**Instructor’s Manual[[1]](#footnote-1) for Chapter 1 – Nutrition Basics**

**Resources Included in This Document**

1. Lists of chapter learning objectives and key terms

2. “Lecture launcher”: true/false pop quiz

3. Assignment worksheets with answer keys: cultural considerations in meal planning, calorie calculations, USDA Food Patterns diet analysis

4. Chapter outline/summary

5. List of relevant websites organized by topic

6. Internet activities: (A) Nutrition.gov site evaluation, (B) DRI tables, (C) USDA Super Tracker, (D) Research Room site topical study

7. Discussion questions

8. Classroom activities: (A) dietary guidelines for fat, (B) class debate (“good” and “bad” foods), (C) technology storage and retrieval

**Learning Objectives**

1.1 Demonstrate a working knowledge of the meaning of the 10 nutrition concepts presented.

1.2 Apply knowledge about the elements of nutrition labeling to decisions about the nutritional value of foods.

1.3 Cite two examples of how nutrient needs change during the life cycle and how nutritional status at one stage during the life cycle can influence health status during another.

1.4 Describe the components of individual-level nutrition assessment.

1.5 Identify the basic elements of four public food and nutrition programs.

1.6 Apply the characteristics of healthy dietary patterns to the design of one.

**Key Terms**

|  |  |  |
| --- | --- | --- |
| nutrients  food security  food insecurity  calorie  essential nutrients  essential amino acids  nonessential nutrients  daily values (DVs)  insulin resistance  type 2 diabetes  glycemic index  amino acids  nonessential amino acids  kwashiorkor  fatty acids  glycerol  essential fatty acids  prostaglandins | thromboxanes  prostacyclins  saturated fats  unsaturated fats  monounsaturated fats  polyunsaturated fats  *trans* fat  cholesterol  dietary pattern  coenzymes  metabolism  antioxidants  phytochemicals  homeostasis  malnutrition  primary malnutrition  secondary malnutrition  nutrigenomics | chronic disease  hypertension  stroke  Alzheimer’s disease  chronic inflammation  oxidative stress  energy-dense foods  empty-calorie foods  nutrient-dense foods  dietary supplements  enrichment  fortification  prebiotics  probiotics  registered dietitian nutritionist (RDN)  anthropometry  nutrition surveillance  nutrition monitoring |

**Lecture Launchers**

* **Ask students to identify themselves** by sharing why they enrolled in the class (interest or requirement) and what they would like to gain from this course.
* **Pop Quiz:** Welcome to the genomic era! True or False?
* As our understanding of the specific influences of food components on genetics and health through the lifespan advances, nutritional advice will become individualized based on a person’s genetic makeup. (True, p. 33)
* High alcohol intake during pregnancy sharply increases the risk of fetal alcohol syndrome in some women, but not others. (True, p. 34)
* Herbal remedies don’t have to be proven to be safe or effective before they are allowed to be marketed in the U.S. (True, p. 38)

**Worksheet Answer Key** (worksheets appear at the end of this document)

**Worksheet 1-1: Case Study—Cultural Considerations in Menu Planning**

Suggested answers (answers will vary):

|  |  |
| --- | --- |
| **Breakfast**  1 cup rice  1 cup fat-free or low-fat yogurt  1 small banana  ½ cup mango juice  **Lunch**  Lamb pita sandwich:  2 ounces whole-wheat pita bread  3 ounces grilled lamb  1 ounce feta cheese  1 tbsp hummus spread  1 cup tomato salad (tomatoes, olive oil, parsley, red wine vinegar, salt and pepper)  ¼ cup dates | **Dinner**  5 ounces grilled top loin steak (kosher or halal)  1 cup lentils  ½ cup cucumbers  2 ounces Matzoh bread  1 tsp olive oil  **Snacks**  1 cup low-fat yogurt  ½ cup guava |

**Worksheet 1-2: Calculating Calories**

Calories 150 Calories from fat 18

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Amount/Serving | | %DV\* | Amount/Serving | | %DV |
| Total Fat | 2 g | 3% | Total Carbohydrate | 28 g | 9% |
| Saturated | 0 g | 0% | Dietary Fiber | 3 g | 11% |
| Cholesterol | 0 g | 0% | Sugars | 2 g |  |
| Sodium | 240 mg | 10% | Protein | 5 g |  |

1. 18

2. 112

3. 20

4. 150

**Worksheet 1-3: How Does Your Dietary Intake Compare to the Recommendations?**

Answers will be individualized.

**Chapter Outline**

I. **Introduction**  
Nutrition is a growing, interdisciplinary science. Nutrition knowledge sometimes is referred to as “the art and science of nutrition.” This chapter links principles of the science of nutrition with applications that can enhance the public’s nutritional health.

II. **Principles of the Science of Nutrition**Chapter 1 gets students up to speed on basic nutrition. This section is a crash course. The 10 principles of human nutrition, listed in Table 1.1 (p. 2), beginning with “food is a basic need of humans,” constitute the thread that links the many concepts presented in this chapter. Six major nutrient categories (carbohydrate, protein, fats [lipids], vitamins, minerals, and water) are defined in Table 1.2 (p. 3). Dietary intake standards for each of the essential nutrients in the six nutrient categories depend on an individual’s age, gender, growth pattern and other factors listed on p. 3-4. A thorough list of food sources of vitamins is provided in Table 1.10 (p. 18 – 22) and a list of food sources of minerals is presented in Table 1.14 (p. 28 - 31). Examples of diseases and disorders that are linked to diet are given in Table 1.16 (p. 35). The discussion questions and activities for Chapter 1 highlight essential nutrients, providing students with practice opportunities to evaluate their own personal nutrient needs.

III. **Nutritional Labeling**  
This section includes a discussion of the items included in the Nutrition Facts panel and the ingredient label, an explanation of the health claims on the labels of foods and dietary supplements, definitions of enrichment and fortification, and a brief introduction on herbal remedies. Functional foods are defined and examples are provided.

IV. **The Life-Course Approach to Nutrition and Health**Sections on dietary modification due to culture and religion provide good opportunities to engage students early in classroom discussion.

V. **Nutrition Assessment**The extent and thoroughness of a nutrition-related assessment depends on the proposed use of the assessment. Questions about nutritional status are asked in context of some intended action or follow up. At the community level, food and nutrition assessment is done from a public health perspective and based on demographic variables (age, gender, income, food and nutrition survey results, and birth and death records), as well as community inventories (number and types of grocery stores and delivery services, markets, distance to stores from bus routes, transportation systems, number and types of restaurants, clinics or other health support services, etc.). Individual assessments are compiled using the ABCD model: anthropometric, biochemical, clinical/physical, and dietary measures. Learning how to competently carry out each assessment approach can easily take a semester-long class. In this text, each of the life-cycle stage sections elaborates on some aspect of nutritional assessment. Various methods of dietary assessment are described, including the USDA Automated Multiple-Pass Dietary Recall.  
  
In the U.S., the National Nutrition Monitoring System regularly investigates issues related to nutritional health such as food availability, dietary intake, weight status, and incidence of nutrition-related diseases. Several national survey methods are described (Table 1.18, p. 43).

VI. **Public Food and Nutrition Programs**Funding for food programs comes from governmental and private agencies; household need and eligibility are frequently determined by using the federally-issued poverty guidelines, which are updated annually in the Federal Register. Food and nutrition programs provide vouchers, cash or actual food, nutrition services, education, and referral. Table 1.20 (p. 44) is a summary of federal food and nutrition programs that are further described in the life-cycle chapters. Table 1.21 (p. 44) provides the objectives for improving the nutritional health of the nation as outlined in the document “Healthy People 2020”.

VII. **Nutrition and Health Guidelines for Americans**Food guidance documents reflect national perspectives on health. Guidelines are designed to improve the public’s health by reducing risk of the most prevalent diseases. ChooseMyPlate.gov (Illustration 1.12, p. 45), the replacement for the former USDA Food Guide Pyramid, now offers individual guidance regarding what to eat, including adaptations for various cultural eating patterns. Food guidance documents were designed to reduce disease risks. The 2015 Dietary Guidelines Advisory Committee concluded that the health of the U.S. population could be improved, and common chronic diseases and disorders prevented, if Americans consume a healthy dietary pattern (shown in Table 1.22, p. 45) and exercise regularly. Key elements of the 2015 Dietary Guidelines related to food and nutrient intake, dietary pattern, and food safety and sustainability are listed in Table 1.23 (p. 46).

**Internet Resources At-a-Glance**

***In textbook***

* **Mercury levels in commercial fish and shellfish**
* U.S. Environmental Protection Agency: [www.epa.gov](http://www.epa.gov)
* **Nutritional Labeling**
* U.S. Food and Drug Administration (FDA) information on Nutrition Facts Panels: <http://www.fda.gov/Food/GuidanceRegulation/GuidanceDocumentsRegulatoryInformation/LabelingNutrition/ucm385663.htm#images>
* Proposed differences in the FDA Nutrition Facts Panels: <http://www.fda.gov/downloads/Food/GuidanceRegulation/GuidanceDocumentsRegulatoryInformation/LabelingNutrition/UCM387451.pdf>
* **Public Food and Nutrition Programs**
* Information on existing federal food and nutrition programs from the USDA Food and Nutrition Service: <http://www.fns.usda.gov/>
* **Nutrition and Health Guidelines**
* USDA MyPlate: <http://www.choosemyplate.gov/>
  + Sample menus for a 2,000-calorie food pattern: <http://www.choosemyplate.gov/content/sample-menus-2000-calorie-food-pattern>
* DASH Eating Plan: <http://health.gov/dietaryguidelines/dga2005/document/pdf/Appendix_A.pdf>

***Additional sites***

* **Public Nutrition Programs**
* Public Nutrition Programs: [www.nutrition.gov](http://www.nutrition.gov)
* **Dietary Assessment**
* What’s in the Foods You Eat: <http://www.ars.usda.gov/Services/docs.htm?docid=17032>
* USDA’s Automated Multiple-Pass Method: [www.ars.usda.gov/Services/docs.htm?docid=7710](http://www.ars.usda.gov/Services/docs.htm?docid=7710)
* SuperTracker dietary assessment tool: <https://www.supertracker.usda.gov/default.aspx>
* **National Nutrition Monitoring System**
* National Health and Nutrition Examination Survey: [www.cdc.gov/nchs/nhanes.htm](http://www.cdc.gov/nchs/nhanes.htm)
* **Nutrition and Health Guides**
* Eating Well with Canada’s Food Guide: <http://www.hc-sc.gc.ca/fn-an/food-guide-aliment/index-eng.php>
* **Nutrition Experts**
* Academy of Nutrition and Dietetics: [www.eatright.org](http://www.eatright.org)
* Dietitians of Canada: [www.dietitians.ca](http://www.dietitians.ca)
* **Nutrition Research**
* Medline Plus: [www.nlm.nih.gov/medlineplus](http://www.nlm.nih.gov/medlineplus)
* **Nationwide Priorities & Nutritional Health**
* United States – Healthy People 2020 Objectives for the Nation: <http://www.healthypeople.gov/2020/topicsobjectives2020/default.aspx>
* Canada – Health Canada: [www.hc-sc.gc.ca](http://www.hc-sc.gc.ca)
* **Governmental Sites Reflecting Current Food and Nutrition Information**
* The National Agricultural Library at USDA is found at <http://www.nal.usda.gov/>
* The Institute of Medicine is at <http://iom.nationalacademies.org/>
* The National Academy of Sciences Tables for DRIs are at <http://ods.od.nih.gov/Health_Information/Dietary_Reference_Intakes.aspx>
* The U.S. Dept. Health and Human Services publishes poverty statistics at <http://aspe.hhs.gov/poverty/index.shtml>
* Canada’s Food Guide is at <http://www.hc-sc.gc.ca/fn-an/food-guide-aliment/index-eng.php>
* A census site for locating your own community and finding poverty statistics in general is at [www.census.gov/hhes/www/poverty](http://www.census.gov/hhes/www/poverty)

**Exploring the Internet: E-Trips**

A. Identify the eight nutrition subject categories using the gateway site [www.nutrition.gov](http://www.nutrition.gov) (What’s in Food; Smart Nutrition 101; Life Stages; Weight Management; Nutrition and Health Issues; Shopping, Cooking & Meal Planning; Dietary Supplements; Food Assistance Programs).  
  
Compare these to the 10 principles of human nutrition identified in Chapter 1. How are they similar? (They discuss dietary guidelines and dietary supplements, identify similar nutrients, and provide information on MyPlate.) How are they different? (The Web site offers information on home canning and pesticides.) Find the location and the linking address to MyPlate and the Dietary Guidelines for Americans. How much time did it take? Is this an easy task that a teenager could complete in order to read and understand more about nutrition? How would you give directions to find the MyPlate Web site address to a 70-year-old widow who wants to learn more about nutrition?   
  
Which tool helps you to answer the question, “What is a nutritious day’s intake for me?” in the least amount of time? Which tool would you prefer to use in order to help you plan one day’s food and beverage intake?

B. Practice using the acronyms included in Illustration 1.2, related to the Dietary Reference Intakes (DRI). Locate the DRI tables at: <http://ods.od.nih.gov/Health_Information/Dietary_Reference_Intakes.aspx>.

1. For all of the nutrients for which recommendations are made for an individual, which are listed as RDA, as AI, or as EAR? Why do we need different descriptors? For which nutrients are UL listed? Why are some levels missing? Ask students to report back on a specific nutrient. Clarify for the class any questions that arose in using the DRI tables (also printed inside the book cover for classroom reference).

2. To go a step further, compare your own nutrient needs from the DRI tables with the mandatory DV in Table 1.3.

C. The USDA maintains an interactive site allowing dietary evaluation with the USDA Food Patterns (<https://www.supertracker.usda.gov/>). Write down what you eat in a 24-hour period (or better yet, record for three days, including one weekend day). (The Worksheet 1-3 form in this document can be used for recording intake.) Evaluate your diet’s adequacy compared to the USDA Food Patterns recommendations individualized for you.

D. Go to the website address for Research Room that is hosted by the Canadian Foundation for Dietetic Research (<http://researchroom.cfdr.ca/about.aspx>). Click on the link to create a profile. Log-in to the Research Room and search the database for a nutrition research topic of interest. Be prepared to summarize your selected research.

**Discussion Questions**

A. In Table 1.1, Principle #3 of the 10 human nutrition principles states: “Health problems related to nutrition originate within cells.” Describe your own personal definition of health. Considering the statement “Health is more than the absence of disease,” identify indicators of health. Can someone who has asthma or diabetes be “healthy”?

B. “Not all fats are created equal.” After years of “eat less fat” advice to the public, we are becoming more vocal about the benefits of fats in the diet. The definition of “healthful” is based on the way a fat/lipid affects LDL cholesterol (healthful fat doesn’t raise, and more likely lowers, LDL cholesterol). Discuss the concept of “healthful” versus “unhealthful” fats. Do you agree with this way of defining healthful?

C. Americans eat roughly nine times as much omega-6 fatty acids as omega-3. While we still do not know an optimal ratio, the suggestion is that eating four times as much omega-6 fatty acid relative to omega-3 fatty acid would promote health. Discuss ideas for reaching this lower and more health-promoting ratio.

D. One of the nutrition objectives of *Healthy People 2020* (Table 1.21) is to increase the proportion of adults who are at a healthy weight. What are some reasonable ways by which this goal could be accomplished?

E. Principle #9 (p. 35 and Table 1.1 on p. 2) reads, “Adequacy, variety, and balance are key characteristics of healthy dietary patterns.” How does this principle relate to Principle #4 (p. 23 and Table 1.1 on p. 2), which states, “Poor nutrition can result from both inadequate and excessive levels of nutrient intake”? Describe the physiological effects of one nutrient (for example, calcium) to illustrate how adequacy and balance in dietary intake support a “just-right” range of nutrient needs in humans.

F. Label interpretation practice: Use Table 1.3 and Illustration 1.9 showing the mandatory components of a nutrition label and a Nutrition Facts panel. Although Daily Values (DV) are designed for everyone, they include some nutrient values that have since been revised (e.g., iron). The standardized format on the food label can guide food choices. Using actual food product labels as examples, ask students to determine how much of a nutrient several foods contain [e.g., calcium in milk, vitamin C in orange juice (120% in 8 oz), vitamin A in ketchup (6% in 1 Tb), fiber in beans, etc.]. How might students use this label information in their own diets? To convert this into a class activity, have everyone bring labels to use for looking up nutrients in foods, then have students make a meal or a diet meeting 35% or 100% of DV. Would they themselves eat the combination of foods chosen?

G. Some food sources of fat-soluble vitamins are NOT considered to be fatty foods, such as carrots, sweet potatoes, and peppers as a source of vitamin A, broccoli as a source of vitamin K, or whole-wheat bread as a source of vitamin E. How can non-fatty foods be good sources of fat-soluble vitamins? [All foods contain some fat, however minute, so that vegetables that do not contain enough fat to appear on a food label still contain enough to carry vitamins occurring in micro- and milligram amounts.]

H. Table 1.9 is a summary of vitamins: Choose one that is well known (e.g., vitamin C) to illustrate the consequences of deficiency as well as the consequences of overdose. Reviewing the primary food sources (in Table 1.9) and the additional specific food sources (Table 1.10) of this vitamin, how likely is it for class members to over- or under-dose? If the nutrient chosen is used in enrichment or fortification of foods (for example, vitamin C is added to some WIC-eligible apple juice), is there a potential of over-consumption? Should we treat fortified foods as vitamin/mineral supplements?

I. The author suggests that “enough is as good as a feast” when discussing the concept of optimum ranges of nutrient intake to promote health (nutrition principle #4). Ask students to generate examples to illustrate this concept.

J. The concept of variety and moderation, or in Principle #9, adequacy and balance, is basic to meeting nutritional needs. How might you apply this concept in various cultures? For instance, on page 39, food intake for someone from El Salvador might include corn tortillas for breakfast, lunch, and/or dinner. Why do nutritionists use the concept of variety in giving dietary advice?

**Classroom Activities**

A. **The dietary guideline for fat** requires an understanding of calorie contributions made by this macronutrient. To help students understand how the dietary guidelines for fat translate to food intake, have them learn how to calculate the percentage of calories fat contributes to a sample diet. Demonstrate one calculation and have them generate the others.

• Consume less than 10 percent of calories from saturated fatty acids by replacing them with monounsaturated and polyunsaturated fatty acids.

• Keep *trans* fatty acid consumption as low as possible.

• Keep total fat intake between 20 to 35 percent of calories, with most fats coming from sources of polyunsaturated and monounsaturated fatty acids, such as fish, nuts, and vegetable oils.

B. **Class debate:** The 10th Principle of Human Nutrition (Table 1.1, and p. 34) states that “there are no ‘good’ or ‘bad’ foods.”

1. Split the class in half by having them move to one or the other side of the room. Assign one side the position that “identifying good and bad foods can help the consumer choose a healthful diet” and assign Principle 10 to the other side. Have each side form small groups of 2-4 and prepare arguments for their position, writing their summaries on note cards. After roughly 5 (no more than 10) minutes of deliberation, have each side of the room self-select a team to present their position. Have the rest of the students help shape that position with additional points generated in the small groups.

2. After the representative teams are selected, the rest of the students go back to their seats and become the audience. Pro and con sides then have 2-3 minutes each to make their case; add rebuttals if time allows.

3. Facilitate (instructor-led) a debriefing involving audience and the presenting teams, which stay where they are. Sample debriefing questions are “What does it mean to eat food occasionally?” “Why is the term *junk food* so useful, or is it?” Can they think of other terms for junk food such as “empty-calorie” food? Summarize the debate by asking if they agree with Principle 10.

C. **Successful technology storage and retrieval:** Lead a class discussion on how students store Web site addresses in their “Favorites.” Do they have helpful suggestions on major topic headings and subtopic headings? Take a class survey on which Web site addresses listed in the textbook have been visited by the largest numbers of students.

**Worksheet 1-1: Case Study—**

**Cultural Considerations in Menu Planning**

You are the new registered dietitian at a hospital that serves many Middle Eastern clients. In the past, you have used the sample 2000-calorie menus from ChooseMyPlate.gov (Illustration 1.13, p. 47) in patient education sessions to demonstrate how to plan healthy meals. You find that you need to modify these menus to better suit your new clientele’s ethnic preferences.

1. Search the Internet for resources that describe Middle Eastern food practices. One example can be found at the Ohio State University Extension website: <http://ohioline.osu.edu/hyg-fact/5000/pdf/5256.pdf>.

2. Using your selected resources as a guide, modify the menu listed below to better meet your clientele’s food preferences.

|  |  |
| --- | --- |
| **Current Menu** | **Recommended Changes** |
| **Breakfast**  Cold cereal:  1 cup shredded wheat cereal  1 tbsp raisins  1 cup fat-free milk  1 small banana  1 slice whole-wheat toast  1 tsp soft margarine  1 tsp jelly  **Lunch**  Smoked turkey sandwich:  2 ounces whole-wheat pita bread  ¼ cup romaine lettuce  2 slices tomato  3 ounces sliced smoked turkey breast  1 tbsp mayo-type salad dressing  1 tsp yellow mustard  ½ cup apple slices  1 cup tomato juice  **Dinner**  Grilled top loin steak  5 ounces grilled top loin steak  ¾ cup mashed potatoes  2 tsp soft margarine  ½ cup steamed carrots  1tbsp honey  2 ounces whole-wheat dinner roll  1tsp soft margarine  1 cup fat-free milk  **Snacks**  1 cup low-fat fruited yogurt |  |

**Worksheet 1-2: Calculating Calories**

**Directions:** Use the information from the nutrition label below to determine the total calories as well as the calories from protein, carbohydrate, and fat for **1 muffin**. Once you have calculated the calories from protein, carbohydrate, and fat, and the %DV for fat and carbohydrate, fill in the blanks on the nutrition label.

**Nutrition Facts:** Serving Size 1 Muffin (57 g)

Serving Per container 6

Calories \_\_\_\_\_\_\_\_ Calories from fat \_\_\_\_\_\_\_\_

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Amount/Serving | | %DV\* | Amount/Serving | | %DV |
| Total Fat | 2 g | \_\_\_\_\_\_\_\_ | Total Carbohydrate | 28 g | \_\_\_\_\_\_\_\_ |
| Saturated | 0 g | 0% | Dietary Fiber | 3 g | 11% |
| Cholesterol | 0 g | 0% | Sugars | 2 g |  |
| Sodium | 240 mg | 10% | Protein | 5 g |  |

Vitamin A 0% Vitamin C 0% Calcium 6% Iron 8%

Thiamin 15% Riboflavin 4% Niacin 10%

1. What are the total calories from fat?

2. What are the total calories from carbohydrate?

3. What are the total calories from protein?

4. What are the total calories from each muffin?

\* Percent Daily values (DV) are based upon a 2000-calorie diet.  
The Daily Value for fat for a 2000-calorie diet: 65 g  
The Daily Value for carbohydrate is: 300 g

**Worksheet 1-3: How Does Your Dietary Intake Compare to the Recommendations?**

|  |  |  |
| --- | --- | --- |
| **Meal or Snack** | **Food or Beverage** | **Serving Size** |
| Breakfast |  |  |
| Snack |  |  |
| Lunch |  |  |
| Snack |  |  |
| Dinner |  |  |
| Snack |  |  |

2. Add up the servings you ate from each food group to determine your totals for the day:

|  |  |
| --- | --- |
| **Food Group** | **Daily Total** |
| Grains | Ounces |
| Vegetables | Cups |
| Fruits | Cups |
| Milk | Cups |
| Protein foods | Ounces |

3. Now access the “create your profile” page of the USDA SuperTracker tool at <https://www.supertracker.usda.gov/createprofile.aspx>. Enter your age, gender, physical activity level, height, and weight to allow the program to calculate a personalized meal plan with recommended intakes from each food group. How does your food intake above compare to the recommendations from the USDA Food Patterns?

4. Now, visit <http://www.choosemyplate.gov/> and click on “MyPlate” and then each of the food groups. What tips for each food group does ChooseMyPlate offer that you would be willing to use to improve your nutritional health?

1. revised by Nadine Kirkpatrick, Sacramento City College, and Carrie King, University of Alaska at Anchorage; originally by U. Beate Krinke, University of Minnesota [↑](#footnote-ref-1)