition is permitted to maintain and improve the nutritional quality of the food supply through (i) restoration, and (ii) nutritional equivalence of substitute foods.
2. Food fortification programs will be used to correct and/or prevent nutritional problems of public health significance.
3. Discretionary fortification, the optional addition of any nutrient from a defined list of vitamins and minerals over defined ranges at the discretion of manufacturers, is expanded to allow for a wider range of fortified products, which would provide for more food sources of nutrients without increased risk to health.
4. The category of special purpose foods is broadened to allow the formulation of a greater variety of products designed for people who may require them for special nutritional purposes.

The difference in national fortification regulations means that the nutrient composition of some foods sold in Canada differs from that of similar foods sold in the United States (e.g., breakfast cereals). Thus, nutrient values from food composition tables and computerized nutrient analysis programs based on the United States Department of Agriculture (USDA) food database, such as *Diet Analysis +* and *MyDiet Analysis*, will not accurately reflect the nutrient content of all foods consumed in Canada. Breakfast cereals are common examples of this difference. This is especially true for vitamins A and D and the mineral iron that can be higher in cereal products sold in the United States. With the new discretionary fortification policy stated in Health Canada's proposed policy and implementation plans for addition of vitamins and minerals to foods, regulated amounts of vitamins A and D are permitted to be added to cereals in Canada. Detailed information about which nutrients are mandatory to add to certain foods and those which can be voluntarily added can be found in Chapter 7, Annex 7-1, in the *Guide to Food Labelling and Advertising* (www.inspection.gc.ca/english/fssa/labeti/guide/ch7-1e.shtml). A recent edition (2008) of *Nutrient Value of Some Common Foods*, a quick reference for the nutrient composition (up to 143 nutrients) of over 5500 Canadian foods, is available at the Health Canada web site www.hc-sc.gc.ca/fn-an/alt_formats/hpfb-dgpsa/pdf/nutrition/nvscf-vnqau_e.pdf. This resource uses the 2007b Canadian Nutrient File, which is accessible at www.hc-sc.gc.ca/fn-an/nutrition/fiche-nutri-data/index-eng.php.

To highlight a nutrient-specific difference between Canadian and American foods, instructors should note that addition of vitamin D to all fluid milk is mandatory in Canada, as is the addition of vitamin A to fat-reduced milk. This is not the case in the United States,[19] and thus options for choosing vitamin D-fortified low-fat or fat-free milks may not exist in specific American-based nutrient analysis programs, and assessment for vitamin D may be unreliable when students use U.S.-based programs to assess their dietary intakes.

In 1997, Health Canada permitted the voluntary addition of calcium and vitamin D to plant-based beverages (e.g., soy- or rice-based beverages). When selecting these beverages, students should check food labels for the addition of these nutrients.

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[17] Canadian Food Inspection Agency. *Guide to Food Labelling and Advertising*. Chapter 7. Nutrient Content Claims. Annex 7-1: Foods to Which Vitamins, Mineral Nutrients and Amino Acids May or Must be Added. Available at: www.inspection.gc.ca/english/fssa/labeti/guide/ch7-1e.shtml.

[18] Health Canada. Food Fortification Regulations. The proposed policy document and implementation plans, executive summary, and information sheets are available at: www.hc-sc.gc.ca/fn-an/nutrition/vitamin/index-eng.php.

[19] Calvo MS, Whiting SJ, Barton CN. Vitamin D fortification in the United States and Canada: current status and data needs. Am J Clin Nutr. 2004;80(6):1710S-16S.

Further information on food fortification can be obtained on the Health Canada web site: www.hc-sc.gc.ca/fn-an/nutrition/vitamin/index-eng.php.

2.4 Canadian Food Labelling

Health Canada and CFIA share the responsibility for food labelling policies under Canada's *Food and Drugs Act* and *Regulations* (www.inspection.gc.ca/english/reg/rege.shtml). Health Canada's responsibilities for food labelling fall within the department's mandate to safeguard health and safety, while CFIA leads the federal program to develop and enforce general food labelling policies and regulations. In particular, CFIA is responsible for protecting consumers from misrepresentation and fraud with respect to food labelling, packaging, and advertising, and for prescribing basic food labelling and advertising requirements. The *Consumer Packaging and Labelling Act and Regulations* also apply to food packaging and labels. All current regulations for labelling requirements and making nutrition claims are described in the *Guide to Food Labelling and Advertising*,[20] which can be accessed through the CFIA web site at: www.inspection.gc.ca/english/fssa/labeti/guide/toce.shtml.

Regulations published in the Canada Gazette, Part II, on January 1, 2003, made nutrition labelling mandatory on most food labels as of January 1, 2006.[21] For smaller food manufacturers the deadline was extended to December 2007. The regulations updated requirements of over 40 nutrient content claims and allowed five diet-related health claims on food labels or in advertisements. Health Canada provides an education strategy to help consumers make informed choices about the foods they buy and eat. Information on nutrition regulations and supporting education materials can be accessed through the Health Canada web site. A ready-to-use PowerPoint presentation on nutrition labelling, ready-to-use articles that help educators teach food labelling, key messages to guide nutrition labelling education, fact sheets, and other educational resources are available at www.hc-sc.gc.ca/fn-an/label-etiquet/nutrition/educat/index-eng.php. *Eating Well with Canada's Food Guide*, found in Appendix I of the textbook, shows an example of the Nutrition Facts table found on Canadian food labels.

Students can explore the web-based tool titled "Interactive Nutrition Label and Quiz" to learn how to use information provided on the food label. This tool is available at: www.hc-sc.gc.ca/fn-an/label-etiquet/nutrition/cons/interactive-eng.php. Another interactive food labelling resource is Healthy Eating is in Store for You™, a collaborative project between Dietitians of Canada and the Canadian Diabetes Association. This set of resources helps consumers make healthy food choices through better use of the nutrition information on the label of packaged foods. Resources for instructors include an Instructor's Guide, Consumer Activity Sheets, and a PowerPoint presentation. Resources for your students include Fact Sheets, FAQs, and a brochure. All resources are available at: www.healthyeatingisinstore.ca/program_resources.asp.

Food Ingredients

Food ingredients are listed, using their common name, in descending order of proportion by weight, as determined before they are combined to make the food. Exceptions are spices, seasonings and herbs (except salt), natural and artificial flavours, flavour enhancers, food additives, and vitamin and mineral nutrients and their derivatives or salts, which may be shown at the end of the ingredient list in any order. If an ingredient is optional, or can be substituted for another one in a product, the label must list all the ingredients that are likely to be used in the product within a one-year period. The label must indicate that all of these specific ingredients may not be present in each package of the food. This is often seen on cracker labels when the source of oil or fat varies with the market availability of oil products. To assist consumers in avoiding the potentially serious consequences of allergic and sensitivity reactions to foods, food label ingredient lists must declare the following foods or their derivatives when present as ingredients: peanuts, tree nuts (almonds, Brazil nuts, cashews, hazelnuts [filberts], macadamia nuts, pecans, pinenuts, pistachios, walnuts), sesame seeds, milk, eggs, fish, crustaceans (e.g., crab, crayfish, lobster, shrimp) and shellfish (e.g., clams, mussels, oysters, scallops), soy, wheat, and sulphites. In addition to the above mandatory requirements, a voluntary precautionary labelling policy allows the food industry to label products that may inadvertently contain substances

[20] Canadian Food Inspection Agency. *Guide to Food Labelling and Advertising*. Available at: www.inspection.gc.ca/english/fssa/labeti/guide/toce.shtml.

[21] Canada Gazette. Regulations for Amending the Food and Drug Regulations (Nutrition Labelling. Nutrient Content Claims and Health Claims). *Canada Gazette Part II*, Vol. 137, No. 1 – January 1, 2003. Available at: http://gazette.gc.ca/archives/p2/2003/2003-01-01/html/sor-dors11-eng.html.

capable of causing severe adverse reactions. Two precautionary statements currently in use are: "may contain X"; or "not suitable for consumption by persons with an allergy to X", where "X" is the name by which the allergen is commonly known. Although precautionary labelling is voluntary, enforcement action will occur when allergens are not clearly represented on pre-packaged foods and a potential health risk has been identified.

At this time there is no labelling requirement to identify food products resulting from genetic engineering (referred to in regulations as "novel foods"), unless there is a significant change in nutrition or composition or there is a potential health or safety risk for a population, such as allergic potential. Canada's trading partners, including the United States, support labelling on a case-by-case basis in instances related to health, safety, or compositional change. In accordance with the *Food and Drugs Act*, labelling of novel foods must be understandable, truthful, and not misleading, and permission is granted for voluntary positive and negative labelling on the condition that the claim is not misleading or deceptive and is factual. Three major consultations have occurred in Canada since 1993 on the labelling of novel foods derived from genetic engineering, and considerable pressure on the government exists for mandatory labelling of genetically modified foods. For current information about volunteer labelling of "novel" food products or the regulations about "novel" foods, consult the CFIA Science Branch, Office of Biotechnology web site at www.inspection.gc.ca/english/sci/biotech/labeti/response.shtml or the Health Canada web site for Genetically Modified Foods and Other Novel Foods, available at www.hc-sc.gc.ca/fn-an/gmf-agm/index-eng.php.

Canadian consumers can now clearly identify whether foods they eat are a Product of Canada or Made in Canada. New guidelines with improved definitions of these terms used on food labels and advertising are effective for all products produced after December 31, 2008. Detailed definitions for these terms can be found in Chapter 4, Section 4.19 of the *Guide to Food Labelling and Advertising*, available at www.inspection.gc.ca/english/fssa/labeti/guide/ch4ae.shtml.

Nutrition Facts

The Nutrition Facts table presents the nutrient content of a food based on a declared amount of food in a standardized format on most prepackaged foods. All of the information in the Nutrition Facts table is based on the noted specific amount of the food—a serving size given in commonly used household measures (e.g., 1 cup) followed by the corresponding metric weight (e.g., 240 grams). This serving size does not necessarily correspond with serving sizes in *Eating Well with Canada's Food Guide*, and is based on a reference amount of food specified in the regulations of the *Guide to Food Labelling and Advertising*.[22] The Nutrition Facts table lists Calories and 13 core nutrients. Additional nutrients may be added to the table (e.g., polyunsaturated fat, vitamin D, zinc). For some macronutrients only the absolute amount is given; for others the absolute amount and % Daily Value is given. The % Daily Values for carbohydrate, total fat, and saturated + *trans* fats are based on a 2000 kcalorie daily energy intake. Vitamins and minerals are given % Daily Value only. % Daily Value gives context to whether there is a lot or a little of a nutrient in the specified amount of food. For educators, a number of fact sheets about nutrition labelling and using the Nutrition Facts table are available at: www.hc-sc.gc.ca/fn-an/label-etiquet/nutrition/educat/te_background-le_point-eng.php.

Nutrient Content Claims

Nutrient content claims are limited to those that are permitted by the *Food and Drug Regulations*. Nutrient content claims describe the relative amount of a nutrient, based on a reference amount of food. Claims such as "reduced" or "lower" in amount, or "source" or "very high source" can only be made in accordance with the standards specified in the table of section B.01.513 of the *Food and Drug Regulations*.[23]

Diet-related Health Claims and Biological Role Claims

In 2002, Health Canada introduced diet-related health claims that added to the previously allowed biological role claims.

Diet-related health claims are permitted for:

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[22] Canadian Food Inspection Agency. *Guide to Food Labelling and Advertising.* Chapter 6, section 6.2. Reference amounts and serving sizes. Available at: www.inspection.gc.ca/english/fssa/labeti/guide/ch6e.shtml.

[23] Justice Canada. Canada's *Food and Drug Regulations.* Part B. Available at: http://laws.justice.gc.ca/en/showdoc/cr/C.R.C.-c.870/bo-ga:l_B/20090615/en.

- high potassium, low sodium, and reduced risk of high blood pressure. When this claim is made, the Nutrition Facts table must include the amount of potassium;
- adequate calcium, vitamin D, and regular physical activity, and reduced risk of osteoporosis. When this claim is made, the Nutrition Facts table must include the amount of vitamin D and phosphorus;
- low saturated and *trans* fats and reduced risk of heart disease. When this claim is made, the label must include the amount of saturated fatty acids and *trans* fatty acids per serving of stated size;
- a diet rich in vegetables and fruit and reduced risk of some types of cancer. When this claim is made, a Nutrition Facts table is required on the product; and
- minimal fermentable carbohydrates in gum, hard candy, or breath-freshening products and reduced risk of dental caries. When this claim is made, the Nutrition Facts table must include the amount of sugar alcohols, if present.

Biological role claims are permitted for a number of nutrients. Examples include: vitamin E—protects the fat in body tissues from oxidation, and protein—helps build and repair body tissues and helps build antibodies.

Specific requirements related to nutrient claims and diet-related health claims can be found in Chapters 7 and 8, respectively, of the *Guide to Food Labelling and Advertising.*[24]

In consultation a wide variety of stakeholders, Health Canada is currently developing a framework for the management of health claims for food, with the objective to increase government efficiency and flexibility in the approval of health claims, while retaining high standards to ensure credibility of the claims.

Educational Messages
Health Canada offers an on-line Interactive Nutrition Label and Quiz to help consumers effectively use the information found on food labels. This resource is available at www.hc-sc.gc.ca/fn-an/label-etiquet/nutrition/cons/interactive-eng.php.

- Nutrition Facts table – easy to find and easy to read.
- Nutrition Facts information is based on a specific amount of food – compare this amount to the amount you eat.
- Use % Daily Value to see if a food has a lot or a little of a nutrient.
- Use information in the Nutrition Facts table, the ingredient list, and nutrition claims to make informed food choices.

For students taking an introductory level nutrition course, the above messages are a suitable focus. Ask your students to become familiar with this interactive resource before having a discussion of food labelling in class. As an activity, students can complete "How to: Calculate Personal Daily Values" box found on page 56 of the textbook to determine more personalized information from the Nutrition Facts table.

Activity
Ask students to bring to class labels from a variety of food packages. Then ask students to identify different components of the label and relate each component to current labelling requirements.

Highlight 2: Vegetarian Diets

Vegetarian Diets: Position of Dietitians of Canada and The American Dietetic Association[25] (2003)
This paper presents a position statement that includes the social, economic, and health implications of vegetarianism. It accounts for dietary implications regarding key nutrients and implications for vegetarianism during different stages in the life span. It also outlines health benefits in the prevention and treatment of certain diseases.

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[24] Canadian Food Inspection Agency. *Guide to Food Labelling and Advertising.* Chapter 7 – Nutrient Content Claims, and Chapter 8 – Diet related Health Claims. Available at: www.inspection.gc.ca/english/fssa/labeti/guide/toce.shtml.

[25] Dietitians of Canada and the American Dietetic Association. 2003. Position statement on vegetarian diets. *Canadian Journal of Dietetic Practice and Research*, 64(2):62-81. Also available from the Resource Centre at the Dietitians of Canada web site: www.dietitians.ca.

A New Food Guide for North American Vegetarians (2003)

This is a companion article to the above position paper and was published in the *Canadian Journal for Dietetic Practice and Research* in 2003.[26] Figure 2 in the article uses a rainbow format to present 6 food groups: Grains; Vegetables; Fruits; Legumes, nuts and other protein-rich foods; Fats; and Calcium-rich foods, which include foods from the other food groups. Suggestions are also provided for meeting adequate nutrition during different stages of the life span. Instructors may find this guide useful since many university students follow a vegetarian eating pattern.

Canadian Web-Based Resource

1. The 5 to 10 a Day for Better Health program (www.5to10aday.com) is a campaign that encourages Canadians to eat at least 5 servings of vegetables and fruit a day with a goal to reduce the risk of cancer and cardiovascular disease.

[26] Messina V, Melina V, Mangels AR. 2003. A new food guide for North American vegetarians. *Canadian Journal of Dietetic Practice and Research*, 64(2):82-86. Also available through the Dietitians of Canada web site at: www.dietitians.ca/news/downloads/Vegetarian_Food_Guide_for_NA.pdf**.**

Worksheet 2-1: Daily Calorie Evaluation

With respect to each of the following food groups, identify the weight portion that you ate over a 24-hour period (teaspoons, ounces or cups) in the first row and the amount of kilocalories that you consumed from those foods in the second row.

Food Groups	**Fruits**	**Vegetables**	**Grains**	**Meat & Beans**	**Milk**	**Oils**	**Discretionary**
Weight portion							
Kcal portion							

24-hour total kilocalories consumed: _____

Once you have finished this chart comparison, please complete the following information in the table below.

Age	
Gender	
Weight (kilograms)	
Height (cm)	
Exercise level (Sedentary, moderately active, etc.)	

Now for some calculations:

1. Calculate your BMI: _____
2. Determine your daily kcal needs using both of the following formulas:

Harris-Benedict Formula:
Male 66.5 + (13.7 x weight in kg) + (5 x height in cm) – (6.8 x age in years)
Female 655 + (9.6 x weight in kg) + (1.8 x height in cm) – (4.7 x age in years)

- If sedentary multiply your BMR by the activity factor of x2
- If active multiply your BMR by the activity factor of x5.5

- Kilocalorie Needs: _____

Mifflin-St. Jeor Formula:
Male 10 x weight (kg) + 6.25 x height (cm) – 5 x age (years) + 5
Female 10 x weight (kg) + 6.25 x height (cm) – 5 x age (years) – 161

- Kilocalorie Needs: _____

3. Compare and reflect on your obtained results.

Worksheet 2-2: Supermarket Worksheet

For the following list of food items, please go to your local supermarket and fill in the information requested in the table below.

Food product	Aisle location	What items are on the opposite side of the aisle?	Shelf location	Is the price readily available?
Vanilla ice cream cups				
Hot dog rolls				
Fresh broccoli				
Canned fruit cocktail				
Infant formula				
Elbow noodles				
Canned soup				
Frozen pizza				
Soda				
Bottled water				

Name of supermarket: _____ Total # of aisles: _____

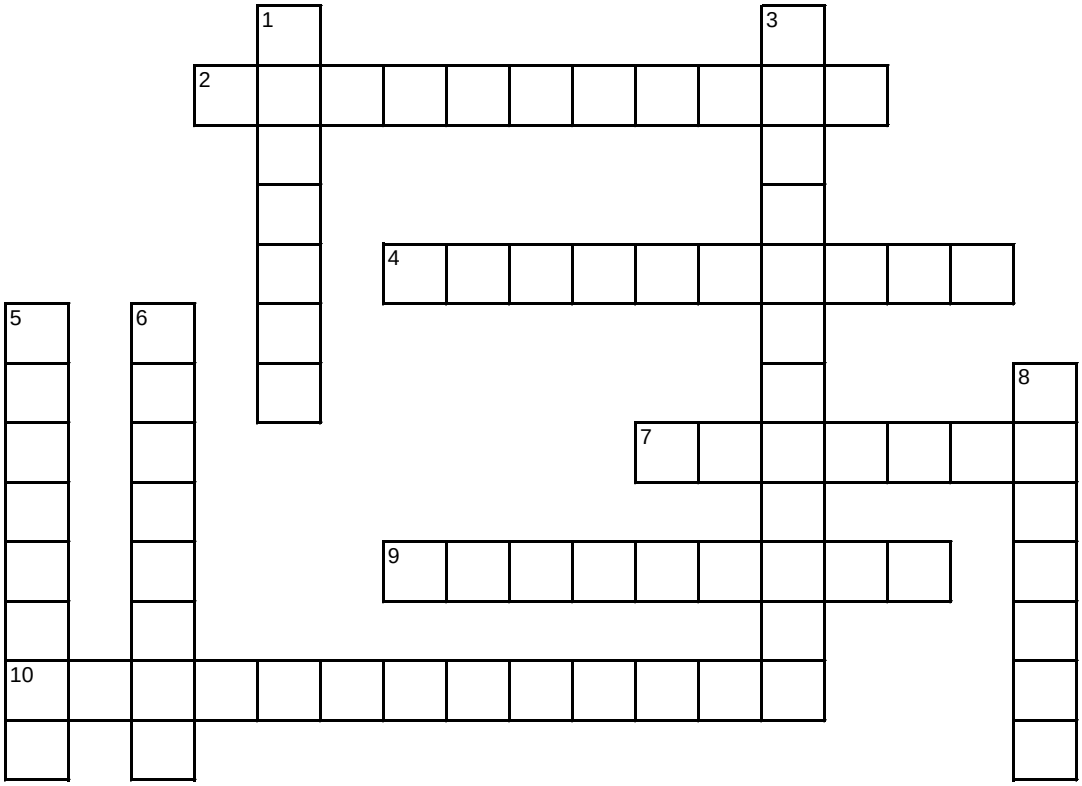
Come prepared to class to discuss your findings. Questions for discussion:

1. How is "food placement" determined in the supermarket setting?
2. Do most consumers compare unit pricing between similar food products?
3. Is there a difference in pricing between low-nutrient-density vs. high-nutrient-density foods?

Worksheet 2-3: 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.)**	**Meat & beans (oz.)**	**Milk (cups)**	**Oils (tsp.)**	**Discretionary kcalories**
Breakfast:							
Snack:							
Lunch:							
Snack:							
Dinner:							
Snack:							
Total consumed							
Recommended based on EER							

Worksheet 2-4: Chapter 2 Crossword Puzzle



Across	Down
2. reference values developed by the FDA specifically for use on food labels	1. eating a wide selection of foods with and among the major food groups
3. statements that characterize the relationship between any nutrient or other substance in a food and a disease or health-related condition	4. in relation to dietary intake, providing enough but not too much of a substance
5. addition of nutrients to a food; adding nutrients that were lost during processing so that the food will meet a specified standard	7. providing foods of a number of types in proportion to each other, such that foods rich in some nutrients do not crowd out of the diet foods that are rich in other nutrients
6. providing all the essential nutrients, fiber, and energy in amounts sufficient to maintain health	9. the addition of nutrients that were either not originally present or present in insignificant amounts to a food
8. the process by which the coarse parts of a food are removed	10. diet-planning tools that organize foods by their proportions of carbohydrate, fat, and protein; foods on any single list can be used interchangeably

Worksheet 2-5: Interpreting Food Labels (Internet Exercise)

Go to the following website to answer questions 1-8:
http://www.fda.gov/Food/LabelingNutrition/ConsumerInformation/default.htm.

Scroll down the page and click on **Nutrition Facts Label brochure** (PDF file) to answer questions 1-7. Once you have finished answering the questions, then you can go back to the main page of the website by clicking on the back arrow of your browser.

1. The information on the Nutrition Facts label is based on one serving of a food item.
   a. True
   b. False

2. On each food label there is a % DV for sugar.
   a. True
   b. False

3. In order to maximize one's protein intake, you should eat foods that are considered to be lean protein sources.
   a. True
   b. False

4. Foods that are labeled "fat free" do not contain any fat.
   a. True
   b. False

5. % Daily Value is based on a 2,500-kilocalorie diet.
   a. True
   b. False

6. The representative food label indicates that the serving size for the item is 2 cups.
   a. True
   b. False

7. The amount of *trans* fat on the label is equal to the amount of saturated fat.
   a. True
   b. False

Go back to the main page of the website. Click on **Make Your Calories Count** located at the bottom of the Labeling & Nutrition box. Proceed through Preface and steps 1 through 3 to answer question 8.

8. Match the selection criteria with the correct explanation.
   a. 3 servings of potato chips
   b. 40 calories
   c. 100 calories
   d. 400 calories
   e. 5% DV or less
   f. 20% DV or more
   g. Mega Crunch flakes
   h. Chicken Noodle Soup
   i. Low Fat Chocolate Milk and Fat Free Skim Milk
   j. Apple Crisp 2 servings
   k. New Orleans Chili

   _____ 420 calories

   _____ 570 calories

   _____ high calorie food source

   _____ high fiber content

   _____ high in calcium content

   _____ high nutrient food source

   _____ low calorie food source

   _____ low in calories, saturated fat, high in fiber and calcium compared with meatloaf

   _____ low in saturated fat content

   _____ low nutrient food source

   _____ moderate calorie food source