Solutions for Wardlaw's Contemporary Nutrition A Functional Approach 5th Edition by Smith

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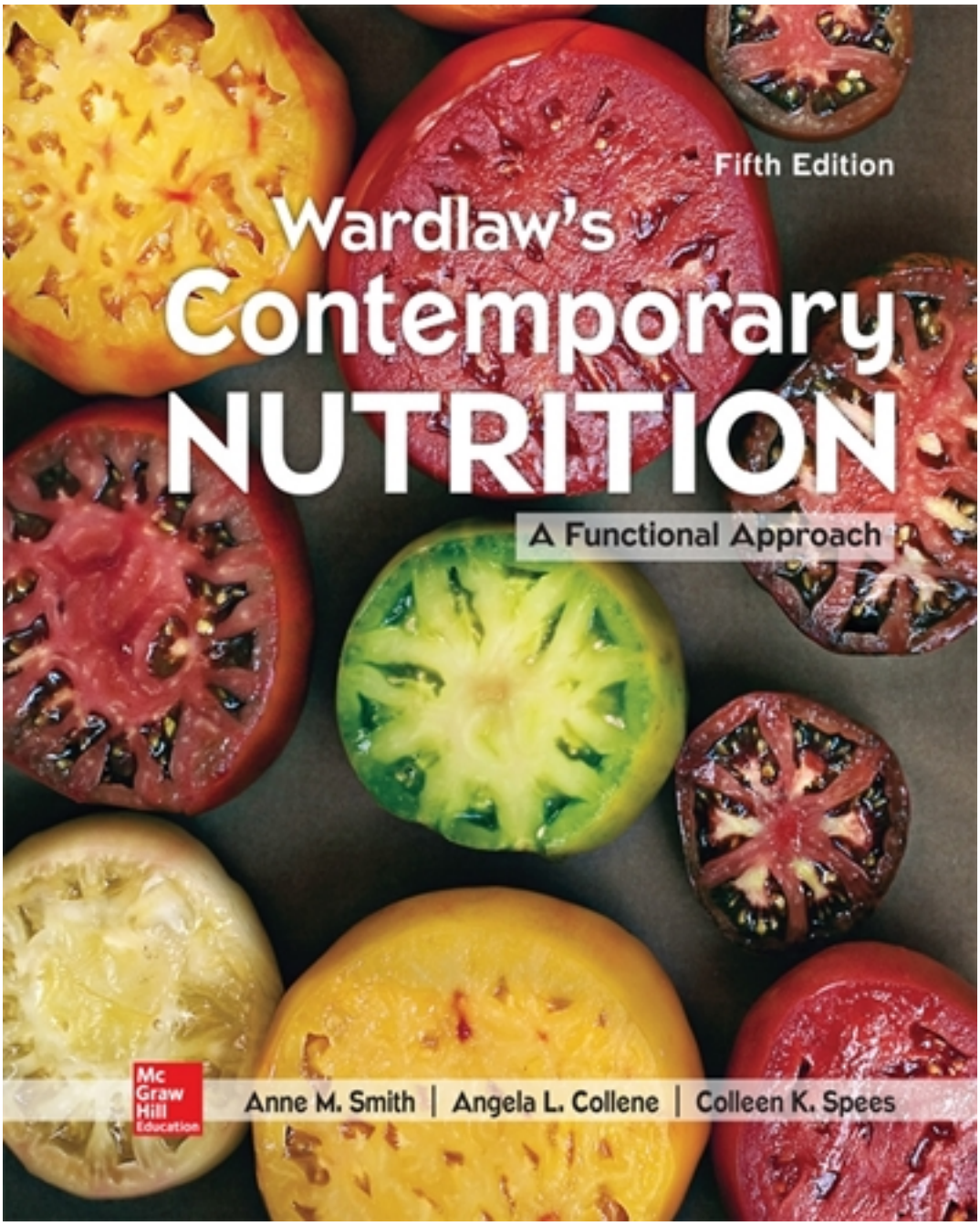

Solutions

CHAPTER 1
NUTRITION, FOOD CHOICES, AND HEALTH

OVERVIEW

This introductory chapter provides an overview of the study of nutrition. Nutrients and their roles in the body are discussed. Energy and how it is measured is described. Helpful math skills used in the study of nutrition are reviewed. The scientific method is explained with particular focus given to its application in the study of nutrition. The typical North American diet is presented along with methods the government uses to monitor consumption. U.S. health objectives included in Healthy People 2020 are briefly described. Recommendations for promoting healthy behaviors and lifestyles are also discussed. The *Nutrition and Your Health* section, "Eating Well in College," investigates common nutritional concerns faced by college students, including choosing foods, weight gain, alcohol and binge drinking, eating disorders, the vegetarian lifestyle, dietary concerns of student athletes, and tips for eating well on a budget.

KEY TERMS

Alcohol
Amino acid
Animal model
Appetite
Bonds
Cancer
Carbohydrates
Cardiovascular disease
Case-control study
Cells
Chemical reaction
Cholesterol
Chronic
Complex carbohydrate
Control group
Diabetes
Double-blind study
Electrolyte
Enzymes
Epidemiology
Essential nutrient
Fat-soluble
Fiber
Genes
Glucose
Hunger
Hypertension
Hypotheses
Inorganic
Kilocalorie (kcal)
Lipids
Macronutrient
Major mineral
Metabolism
Micronutrient
Minerals
Nutrients
Obesity
Osteoporosis
Phytochemical
Placebo
Proteins
Registered dietitian (RD)
Registered dietitian nutritionist (RDN)
Risk factors
Satiety
Scurvy
Simple sugar
Solvent
Starch
Stroke
Theory
Trace mineral
Vitamins
Water
Water-soluble

STUDENT LEARNING OUTCOMES

Chapter 1 is designed to allow you to:

1.1 Describe how our food choices are affected by the flavor, texture, and appearance of food; routines and habits; early experiences and customs; advertising; nutrition and health concerns; restaurants; social changes; economics; and physiological processes affected by meal size and composition.
1.2 Identify diet and lifestyle factors that contribute to the 15 leading causes of death in North America.
1.3 Define the terms *nutrition*, *carbohydrate*, *protein*, *lipid (fat)*, *alcohol*, *vitamin*, *mineral*, *water*, *phytochemical*, *kilocalorie (kcal)*, and *fiber*.
1.4 Determine the total calories (kcal) of a food or diet using the weight and calorie content of the energy-yielding nutrients, convert English to metric units, and calculate percentages, such as percent of calories from fat in a diet.
1.5 Understand the scientific method as it is used in forming hypotheses and theories in the field of nutrition, including the determination of nutrient needs.
1.6 List the major characteristics of the North American diet, the food habits that often need improvement, and the key "Nutrition and Weight Status" objectives of the *Healthy People 2020* report.
1.7 Describe a basic plan for health promotion and disease prevention, and what to expect from good nutrition and a healthy lifestyle.
1.8 Identify food and nutrition issues relevant to college students.

LECTURE OUTLINE

1.1 Why Do You Choose the Food You Eat?

A. What influences your choices? A mix of biological and social factors influences your food choices (see Figure 1-1).
    1. Food flavor, texture, and appearance are the most important factors.
    2. Early exposure to various people, places, and events
    3. Routines and habits
    4. Marketing and advertising by the food industry (see Figure 1-2)
    5. Restaurant dining
        a. Larger portions, nutrient poor, and more calorie dense than home cooked meals
        b. Federal regulations require health information on menus of some restaurants.
    6. Time and convenience
    7. Cost and economics
        a. Food cost is second reason why people choose their foods.
        b. Young adults and those with higher incomes spend the most on food.
    8. Nutrition
        a. Well-educated, middle class professionals make more health-related food choices.
        b. A greater percentage of women read food labels than men.

B. Why are you so hungry?
    1. Hunger is the physiological (internal) drive to eat.
    2. Appetite is the psychological (external) influences that encourages us to eat, often in absence of hunger.
    3. Satiety is the state in which there is no longer a desire to eat; a feeling of satisfaction.
    4. The *feeding center* and *satiety center* of the brain work to promote adequate nutrient intake.
C. Putting our food choices into perspective
    1. Satiety regulation is not perfect.
    2. Decrease portion sizes slowly to allow the body (appetite and satiety) time to adjust.

1.2 How Is Nutrition Connected to Good Health?

A. What is nutrition?
    1. Science that links food to health and disease
    2. Ingestion, digestion, absorption, transport, and excretion of food substances
B. Nutrients come from food
    1. Nutrients are substances found in food that provide energy and are vital for growth and maintenance of body.
    2. An essential nutrient is required by the body to meet its needs. The body cannot produce it, or produces it in too little quantity to meet its needs.
    3. Essential nutrients must satisfy three criteria.
        a. One specific biological function of the nutrient must be identified in the body.
        b. Omission of the nutrient must lead to decline in biological functions.
        c. Replacing the omitted nutrient before permanent damage occurs restores normal biological functions.
C. Why study nutrition?
    1. Poor diet and sedentary lifestyle are risk factors for life-threatening chronic diseases (see Figure 1-3).
    2. Cardiovascular disease, hypertension, diabetes, cancer, and related disorders account for two-thirds of all deaths in North America (see Figure 1-3).
    3. Combination of poor diet and lack of physical activity may be the second leading cause of death in the United States.
    4. Obesity is second leading cause of preventable death in North America.
    5. Table 1-1 presents glossary terms to aid your introduction to nutrition.

1.3 What Are the Classes and Sources of Nutrients?

A. Overview
    1. The six classes of nutrients can be categorized by function (see Table 1-2).
        a. Provide calories to meet energy needs
        b. Promote growth, development, and maintenance
        c. Regulate body processes
    2. The six classes of nutrients are also categorized by daily needs.
        a. Macronutrients are needed in gram or cup quantities each day.

b. Micronutrients are needed in milligram or microgram quantities each day.

B. Carbohydrates
   1. Simple sugars (monosaccharides and disaccharides)
   2. Complex carbohydrates (polysaccharides)
      a. Starch (digestible)
      b. Fiber (indigestible)
   3. Primary source of energy (4 kcal/g)

C. Lipids (i.e., fats, oils)
   1. Energy yield: 9 kcal/g
   2. Primary form of energy storage
   3. Animal fats (butter and lard) are solid at room temperature
   4. Plant oils are liquid at room temperature
   5. Essential fatty acids
      a. Not produced by the body and must be consumed in diet (essential nutrient)
      b. Roles in blood pressure regulation and synthesis/repair of cells
      c. Small amount required
         i Four tbsp oil per day
         ii Serving of fatty fish 2×/week

D. Proteins
   1. Functions
      a. Structural components of muscle and bone
      b. Blood components
      c. Body cell structure
      d. Enzymes
      e. Immune factors
   2. Energy yield: 4 kcal/g (limited use for energy)
   3. Building blocks of proteins are amino acids
   4. Dietary sources
      a. Animal
      b. Plant
   5. Typical North American consumes up to two times daily requirement.

E. Vitamins
   1. Enable chemical reactions
   2. Provide no energy (0 kcal/g)
   3. 13 Vitamins categorized by solubility
      a. Fat-soluble (vitamins A, D, E, and K)
         i Main sources: dairy products, nuts, seeds, oils, breakfast cereals
         ii Not readily excreted from the body
         iii Some may accumulate in the body toward toxic levels (i.e., vitamin A)
      b. Water-soluble (B vitamins and vitamin C)
         i Main sources: fruits and vegetables
         ii Easily destroyed by cooking
         iii Most are readily excreted from the body

F. Minerals
    1. Inorganic—do not contain carbon
    2. Not destroyed by cooking, but can be lost in cooking water
    3. Provide no energy (0 kcal/g)
    4. Functions: role in nervous system, water balance, structural systems, and other cellular systems
    5. Sixteen or more essential minerals
    6. Categorized by dietary need
        a. Major minerals (needed in amounts greater than 100 mg)
        b. Trace minerals (needed in amounts less than 100 mg)
    7. Electrolytes—minerals that function based on electrical charge when dissolved in water (sodium, potassium, and chloride)

G. Water
    1. Functions
        a. Solvent
        b. Lubricant
        c. Transport of nutrients and wastes
        d. Medium for temperature regulation and chemical processes
    2. Human body is approximately 60% water
    3. Human needs
        a. Men: 13 cups/day
        b. Women: 9 cups/day
    4. Sources
        a. Beverages
        b. Foods
        c. By-product of metabolism

H. Other important components in food
    1. Phytochemicals
        a. Found in fruits and vegetables
        b. Not essential nutrients
        c. Provide a variety of health benefits and may reduce risks for certain diseases
        d. Foods with high phytochemical content are referred to as "superfoods."
        e. Table 1-3 lists common food sources of some phytochemicals.
    2. Sphingolipids and conjugated linoleic acid (CLA)
        a. Found in meat and dairy products
        b. Show some health benefits

I. Sources of nutrients
    1. 500 g (1 pound) protein, fat, and carbohydrates consumed daily
    2. 20 g minerals (in total) consumed daily
    3. 300 mg vitamins (in total) consumed daily
    4. Genetic material directs the use of nutrients in the body.

1.4 What Math Concepts Will Aid Your Study of Nutrition?

A. Calories

1. Sources
    a. Carbohydrates (4 kcal/g)
    b. Lipids (9 kcal/g)
    c. Proteins (4 kcal/g)
    d. Alcohol (7 kcal/g; not an essential nutrient, therefore not required)
2. Most foods provide more than one calorie source
3. Energy (kcal) is used to
    a. Build new compounds
    b. Perform muscular movements
    c. Promote nerve transmission
    d. Maintain electrolyte balance within cells
4. Energy derived from food is measured in kilocalories (kcal)
    a. 1 calorie = heat energy needed to raise the temperature of 1 gram of water 1°C
    b. 1 kilocalorie (Calorie) = 1000 calories (1 kcal) = heat energy needed to raise the temperature of 1000 grams of water 1°C
    c. On food labels, "calories" without a capital "C" means kcal.
    d. Figure 1-4 is a food label example of whole wheat bread.

B. Calculating calories
1. Use the 4-9-4 estimates to calculate calories from carbohydrate, fat, and protein.
2. Use the 4-9-4 estimates to determine what portion of total calorie intake is contributed by carbohydrate, fat, and protein.

C. Percentages
1. Percent refers to a part of the total when the total represents 100 parts.
2. Nutrition relevance: Used often when referring to menus and nutrient composition

D. The metric system
1. 1 ounce = 28 grams
2. 1 kilogram = 2.2 pounds
3. 1 millimeter is approximately the thickness of a dime
4. 1 inch. = 2.54 centimeters
5. 1 quart = 0.946 liters

1.5 How Do We Know What We Know About Nutrition?

A. The scientific method (see Figure 1-5)
1. Make observations and ask questions.
2. Develop hypothesis
    a. Generated by observing natural phenomenon
    b. Generated by studying patterns among population groups
3. Controlled experiments are conducted to test the hypothesis.
    a. Double-blind placebo controlled study design is the most rigorous type of experiment—neither researcher nor participant is aware of the group assignment.
        i Experimental group
        ii Control group

b. Case–control study design involves comparisons made between individuals with and without certain conditions.

4. Peer review evaluation and publication
5. Conduct follow-up studies to confirm or extend the findings.
6. Accept or reject the hypothesis.

B. Types of experiments (see Figure 1-6)

1. Human studies provide strong evidence about relationships between nutrients and health.
2. Animal studies
3. Case–control studies
4. Epidemiological studies
   a. Study diet and disease patterns among populations.
   b. Suggest hypothesis which then needs to be tested by controlled experiments.

1.6 What Is the Current State of the North American Diet and Health?

A. Does obesity threaten our future?

1. Obesity is defined as having an excessive amount of body fat relative to lean tissue.
2. It is estimated that more than 35% of adults are obese.
3. Two-thirds of adults an 1/3 of children are overweight or obese.
4. Robert Wood Johnson Foundation report: *F as in Fat: How Obesity Threatens America's Future 2013* (see Further Reading 19).
   a. Self-reported, state-by-state obesity data from the CDC (see Figure 1-7)
   b. Seven states had obesity rates between 20% and 25% in 2013.
   c. Eighteen states had obesity rates above 30% in 2013.
   d. Two states had obesity rates above 35% in 2013.
   e. Calls for national commitment to the prevention of obesity by 2030.
5. Obesity plays a role in chronic illnesses.
   a. Heart disease
   b. Stroke
   c. High blood pressure
   d. High cholesterol
   e. Diabetes
   f. Arthritis
   g. Certain cancers
6. Problem: Consumption of too many energy dense, nutrient poor foods while living a sedentary lifestyle

B. Assessing the current North American diet

1. National Health and Examination Survey (NHANES) data from 2009 to 2010 indicates:
   a. 15% of calories as proteins (FNB recommends 10% to 35%)
   b. 52% of calories as carbohydrates (FNB recommends 45% to 65%)
   c. 33% of calories as fats (FNB recommends 20% to 35%)

2. Majority (2/3) of protein intake for most North Americans is from animal sources
3. Approximately half of carbohydrates are from simple sugar sources, with the remaining coming from starches such as pastas, breads, and potatoes.
4. Approximately 60% of dietary fats are from animal sources.
5. NHANES 2011–2012 results show positive trends toward healthier lifestyles.
    a. Daily calorie consumption is declining
    b. Soda (full-calorie) intake has declined 25% since late 1990s.
6. Consume a variety of nutrient-dense foods within and across the food groups.
7. Balance calorie intake with energy needs.
    a. Increase intake of nutrient-dense fruits and vegetables
    b. Decrease intake of energy-dense foods such as sugary beverages and fatty foods

C. Health objectives for the United States for the year 2020
1. Healthy People 2020 is issued by the U.S. Department of Health and Human Services' (DHHS) Public Health Service.
    a. Health objectives for our nation released every 10 years
    b. Contains more than 600 health objectives across 42 topic areas
    c. Outlines national standards to:
        i Eliminate health disparities
        ii Improve access to health education and care
        iii Strengthens public health services and efforts
2. Overarching goals
    a. Attain high-quality, longer lives free of preventable disease, disability, injury, and premature death.
    b. Achieve health equity, eliminate disparities, and improve health of all groups.
    c. Create social and physical environments that promote good health for all.
    d. Promote quality of life, healthy development, and healthy behaviors across all life stages.
3. See www.HealthyPeople.gov for more information
4. Nutrition and Weight Status
    a. Topic area specific to nutrition
    b. Includes targeting individual behaviors
    c. Focuses on policies and environments that impact these behaviors in community settings
    d. Maintaining a healthy weight
    e. Supporting the benefits of eating a healthful diet
        i Consuming a variety of nutrient-dense foods within and across the food groups, especially whole grains, vegetables, fruits, low-fat or fat-free milk or milk products, and lean meats and other proteins.
        ii Limiting intake of solid fats, cholesterol, added sugar, sodium (salt), and alcohol.
        iii Limiting intake of calories to meet caloric needs.

f. Table 1-4 presents a list of the six categories of objectives for Healthy People 2020 Nutrition and Weight Status with 22 specific objectives.
g. Table 1-5 presents a detailed sample of Nutrition and Weight Status Objectives and details about the current status and target goals for 2020.

5. New topic areas included in Healthy People 2020
    a. Highlights and focuses on changes in health needs of certain life stages
        i Early and middle childhood
        ii Adolescence
        iii Older adults
    b. Genomics
        i Investigating the relationship of nutrition and genetics
        ii Nine out of 10 leading causes of death have a genetic component.

1.7 What Can You Expect from Good Nutrition and a Healthy Lifestyle?

A. Healthy weight
    1. Seek a lifestyle to promote weight maintenance.
    2. Recognize that weight gain can be associated with overweight/obesity and risks for chronic illnesses.
    3. Increased options for food as result of continual innovation by food manufacturers
    4. Sedentary lifestyles
B. Longer, healthier lives
    1. North Americans live longer and enjoy better health.
    2. Improve health by decreasing intake of animals fats and cholesterol and increasing intake of fruits and vegetables.
C. The total diet
    1. There are no “good” or “bad” foods.
    2. “The total diet or overall pattern of food eaten is the most important focus of healthy eating” (American Academy of Nutrition and Dietetics).
    3. Other ways to promote health and prevent chronic diseases
        a. Consume enough essential nutrients while moderating energy, solid fat, added sugar, and alcohol intake.
        b. Obtain regular physical activity (30–60 minutes most days).
        c. Minimize alcohol intake.
        d. Obtain adequate sleep (7–9 hours per night).
        e. Consume recommended amounts of water daily.
        f. Reduce stress.
        g. Use medications only when necessary.
        h. Abstain from illicit drug use.
        i. Maintain healthy relationships.

1.8 *Nutrition and Your Health*: Eating Well in College

A. Overview
    1. Habits of college students fall short of recommendations for whole grains, vegetables, fruits, milk, and meat; include too much fats, sweets, and alcohol.

2. Health behaviors formed during young adulthood are likely to persist throughout life.

B. Food choices
   1. Stress may negatively impact nutrition and activity habits.
   2. Abundance of energy-dense, nutrient-poor food choices on college campuses
   3. Meals are a time for socialization.

C. Weight control and the "Freshman Fifteen"
   1. A recent study (see Further Reading 21) of 7000 U.S. college students found that students gain 2.4–3.5 pounds during their first year away from home.
      a. Heavy alcohol consumption
      b. Working during college
   2. Maintaining healthy weight and losing excess weight will improve short-term and long-term health.
   3. Losing excess weight
      a. Set several, small, achievable goals.
      b. Monitor foods and activities (Use interactive tools on www.ChooseMyPlate.gov).
      c. Gradual weight loss of 1–2 pounds per week (deficit of 500 kcal/day below needs)
      d. Eat a balanced breakfast.
      e. Moderate use of alcohol and sugary beverages (including gourmet coffee beverages)
      f. Exercise regularly
         i Enjoyable activities
         ii Work out with a friend

D. Alcohol and binge drinking
   1. Binge drinking
      a. Five or more drinks in a row for men
      b. Four or more drinks in a row for women
   2. Moderate alcohol intake
      a. Two drinks a day or less for men
      b. One drink a day for women
   3. Two of five students on college campuses participates in binge drinking.
   4. Alcohol-related health risks
      a. Accidents/injuries
      b. Unsafe sex and its consequences
      c. Long-term health problems
      d. Suicides
      e. Academic problems
      f. Legal troubles
      g. Alcohol abuse or dependence
      h. Weight gain
   5. Thirty-one percent of college students meet criteria for alcohol use disorders.

E. Eating disorders
   1. Thirty percent of college students are at risk of developing an eating disorder.
   2. Short-term disordered eating patterns may progress to an eating disorder.

3. Food becomes the focus of emotional issues.
4. Risks
    a. Limited academic performance
    b. Loss of menstrual periods
    c. Thinning bones
    d. Gastrointestinal problems
    e. Kidney problems
    f. Heart abnormalities
    g. Death

F. Choosing a vegetarian lifestyle
1. Plant-based diets can be a healthful lifestyle, but require appropriate planning.
2. Fortified breakfast cereals provide many vitamins and minerals.
3. Many vegetarian options available
4. Tips to optimize nutritional benefit of plant-based diets
    a. Choose baked, steamed, or stir-fried rather than deep-fried.
    b. Choose whole grains rather than refined carbohydrates.
    c. Consume foods fortified with vitamins and minerals.

G. Fuel for competition: student athletes
1. Increased calorie and nutrient needs.
2. Avoid severe calorie restriction—carbohydrate and fat supply energy to exercising muscles.
3. Emphasis on fluids—sports drinks are ideal for events lasting longer than 60 minutes
4. Losing fluid intentionally is an unhealthy practice.
5. Expensive supplements are not necessary.

H. Tips for eating well on a college student's budget
1. Participate in a prepaid campus meal plan.
2. Planning ahead will save money and improve nutrient intake.
3. Never shop on an empty stomach.
4. Buy store brands.
5. Make use of canned and frozen fruits and vegetables and dry foods.
6. Purchase concentrated fruit juices.
7. Eggs and peanut butter are inexpensive sources of protein.

RATE YOUR PLATE

I. Examine Your Eating Habits More Closely

Choose a day of the week that is typical of your eating pattern. Using the first table found in Appendix C, list all foods and drinks you consumed for 24 hours. In addition, write down the approximate amounts of food you at in units, such as cups, ounces, tea-spoons, and tablespoons. Place the corresponding abbreviation from the list below in the *Reason for Choice* column to indicate why you picked that food or drink. There can be more than one reason for choosing a particular food or drink.

FLVR	Flavor/texture	ADV	Advertisement	PEER	Peers
CONV	Convenience	WTCL	Weight control	NUTR	Nutritive value
EMO	Emotions	HUNG	Hunger	$	Cost
AVA	Availability	FAM	Family/cultural	HLTH	Health

Application

Ask yourself what your most frequent reason is for eating and drinking. To what degree is health or nutritive value reason for your food choices? Should you make these higher priorities?

I choose many foods because they are considered healthy and will help with my health goals and weight maintenance. Other times I am choosing foods that I am used to eating or because I am craving something sweet (taste). I should start to think of the nutrients provided by different foods, and some new foods I have not tried, in order to add some variety to my diet. This variety will help me meet more of my nutrient requirements. I could add variety at breakfast, for example, with fruit. I could add a healthy snack in the afternoon, such as low fat yogurt and granola, rather than drinking regular cola. I noticed that this a time I am often hungry. This will also help me meet more of my nutrient requirements, such as calcium, and fiber.

TABLE C-1 ▶ Example of a One-Day Food Record

Time	Minutes Spent Eating	M or S*	H† (0–3)	Activity While Eating	Place of Eating	Food and Quantity	Others Present	Reason for Choice
7:10 a.m.	15	M	2	Standing, fixing lunch	Kitchen	Orange juice, 1 cup	—	Health
						Crispix, 1 cup		Habit
						Nonfat milk, ½ cup		Health
						Sugar, 2 tsp		Taste
						Black coffee, 1 cup		Habit
10:00 a.m.	4	S	1	Sitting, taking notes	Classroom	Diet cola, 12 oz	Class	Weight control
12:15 p.m.	40	M	2	Sitting, talking	Student union	Chicken sandwich with lettuce and mayonnaise (3 oz chicken, 2 slices of white bread, and 2 tsp mayonnaise)	Friends	Taste
						Pear, 1 medium		Health
						Nonfat milk, 1 cup		Health
2:30 p.m.	10	S	1	Sitting, studying	Library	Regular cola, 12 oz	Friend	Hunger
6:30 p.m.	35	M	3	Sitting, talking	Kitchen	Pork chop, 1	Boyfriend	Convenience
						Baked potato, 1		Health
						Margarine, 2 tbsp		Taste
						Lettuce and tomato salad, 1 cup		Health
						Ranch dressing, 2 tbsp		Taste
						Peas, ½ cup		Health
						Whole milk, 1 cup		Habit
						Cherry pie, 1 piece		Taste
						Iced tea, 12 oz		Health
9:10 p.m.	10	S	2	Sitting, studying	Living room	Apple, 1 medium	—	Weight control
						Water, 1 cup		Weight control

*M or S: Meal or snack.
†H: Degree of hunger (0 = none; 3 = maximum).

II. Observe the Supermarket Explosion

Today's supermarkets carry up to 60,000 items. Think about your last grocery shopping trip and the items you purchased to eat. Following is a list of 20 newer food products added to supermarket shelves. For those items you have tried, use the key from Part I to identify why you chose those products.

Answer choices may vary. Below are examples of why one might choose the following food products.

CONV Prepackaged salad greens (variety packs other than iceberg lettuce)
HLTH Gourmet or sprayable salad oils (e.g., walnut, almond, olive, or sesame oil)
CONV Precooked frozen turkey patties, precooked bacon
PEER/CONV Microwavable sandwiches (e.g., Hot Pockets or frozen sandwiches)
CONV Microwavable meals in a bowl (e.g., mac and cheese, or soup)
CONV Refrigerated precooked pasta (e.g., tortellini or fettucini) and accompanying sauces (e.g., pesto or tomato basil)

HLTH Imported grain products (e.g., risotto, farfalline, gnocchi, or fusilli)
$____ Whole-grain pasta or rice
CONV Frozen dinners (list your favorite of any of the wide variety)
WTCL Bottle water (flavored or unflavored)
ADV Trendy juices (e.g., draft apple cider, acai, or pomegranate)
ADV/FLVR/CONV Roasted and/or flavored coffees (e.g., beans, ground, instant, or K-Cups)
CONV Instant hot cereal in a bowl (add water and go!)
CONV "Fast-shake" pancake mix (add water, shake, and ready to cook)
FLVR/HUNG Breakfast bars or cookies (e.g., granola or fruit-flavored bars)
HLTH Dried fruit and nut mixes
HLTH Meal replacement/fitness products (e.g., "energy" bars, high-protein bars, or sports drinks)
HLTH/ADV Low-calorie muffin tops or bagel thins
CONV/HLTH Packaged yogurt smoothies
HLTH/ADV Milk substitutes (e.g., rice milk or soy milk)

Finally, identify three new food products not on this list that you have seen in the past year. Discuss the appeal of these products to the North American consumer.

Some other new food product examples include, but are not limited to:

- *Ready to eat, microwavable side items (e.g., mashed potatoes, macaroni and cheese, green beans casserole) appeal to individuals and families that value convenience.*
- *Vitamin enhanced water offers a health advantage to plain water, for individuals who may not be meeting nutrient needs.*
- *"Take and bake" breads appeal to individuals and families that desire hot baked bread with a meal but lack the time to prepare and bake it fresh. There are a variety of brands including organic, multigrain, sourdough, Italian, etc.*
- *Prepackaged, washed, and cut fruit and/or vegetables allow individuals to eat fresh produce without spending time to wash, and/or cut.*

Wardlaw's Contemporary Nutrition: A Functional Approach, Fifth Edition

ANSWERS TO STUDY QUESTIONS

For many of the study questions, individual answers will vary. Examples of appropriate answers to these subjective questions are shown.

CHAPTER 1

1. ***Describe the process that controls hunger and satiety in the body. List other factors that influence our food choices. (LO 1.1)***
   Hunger is a physiological drive to eat, and is controlled by internal body mechanisms. As nutrients are processed by the stomach and small intestine, these organs communicate with the liver and brain, reducing further food intake. The liver also uses its direct nerve pathways to the brain to signal hunger and fullness. The hypothalamus, a portion of the brain, helps to regulate hunger and satiety. The feeding center of the hypothalamus signals the body to eat, whereas the satiety center signals the body to stop eating. Besides hunger—the internal, physiological drive to find and eat food—many external factors contribute to food choices. Some of these factors include flavor, texture, and appearance of foods; early life experiences; routines or habits; advertising; social changes; economics; and nutrition knowledge.

2. ***Describe how your food preferences have been shaped by the following factors:***
   a. Exposure to foods at an early age
   b. Advertising (what is the newest food you have tried?)
   c. Eating out
   d. Peer pressure
   e. Economic factors (LO 1.1)
   Food choices are influenced by many factors:
   a. Being raised by a vegetarian mother, I was exposed to a wide variety of fruits and vegetables from a young age and never went through a picky stage or refused to eat vegetables.
   b. At the grocery store, there were coupons and free samples of a new type of cereal bar. I tried it, liked it, and purchased it for breakfast this week.
   c. Because we were in a hurry and stopped at a fast food restaurant, my food choices at lunch today were excessive in calories, fat, and sodium.
   d. At Thanksgiving dinner, my grandmother offered me a second helping of mashed potatoes and gravy. I didn't want to hurt her feelings, so I ate the extra portion.
   e. Expenses play a major role in my diet patterns. As a college student, funds are limited, so I really try to eat inexpensive food items or those that are on sale. For example, I purchased canned peaches instead of fresh peaches.

3. ***What products in your supermarket reflect the consumer demand for healthier foods? For convenience? (LO 1.1)***
   Many grocery stores now offer an organic aisle or health food aisle, which reflects a changing trend in consumer demands. In terms of convenience, the frozen food section has become larger than ever and many supermarkets now offer prepared meals, such as sandwiches and roasted chicken.

4. ***Name one chronic disease associated with poor nutrition habits. Now list a few corresponding risk factors. (LO 1.2)***
   Cardiovascular disease is a chronic disease associated with poor nutritional habits. A few corresponding risk factors are high blood cholesterol, high blood pressure, inadequate physical activity, diabetes, and smoking.

5. ***Describe two sources of fat and explain why the differences are important in terms of overall health. (LO 1.3)***
   There are two basic types of fat, unsaturated fat and saturated fat. Plant oils tend to contain many unsaturated fatty acids, which make them liquid at room temperature. Certain unsaturated fatty acids are essential nutrients, and some may also lower blood cholesterol. Animal fats are often rich in saturated fatty acids, which make them solid at room temperature. Saturated fatty acids tend to raise blood cholesterol.

6. ***Identify three ways that water is used in the body. (LO 1.3)***
   Individual answers will vary. *Example:* To name just a few functions, water acts as a solvent and lubricant, provides a medium for transport of nutrients and wastes, and helps to regulate body temperature.

7. ***Explain the concept of calories as it relates to foods. What are the values used to calculate kcal from grams of carbohydrate, fat, protein, and alcohol? (LO 1.4)***
   A calorie is a measure of heat energy: the amount of heat it takes to raise the temperature of 1 gram of water 1°C. Energy is stored in the chemical bonds in the carbohydrates, fat, and protein in the foods we eat. We can use this chemical energy to perform body functions, from pumping ions across cell membranes to moving skeletal muscles. Foods generally provide calories from more than one source. The fuel value for a gram of carbohydrate is 4 kcal, a gram of fat is 9 kcal, a gram of protein is 4 kcal, and a gram of alcohol is 7 kcal.

8. ***A bowl of Panera's broccoli cheddar soup contains 21 grams carbohydrate, 13 grams fat, and 12 grams protein. Calculate the percentage of calories derived from fat. (LO 1.4)***
   21 grams x 4 calories/gram of carbohydrate = 84 calories from carbohydrate
   13 grams fat x 9 calories/gram of fat = 117 calories from fat
   12 grams protein x 4 calories/gram of protein = 48 calories from protein
   84 + 117 + 48 = 213 total calories
   117 calories from fat/213 total calories = 0.55 x 100 = 55% calories from fat

9. According to national nutrition surveys, which nutrients tend to be underconsumed by many North Americans? Why do you think this is the case? (LO 1.5)

Some North Americans have inadequate intakes of iron, calcium, vitamin A, various B vitamins, vitamin C, vitamin D, vitamin E, potassium, zinc, and fiber. This is primarily because of an inadequate fruit, vegetable, and whole grain intake, as well as over-consumption of sugared soft drinks and snacks.

10. List four Healthy People 2020 objectives for the United States. How would you rate yourself in each area? Why? (LO 1.5 & 1.6)

Four *Healthy People 2020* objectives for the United States are as follows:

a. Increase the proportion of adults who are at a healthy weight. At 5'7" and 140 pounds, I am at a healthy weight.
b. Increase the variety and contribution of vegetables to the diets of the population ages 2 years and older. I usually consume one or two servings of vegetables per day. I should increase my consumption of vegetables.
c. Reduce consumption of saturated fat in the population ages 2 years and older. I usually select poultry and fish instead of red meat, so these choices are lower in saturated fat. However, I should cut down on the amount of cheese I eat, as this is a source of saturated fat.
d. Reduce consumption of sodium in the population ages 2 years and older. I prepare most of my foods at home rather than relying on fast food or frozen meals. This helps me to keep my sodium intake within a healthy range.

11. List five strategies to avoid weight gain during college. (LO 1.7)

Five strategies to avoid weight gain during college are:

a. Eat breakfast.
b. Plan ahead to eat a balanced meal or snack every 3–4 hours.
c. Limit liquid calories by drinking water instead of high-calorie soft drinks, fruit juice, alcohol, or coffee.
d. Keep a stash of low-calorie, nutritious snacks, such as pretzels, light microwave popcorn, and fruit (fresh, canned, or dried).
e. Exercise at least 30 minutes at least 5 days a week.