

## Chapter 2 – Nutrition Tools—Standards and Guidelines

### Quick List: IM Resources for Chapter 2

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### Chapter Learning Objectives and Key Points

#### 2.1 Identify the full names and explain the functions of the RDA, AI, UL, EAR, and AMDR and discuss how the Daily Values differ in nature and use from other sets of nutrient standards.

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

#### 2.2 List the four major topic areas of the *Dietary Guidelines for Americans* and explain their importance to the population.

The *Dietary Guidelines for Americans* address problems of undernutrition and overnutrition. They recommend following a healthful eating pattern and being physically active.

#### 2.3 Describe how and why foods are grouped in the USDA Food Patterns, including subgroups.

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

#### 2.4 Outline the basic steps of diet planning with the USDA Food Patterns, and address limits for solid fats and added sugars.

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

#### 2.5 Evaluate a food label, delineating the different uses of information found on the Nutrition Facts panel, on the ingredients list, and in any health claims or other claims made for the product.

<sup>1</sup> Contributed by Kris Levy, R.D., L.D., Columbus State Community College

<sup>2</sup> Contributed by Lora Beth Brown, Ed.D., R.D., C.D., Brigham Young University

- 2.6 **State specific nutritional advantages of a carefully planned nutrient-dense diet over a diet chosen without regard for nutrition principles.**
- 2.7 **Discuss the positive and negative findings for dietary phytochemicals with regard to health, and make a case for food sources over supplements to provide them.**

### *Critical Thinking Questions*

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

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

The EER values are set mid-way along the population curve because most people obtain too much energy for their bodies' needs. This results in unnecessary weight gains with risk to health. The DRI committee has purposefully set the EER value at a less generous level so that most people adhering to them do not exceed their energy needs for the day.

2. *You wish to increase your intake of whole grains without taking in excessive amounts of calories. How would you utilize the USDA ChooseMyPlate.gov website to find out about whole-grain foods and the correct portion sizes and amounts to incorporate into your eating plan?*

You would visit the [www.choosemyplate.gov](http://www.choosemyplate.gov) website and click on Daily Food Plans under SuperTracker & Other Tools, then click on the Daily Food Plan link. You would enter your age, sex, weight, height, and physical activity level and submit this information, and receive a Daily Food Plan listing how many ounces or cups recommended from each food group per day. In the Grains section of the customized plan, you would then click on tips for a list of suggestions for eating more whole grains. From this page, you could navigate to other grains group information, including "What Counts as an Ounce?" to learn how to achieve the desired portion sizes. You could develop a one-day eating plan with some of the whole-grain choices given the portion amounts that are recommended for you.

3. *Which of the following people does the RDA for vitamin D not apply to and why? (a) A middle-aged active woman; (b) a growing child; (c) an elderly man; or (d) an adolescent male with cystic fibrosis.*

The correct choice is d. The RDA values are designed to meet the nutritional needs of most healthy people at various life stages. The RDAs may not apply to people with chronic diseases due to their condition or the impact of their condition on absorption or use of a given nutrient. People with cystic fibrosis secrete abnormally thick mucus that may reduce pancreatic function and interfere with nutrient digestion and absorption.

4. *The Acceptable Macronutrient Distribution Ranges (AMDR) for the energy-yielding nutrients are generous. Describe the group of people who would benefit from the lower limits of each range—for carbohydrates, lipids, and proteins. Which groups of people would benefit from the higher limits of each range—for carbohydrates, fats, and proteins?*

The AMDR for carbohydrates is 45-65% of total calories. A person who is very physically active will need a lot of carbohydrates to supply their muscles with glucose for ATP (energy). They may easily need 65% of all calories in the form of carbohydrates. An inactive person may only need 45% of all calories from carbohydrates since their muscles don't need as much glucose for movement.

The AMDR for fat is 20-35% of total calories. Again, a physically active person can likely eat up to 35% of their calories from fat. A person who must watch their fat intake, such as someone with high blood triglycerides or a disease that causes fat malabsorption, may want to take in only 20% of their calories from fat.

The AMDR for protein is 10-35% of total calories. Someone who engages in physically demanding activity may need more protein to maintain her muscles. She can easily keep her muscles strong by getting 35% of her

total calories in the form of protein. A person with kidney disease may need to watch his protein intake and may only want to take in 10% of all calories in the form of protein.

5. *Describe any two reasons why it is important to have broad-reaching guidelines for each of the major nutrient groups when considering meal planning each day.*

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

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

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

See Figure 2-6 in the textbook. For example, a potato that provides 117 calories when baked provides 258 calories plus added solid fats when fried in fat. One could look up a whole food that is nutrient dense using Appendix A in the textbook or the MyPlate website and then compare that food's calorie, vitamin, and mineral contents to a similar food that is prepared with added fat or sugar.

### ***Controversy Discussion Questions***

1. *Describe what the term “oxidative stress” means in terms of the body tissues. Give any 3 examples of how oxidative stress can cause disease in the body.*

Oxidative stress refers to the buildup of free radicals, which are oxygen-like molecules that are charged and react with the body's proteins, fats, and tissues. Free radicals are a natural by-product of cellular respiration, which is the production of energy (ATP), in the presence of oxygen. Too many of these molecules can cause inflammation in the tissues as well as changes in blood lipids and cell DNA, which can lead to harmful changes in the body.

Examples of how oxidative stress can lead to disease are:

- Oxidation of low-density lipoprotein in the blood can cause inflammation of the blood vessels in the body. This could be a serious problem for blood vessels supplying the heart and the brain tissue and could lead to heart attack or stroke.
- Oxidative stress can cause changes in the brain tissue that can lead to memory loss or loss of brain function as we age.
- Free radicals can attack DNA molecules, which store genetic information and control cell development. This could lead to changes in the cells that cause them to start to grow uncontrollably and lead to cancer.

2. a. *What is a phytoestrogen?*

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

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

Soy beans can have a lot of phytoestrogens in them or they may contain substances that can be converted into phytoestrogens by intestinal bacteria.

Flaxseeds contain lignans that can be converted into phytoestrogens by the intestinal bacteria.

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

Supplements may contain phytoestrogens in much higher concentrations than are found in foods. There is a lot of research examining the effects of phytoestrogens in the body. Some studies suggest that high levels of phytoestrogens may actually increase the risk of development of certain types of cancer, whereas other studies suggest the opposite effects. Pregnant women should never take phytoestrogen supplements either.

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

Probiotics are bacteria that are found in yogurt cultures such as *Acidophilus* or *Lactobacillus*. These organisms do not harm the body and may actually help the digestive system in the long run. Everyone's colon contains many bacteria that actually help the body obtain nutrients such as vitamin K. Bacteria in the digestive system can digest nutrients in food and release molecules that may reduce the inflammation in the lining of the digestive tract.

Such normal flora can be destroyed when antimicrobial medications are used. This can cause the overgrowth of other more harmful bacteria, which can lead to diarrhea and other illnesses. Probiotics can be taken to repopulate the digestive system with more beneficial bacteria that will help control the growth of more harmful bacteria.

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

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

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

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

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

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

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

## **Worksheet Answer Key**

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

1. Marshmallow Magician lists that it contains 12 vitamins and minerals and 110 kilocalories per serving of cereal, and is a good source of calcium and whole grain. Zen-Tastic lists high fiber, low fat, low sodium, whole grain, vegetarian, and contains no *trans* fats.
2.
  - a. Zen-Tastic does with 9 grams of fiber.
  - b. The sources of fiber in this cereal include brown rice flour, rolled oats, wheat bran, and dried cranberries.
3.
  - a. Marshmallow Magician does, with 10% for both vitamins.
  - b. Yes—Marshmallow Magician would usually be considered a high-sugar cereal.
  - c. Marshmallow Magician could provide some extra vitamins and minerals for a person who eats a lot of fast food or processed food, which may not have a lot of vitamins or minerals.
4.
  - a. Added to the cereal as pyroxidine hydrochloride
  - b. Added to the cereal
  - c. Vitamin B<sub>6</sub> is listed further down on the ingredients list.
5.
  - a. *Open answer (answers will vary)* [it's a marketing term with no legal definition]
  - b. Perhaps this cereal promotes regularity and energy that may help a person feel better overall.
6.
  - a. Skim milk
  - b. *Open answer*

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

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

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

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

	Calories	Iron (mg)	Vitamin A (RAE ug)
1 cup 2% milk (with nonfat milk solids)	125	0.12	137
3 oz. ground beef extra lean, broiled well (plain hamburger without bun)	214	2.21	0
8 raw baby carrots	28	0.71	552
<b>Totals</b>	<b>367</b>	<b>3.04</b>	<b>689</b>

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

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

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

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

- |                              |                  |              |
|------------------------------|------------------|--------------|
| 1. sodium                    | 5. UL            | 9. Exchange  |
| 2. flavonoids                | 6. MyPlate       | 10. Adequate |
| 3. A: probiotics, D: protein | 7. lycopene      | 11. serving  |
| 4. Macronutrient             | 8. discretionary |              |

### Learning Activities & Project Ideas

#### Activity 2-1: Do It Yourself—Crafting Consumer Tips Project<sup>3</sup>

LO 2.2

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

Boost the effectiveness of your tips by using these guidelines:

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

#### Activity 2-2: Estimating Amounts<sup>4</sup>

LO 2.3, 2.4

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

Prior to the assignment, you will need to set up the display, which will include the following food items:

McDonald’s Big Mac, large order of McDonald’s French fries, a potato, a Taco Bell bean burrito, a pouch of fruit drink, an apple, green beans, ice cream, single-serving milk bottle, Teriyaki Stix rice bowl, peanut butter, bread, fat-free salad dressing, and regular salad dressing.

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

<sup>3</sup> Source: Dietary Guidelines Alliance, Chicago, IL.

<sup>4</sup> Contributed by Lora Beth Brown, Ed.D., R.D., C.D., Brigham Young University

**Activity 2-3: Estimating Amounts (with Instructor-Chosen Foods)**

LO 2.3, 2.4

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

Grains Food Gallery: [http://www.choosemyplate.gov/food-groups/food\\_library/grains/brownrice.html](http://www.choosemyplate.gov/food-groups/food_library/grains/brownrice.html)  
 Vegetables Food Gallery: [http://www.choosemyplate.gov/food-groups/food\\_library/vegetables/spinach.html](http://www.choosemyplate.gov/food-groups/food_library/vegetables/spinach.html)  
 Fruits Food Gallery: [http://www.choosemyplate.gov/food-groups/food\\_library/fruit/bananas.html](http://www.choosemyplate.gov/food-groups/food_library/fruit/bananas.html)  
 Dairy Food Gallery: [http://www.choosemyplate.gov/food-groups/food\\_library/dairy/skim.html](http://www.choosemyplate.gov/food-groups/food_library/dairy/skim.html)  
 Protein Foods Gallery: [http://www.choosemyplate.gov/food-groups/food\\_library/proteinfoods/lean\\_beef.html](http://www.choosemyplate.gov/food-groups/food_library/proteinfoods/lean_beef.html)

**Activity 2-4: Perceived vs. Standard Grain Portion Sizes<sup>5</sup>**

LO 2.3, 2.4

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

**Activity 2-5: Beverage Portion Sizes<sup>5</sup>**

LO 2.3, 2.4

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

**Activity 2-6: Models of MyPlate Portion Sizes<sup>5</sup>**

LO 2.3, 2.4

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

**Activity 2-7: Compare Your Food Intake to the USDA Food Patterns**

LO 2.3, 2.4

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

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

LO 2.5

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

<sup>5</sup> Contributed by Lora Beth Brown, Ed.D., R.D., C.D., Brigham Young University

in order to help consumers choose healthful fresh and whole foods. You can also discuss the students' choices of fresh foods in terms of nutrient density and their places in the USDA Food Patterns/MyPlate. If desired, distribute Handout 2-1, which lists the FDA's lists used for the voluntary labeling program.

### **Activity 2-9: Review—USDA Food Patterns Jeopardy!**<sup>6</sup>

LO 2.3

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

### **Activity 2-10: Phytochemical Commercials Project**<sup>7</sup>

LO 2.7

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

## ***Chapter Lecture Outline***

### I. Introduction

#### A. Eating well is easy in theory:

1. Just choose a selection of foods that supplies appropriate amounts of the essential nutrients, fiber, phytochemicals, and energy, without excess intakes of unhealthy fats, sugar, and salt.
2. Be sure to get enough exercise to balance the foods you eat!!

#### B. In practice, eating well proves harder than it appears.

1. Many people are overweight, or undernourished, or suffer from nutrient excesses or deficiencies that impair their health.
2. They are malnourished.

### II. Nutrient Recommendations

#### A. Dietary Reference Intakes

1. The Dietary Reference Intakes are nutrient intake standards set for people living in the United States and Canada.
2. The Daily Values are U.S. standards used on food labels that allow consumers to compare the nutrient content of 2 foods.
3. The DRI committee has set values for: Vitamins, minerals, carbohydrates, fiber, lipids, protein, water, energy

#### B. The DRI Lists and Purposes

1. RDA and AI—Recommended Nutrient Intakes
  - a. Both are nutrient goals
  - b. RDA – Recommended Dietary Allowances are based on solid experimental evidence.
  - c. AI – Adequate Intake values are set up if there is not enough information about a nutrient to establish an RDA value for that nutrient.
2. EAR—Nutrition Research and Policy – The EAR values form the scientific basis from which the RDA values are derived.
3. UL—Safety
  - a. UL – Tolerable Upper Intake Levels
  - b. To identify potentially hazardous levels of nutrient intakes

<sup>6</sup> Contributed by: Don Simpson, University of Arkansas, Fayetteville

<sup>7</sup> Contributed by Nancy J. Correa-Matos, Ph.D., R.D., University of North Florida

- c. Beneficial to those who take supplements or who consume foods with added vitamins or minerals
- d. Not all nutrients have an established UL value
- 4. AMDR—Calorie Percentage Ranges
  - a. A diet consisting of the macronutrients in these proportions will help ensure nutritional adequacy with a reduced risk of developing chronic diseases.
  - b. 45 to 65 percent from carbohydrates
  - c. 20 to 35 percent from fat
  - d. 10 to 35 percent from protein
- C. Understanding the DRI Recommended Intakes
  - 1. DRI for Population Groups
    - a. Separate recommendations for men, women, pregnant, lactating, infants, and children
    - b. Specific age ranges
    - c. Recommendations for healthy people
  - 2. Other Characteristics of the DRI
    - a. The values are based on available scientific research and updated periodically in light of new knowledge.
    - b. The values are based on the concepts of probability and risk.
    - c. The values are recommendations for optimal intakes, not minimum requirements. They include a generous margin of safety.
    - d. The values are set in reference to specific indicators of nutrient adequacy such as blood nutrient concentrations or reduction of particular chronic conditions, rather than prevention of deficiency symptoms alone.
    - e. The values reflect daily intakes to be achieved, on average, over time. The values are set high enough to ensure that body stores will meet nutrient needs during periods of inadequate intakes.
  - 3. The DRI Apply to Healthy People Only – A person who is ill may require a higher intake of certain nutrients or may not be able to tolerate the DRI recommendations.
- D. How the Committee Establishes DRI Values—An RDA Example
  - 1. Determining Individual Requirements – How does the DRI committee set values?
    - a. For determining RDA, a balance study is performed.
    - b. Determines a person’s requirement to achieve balance for nutrient X
  - 2. Accounting for the Needs of the Population – The EAR value of a nutrient would be set at the mean for the entire population.
  - 3. The Decision – The RDA value is set such that 97-98% of the population receives enough nutrient X for optimal functioning.
- E. Setting Energy Requirements
  - 1. In contrast to the RDA for nutrients, the value set for energy, the Estimated Energy Requirement (EER), is not generous.
  - 2. It is set at an average value so as to maintain body weight and to discourage unhealthy weight gain.
  - 3. The AMDR values help achieve a healthy balance of nutrients in the diet as well as reduce the risk of chronic diseases.
- F. Why Are Daily Values Used on Labels?
  - 1. One set of values that applies to everyone found only on food labels
  - 2. Reflect the needs of an “average” person – someone eating 2,000 to 2,500 calories a day
  - 3. Enable consumers to compare the nutrient values among foods
  - 4. The Daily Values do not serve as nutrient intake goals for individuals.

### III. *Dietary Guidelines for Americans*

- A. The *Guidelines* Promote Health – offer science-based advice for people ages 2 and up – Table 2-1
- B. Four Major Topic Areas
  - 1. Balance calories to manage a healthy body weight. – Overweight or obese people should consume fewer calories from food and beverages.
  - 2. Reduce intakes of certain foods and food components.
    - a. Reduce intake of foods high in sodium to lower risk of kidney disease or high blood pressure.
    - b. Limit saturated fats to less than 10% of daily calories as well as consuming less than 300 mg/day of cholesterol.
    - c. Limit *trans* fat, solid fat, added sugar, and refined grain intakes.

- d. Consume alcohol in moderation.
- 3. Increase intakes of certain nutrient-dense foods.
  - a. Eat a larger quantity and variety of fruits and vegetables.
  - b. Consume at least half of grain intake as whole grains.
  - c. Increase intake of fat-free or low-fat dairy products
  - d. Choose a variety of lean protein sources, especially seafoods, legumes, nuts, or soy products.
  - e. Avoid solid fats in protein and fat/oil choices.
  - f. Choose foods with more potassium, fiber, calcium, and vitamin D.
- 4. Build a healthy eating pattern.
  - a. Select an eating plan that meets nutrient needs at an appropriate calorie level.
  - b. Follow food safety guidelines to minimize risk of food-borne illness.
- C. How Does the U.S. Diet Compare to the Guidelines?
  - 1. Based on the NHANES surveys 2001-2004 or 2005-2006) – comparison of recommendations to actual intakes
  - 2. Figure 2-4 shows that we eat too few of the food groups that supply key nutrients as well as fiber, potassium, vitamin D, and calcium and we consume too many calories, sugars, and solid fats.
- D. Our Two Cents' Worth – Enjoy eating healthfully but eat less.

#### IV. Diet Planning with the USDA Food Patterns

- A. Introduction
  - 1. A major recommendation of the *Dietary Guidelines for Americans* is to choose a diet based on the food group plan concept.
  - 2. If you design your diet around the USDA Food Patterns, you will achieve adequacy, balance, and variety.
- B. The Food Groups and Subgroups
  - 1. Vegetables Subgroups and Protein Foods Subgroups
    - a. Not every vegetable supplies nutrients found in all of the foods of the vegetables group – Example: vegetables are divided into red and orange, dark green, starchy, legumes based on their content of various nutrients
    - b. The fat content of protein foods can vary widely.
    - c. Meats tend to have higher saturated fat content while seafood, nuts, seeds, and soy foods have less saturated fats and enough essential fatty acids.
  - 2. Grains Subgroups and other Foods
    - a. The nutrient content of foods in the grains group vary widely.
    - b. Refined grains usually lack fiber and other beneficial nutrients but supply energy.
    - c. Whole grains should be included in each day's intakes.
    - d. Spices, herbs, and coffee provide few nutrients but may contain beneficial phytochemicals.
  - 3. Variety Among and Within Food Groups – Select a variety of foods between food groups and within each food group to ensure nutritional adequacy.
- C. Choosing Nutrient-Dense Foods
  - 1. Solid Fats, Added Sugars, and Alcohol Reduce Nutrient Density
    - a. Choose the most nutrient-dense foods from each group to prevent overweight or obesity.
    - b. Solid fats, added sugars, and alcohol reduce nutrient density of foods
  - 2. The Concept of Discretionary Calories
    - a. Difference between cal needed for nutrient-dense foods to provide dietary adequacy and total cal requirement
    - b. The discretionary calorie allowance can help people who want to limit calorie intake to avoid weight gain.
    - c. Nutrient-dense foods are the best choices for “spending” the allowance.

#### V. Diet Planning Application

- A. Plan a day's meals to follow the USDA Food Patterns within a given calorie budget.
  - 1. Use Table 2-2 to determine the daily calorie budget for a given group of people as well as to determine the number of servings of foods from each major food group.
  - 2. See Table 2-3 to determine the amount of vegetable and protein food subgroups needed for the week.

3. Table 2-4 demonstrates a sample diet plan that shows how the food groups are broken up between the day's meals.

#### B. MyPlate Educational Tool

1. The concepts of the USDA Food Patterns are conveyed to the consumer through the MyPlate educational tool.
2. More information at [www.choosemyplate.gov](http://www.choosemyplate.gov)

#### C. Flexibility of the USDA Food Patterns

1. Allows for substitutions according to personal preferences, national and cultural food choices as shown in Figure 2-9
2. Vegetarians can use the USDA Food Patterns for meal planning as well. They can choose among the plant protein foods and count legumes (in the vegetables group) as protein foods.

#### D. A Note about Exchange Systems

1. Exchange lists facilitate calorie control by providing an understanding of how much carbohydrate, fat, and protein are in standardized portions of foods from each group.
2. Appendix D describes the foods within the exchange groups as well as their associated macronutrient contents.

#### E. The Last Word on Diet Planning

1. Small changes each day can add up to substantial changes over time.
2. These changes may help reduce the risk of developing chronic diseases.

#### F. A Consumer's Guide to Controlling Portion Sizes at Home and Away – to control calories, must pay attention to portion sizes

1. How Big Is Your Bagel? – Be aware of large portion sizes
2. Practice with Weights and Measures – Be able to recognize actual portion sizes as recommended by the USDA Food Patterns and relate them to common objects.
3. Colossal Cuisine in Restaurants – The percentage of total calories from foods eaten away from home has doubled over the last 30 years (see Figure 2-10).
4. Moving Ahead – Make portion control a habit to avoid overeating.

## VI. Checking Out Food Labels

### A. What Food Labels Must Include

#### 1. Introduction

- a. The Nutrition Education and Labeling Act of 1990
- b. Every packaged food must state:
  1. The common name of the product.
  2. The name and address of the manufacturer, packer, or distributor.
  3. The net contents in terms of weight, measure, or count.
  4. The nutrient contents of the product (Nutrition Facts panel).
  5. The ingredients, in descending order of predominance by weight.
  6. Essential warnings, such as alerts about ingredients that often cause allergic reactions or other problems.
- c. Small items like candy may only have a telephone number on the label.
- d. Tuna fish will have a small label with abbreviated information.

#### 2. The Nutrition Facts Panel

- a. The following are found on all labels:
  1. Serving size, servings per container, calories/calories from fat
  2. Nutrient amounts and percentages of Daily Values for: Total fat, cholesterol, sodium, total carbohydrate/sugars/dietary fiber, protein
- b. In addition, the label must state the contents of these nutrients expressed as percentages of the Daily Values: Vitamin A, vitamin C, calcium, iron
- c. The labels also have a calories per gram reminder as a handy reference.

#### 3. Ingredients List – may seem straightforward but sugar can have many other names

- a. Ingredients are listed in descending order by weight
- b. This can help consumers spot ingredients that they are allergic to, drinks that are made of juice versus water and sugar, and whole-grain foods versus refined grains.

#### 4. More About Percentages of Daily Values

- a. The calculations used to determine the “% Daily Value” figures for nutrient contributions from a serving of food are based on a 2,000-calorie diet.
  - b. Example: If a food contributes 13 milligrams of vitamin C per serving, and the DV is 60 milligrams, then a serving of that food provides about 22 percent of the DV for vitamin C.
  - c. Labels also have calorie/gram reminders that can help consumers plan meals.
- B. What Food Labels *May* Include
1. Introduction: So far, we have looked at the accurate and reliable facts on nutrition labels. Let’s look at more reliable claims but also unreliable but legal claims that can be made on food labels.
  2. Nutrient Claims: Reliable Information
    - a. If a food meets specific criteria, the label may display certain approved nutrient claims, as shown in Table 2-6.
    - b. The term “good source” means that the product will contain 10-19% of the Daily Value per serving.
  3. Health Claims: Reliable and Not So Reliable
    - a. The FDA allows health claims that are supported by weak evidence as well as those with a high degree of scientific evidence to appear on labels.
    - b. “Qualified” claims must contain statements that describe the extent to which studies back up a given claim.
    - c. Table 2-7 shows examples of reliable health claims on labels.
  4. Structure-Function Claims: Best Ignored
    - a. No prior approval is needed from the FDA.
    - b. Structure-function claims can appear on a food or supplement.
    - c. For claims on a supplement, the manufacturer must notify the FDA after marketing, and the label has to have a disclaimer stating that the FDA has not evaluated the claim.
  5. Label Short Cuts
    - a. Label short cuts are icons on food packages that may be endorsements from professional or academic groups.
    - b. The FDA is developing a standardized set of symbols for all products that meet the criteria of the *Dietary Guidelines for Americans 2010*.

## VII. Food Feature: Getting A Feel For the Nutrients in Foods

- A. Comparing the Nutrients – Figures 2-14 & 2-15 show two very different intakes for 2 days.
- B. Monday’s Meals in Detail – Monday’s meals are clearly more nutrient dense than Tuesday’s meals.
- C. Tuesday’s Meals in Detail – No fruit or whole grains, little vegetables or dairy, too much energy and unhealthful food components
- D. Use a Computer—Or Not? – People use the computer with diet analysis programs or track their meals on paper to assess their food options and make more informed choices.

## VIII. Controversy: Are Some Foods Superfoods for Health?

- A. A Scientist’s View of Phytochemicals – Blueberries, chocolate, flaxseed, garlic, soybeans and soy products, tomatoes; tea, whole grain, and wine; yogurt
  1. Phytochemicals, such as flavonoids, may reduce inflammation in the body and serve as antioxidants
    - a. See Table C2-2 for potential health effects and food sources of phytochemicals
    - b. See Figure C2-1 for antioxidant capacity of selected foods
  2. Blueberries and the Brain – Blueberries provide flavonoids that may reduce oxidative damage in brain tissue.
  3. Chocolate, Heart, and Mood – Chocolate contains flavonoids that may protect heart tissue from oxidative damage.
  4. Flaxseeds provide lignans, which are converted into phytoestrogens that may lower the risk of intestinal cancer, breast cancer, prostate cancer, and heart disease.
  5. Garlic contains organosulfur compounds that may reduce the risks of some cancers, heart disease, and some infections.
  6. Soybeans and Soy Products – Soy products contain phytoestrogens that may reduce the risks of some cancers, reduce hot flashes, and help reduce blood cholesterol.
  7. Soy’s Potential Downsides – ACS recommends moderation for those with a history of breast cancer
  8. Tomatoes contain lycopene, which may help reduce the risk of some cancers.

9. Tea – source of flavonoids; green tea consumption may reduce blood lipids
  10. Grapes and Wine – Wine contains resveratrol, a compound that may exhibit anticancer properties and extend the lifespan of some cells.
  11. Yogurt contains beneficial bacteria called probiotics that may help regulate digestion and help reduce allergies in some people.
- B. Phytochemical Supplements
1. Foods deliver 1000s of phytochemicals in addition to nutrients.
  2. Supporters of Phytochemical Supplements – say:
    - a. Evidence is good enough to recommend supplements.
    - b. People have been eating them forever and so they must be safe to consume as supplements.
  3. Detractors of Phytochemical Supplements – say:
    - a. The body is not used to handling them in large concentrations, especially flaxseed, which can interfere with vitamin and mineral absorption.
    - b. They alter body functions in ways not yet understood fully.
    - c. Evidence for the safety of isolated phytochemicals in humans is lacking.
    - d. No regulatory body oversees their safety. No studies are required to prove they are safe or effective before they are marketed.
    - e. The manufacturers of phytochemical supplements make structure-function claims that are unproven or untested by the FDA.
- C. The Concept of Functional Foods
1. Manufactured functional foods consist of processed foods that are fortified with nutrients or enhanced with phytochemicals or herbs.
  2. What are better choices: snack foods sprinkled with phytochemicals or whole foods?
  3. Are smoothies that contain medicinal herbs safe for everyone to consume?
- D. The Final Word
1. ...is that moderation of intake of any one superfood is very important.
  2. It is important to consume a variety of grains, beans, fruits, and vegetables.

## Worksheet 2-1: Breakfast Cereal Label Analysis

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

<p>What's so great about Zen-Tastic organic cereal?</p> <p>High fiber Low fat Low sodium Whole grain Vegetarian No trans fats</p>		<h1 style="margin: 0;">Nutrition Facts</h1> <p>Serving Size <math>\frac{3}{4}</math> cup (55g) Servings Per Container about 6</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 70%;"></th> <th style="width: 15%; text-align: center;">Cereal</th> <th style="width: 15%; text-align: center;">Cereal + 125 ml fortified skim milk</th> </tr> </thead> <tbody> <tr> <td><b>Amount Per Serving</b></td> <td></td> <td></td> </tr> <tr> <td><b>Calories</b></td> <td style="text-align: center;">190</td> <td style="text-align: center;">230</td> </tr> <tr> <td style="padding-left: 20px;">Calories from Fat</td> <td style="text-align: center;">25</td> <td style="text-align: center;">25</td> </tr> <tr> <td></td> <td colspan="2" style="text-align: center;"><b>% Daily Value**</b></td> </tr> <tr> <td><b>Total Fat</b> 2.5g*</td> <td style="text-align: center;"><b>4%</b></td> <td style="text-align: center;"><b>4%</b></td> </tr> <tr> <td style="padding-left: 20px;">Saturated Fat 0g</td> <td style="text-align: center;"><b>0%</b></td> <td style="text-align: center;"><b>0%</b></td> </tr> <tr> <td style="padding-left: 20px;">Trans Fat 0g</td> <td></td> <td></td> </tr> <tr> <td><b>Cholesterol</b> 0mg</td> <td style="text-align: center;"><b>0%</b></td> <td style="text-align: center;"><b>0%</b></td> </tr> <tr> <td><b>Sodium</b> 95mg</td> <td style="text-align: center;"><b>4%</b></td> <td style="text-align: center;"><b>7%</b></td> </tr> <tr> <td><b>Total Carbohydrate</b> 41g</td> <td style="text-align: center;"><b>14%</b></td> <td style="text-align: center;"><b>16%</b></td> </tr> <tr> <td style="padding-left: 20px;">Dietary Fiber 9g</td> <td style="text-align: center;"><b>36%</b></td> <td style="text-align: center;"><b>36%</b></td> </tr> <tr> <td style="padding-left: 20px;">Sugars 13g</td> <td></td> <td></td> </tr> <tr> <td><b>Protein</b> 5g</td> <td></td> <td></td> </tr> <tr> <td><b>Vitamin A</b></td> <td style="text-align: center;"><b>0%</b></td> <td style="text-align: center;"><b>6%</b></td> </tr> <tr> <td><b>Vitamin C</b></td> <td style="text-align: center;"><b>0%</b></td> <td style="text-align: center;"><b>0%</b></td> </tr> <tr> <td><b>Calcium</b></td> <td style="text-align: center;"><b>2%</b></td> <td style="text-align: center;"><b>15%</b></td> </tr> <tr> <td><b>Iron</b></td> <td style="text-align: center;"><b>10%</b></td> <td style="text-align: center;"><b>10%</b></td> </tr> </tbody> </table> <p style="font-size: small; margin-top: 5px;">* Amount in cereal. One half cup skim milk contributes an additional 40 calories, 65mg sodium, 6g total carbohydrate (6g sugars), and 4g protein. **Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.</p> <table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <thead> <tr> <th></th> <th></th> <th style="text-align: center;">2,000</th> <th style="text-align: center;">2,500</th> </tr> </thead> <tbody> <tr> <td>Total Fat</td> <td>Less than</td> <td style="text-align: center;">65g</td> <td style="text-align: center;">80g</td> </tr> <tr> <td>Sat Fat</td> <td>Less than</td> <td style="text-align: center;">20g</td> <td style="text-align: center;">25g</td> </tr> <tr> <td>Cholesterol</td> <td>Less than</td> <td style="text-align: center;">300mg</td> <td style="text-align: center;">300mg</td> </tr> <tr> <td>Sodium</td> <td>Less than</td> <td style="text-align: center;">2400mg</td> <td style="text-align: center;">2400mg</td> </tr> <tr> <td>Total Carbohydrate</td> <td></td> <td style="text-align: center;">300g</td> <td style="text-align: center;">375g</td> </tr> <tr> <td>Dietary Fiber</td> <td></td> <td style="text-align: center;">25g</td> <td style="text-align: center;">30g</td> </tr> </tbody> </table>		Cereal	Cereal + 125 ml fortified skim milk	<b>Amount Per Serving</b>			<b>Calories</b>	190	230	Calories from Fat	25	25		<b>% Daily Value**</b>		<b>Total Fat</b> 2.5g*	<b>4%</b>	<b>4%</b>	Saturated Fat 0g	<b>0%</b>	<b>0%</b>	Trans Fat 0g			<b>Cholesterol</b> 0mg	<b>0%</b>	<b>0%</b>	<b>Sodium</b> 95mg	<b>4%</b>	<b>7%</b>	<b>Total Carbohydrate</b> 41g	<b>14%</b>	<b>16%</b>	Dietary Fiber 9g	<b>36%</b>	<b>36%</b>	Sugars 13g			<b>Protein</b> 5g			<b>Vitamin A</b>	<b>0%</b>	<b>6%</b>	<b>Vitamin C</b>	<b>0%</b>	<b>0%</b>	<b>Calcium</b>	<b>2%</b>	<b>15%</b>	<b>Iron</b>	<b>10%</b>	<b>10%</b>			2,000	2,500	Total Fat	Less than	65g	80g	Sat Fat	Less than	20g	25g	Cholesterol	Less than	300mg	300mg	Sodium	Less than	2400mg	2400mg	Total Carbohydrate		300g	375g	Dietary Fiber		25g	30g
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**INGREDIENTS:**  
Organic brown rice flour, organic evaporated cane juice, organic rolled oats, organic wheat bran, organic sweetened dried cranberries (organic cranberries, organic evaporated cane juice), organic whole wheat meal, organic soy flour, organic whole oat flour, organic oat bran, inulin, organic soy oil, organic soy fiber, organic molasses, organic barley malt extract, organic yellow corn flour, organic whole millet, organic oat syrup solids, sea salt, organic quinoa, organic ginger, organic buckwheat flour, organic barley flour, organic rice bran extract, organic cinnamon, tocopherols (natural vitamin E), organic cloves, organic nutmeg.

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

# Nutrition Facts

Serving Size  $\frac{3}{4}$  cup (27g)

Servings Per Container about 12

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

\* Amount in cereal. A serving of cereal plus skim milk provides 1g total fat, less than 5mg cholesterol, 250mg sodium, 250mg potassium, 28g total carbohydrate (16g sugars) and 6g protein.

\*\*Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.



**INGREDIENTS:** WHOLE GRAIN OATS, MARSHMALLOWS (SUGAR, MODIFIED CORN STARCH, CORN SYRUP, DEXTROSE, GELATIN, CALCIUM CARBONATE, YELLOW 5&6, BLUE 1, RED 40, ARTIFICIAL FLAVOR), SUGAR, OAT FLOUR, CORN SYRUP, CORN STARCH, SALT, CALCIUM CARBONATE, TRISODIUM PHOSPHATE, COLOR ADDED, ZINC AND IRON (MINERAL NUTRIENTS), VITAMIN C (SODIUM ASCORBATE), A B VITAMIN (NIACINAMIDE), ARTIFICIAL FLAVOR, VITAMIN B<sub>6</sub> (PYRIDOXINE HYDROCHLORIDE), VITAMIN B<sub>2</sub> (RIBOFLAVIN), VITAMIN B<sub>1</sub> (THIAMIN MONONITRATE), VITAMIN A (PALMITATE), A B VITAMIN (FOLIC ACID), VITAMIN B<sub>12</sub>, VITAMIN D, VITAMIN E (MIXED TOCOPHEROLS) ADDED TO PRESERVE FRESHNESS.

1. What are the nutritional claims of each cereal?
  
2.
  - a. Which cereal has a higher level of fiber?
  - b. What is the source of fiber in this cereal?
  
3.
  - a. Which cereal has a higher % Daily Value of vitamins A and C?
  - b. Does this surprise you? Why or why not?
  
  - c. When can the addition of this cereal to a morning meal help add to the overall nutrition for a person during the course of a day?
  
4.
  - a. What is the source of vitamin B<sub>6</sub> in the Marshmallow Magician cereal?
  - b. Is it a naturally occurring ingredient?
  - c. How can you tell?
  
5.
  - a. What is “inner harmony” (from the Zen-Tastic package)?
  
  - b. How does this cereal contribute to inner harmony?
  
6.
  - a. What type of milk is listed in the right side of the Nutrition Facts panel of the Marshmallow Magician cereal?
  
  - b. Does this seem like a reasonable choice for this cereal?

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

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

### Look at Eating Plan H:

1. Name the foods that would contribute discretionary calories to the daily intakes of the person eating this meal.
2. Why are these foods not counted towards the principal diet in terms of nutritional adequacy?

### Look at Eating Plan G:

3. Which key nutrients are present in very large amounts, and how would you know this?
4. What food choice substitutions would you suggest to reduce these nutrients?
5. What type of diet is represented here?
6. What types of foods could be added to ensure enough minerals and protein?

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

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

1. RDA –
  
2. AI –
  
3. EAR –
  
4. UL –

Find the DRI tables in your textbook.

5. How much calcium would a 15-year-old girl need each day? \_\_\_\_\_
6. How much calcium would a 35-year-old man need? \_\_\_\_\_
7. How much calcium would a 60-year-old woman need? \_\_\_\_\_
8. Why do you think these individuals require different amounts of calcium? Think about the body and bone health throughout the lifecycle.

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

9. Carbohydrate \_\_\_\_\_
10. Fat \_\_\_\_\_
11. Protein \_\_\_\_\_

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

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

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

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

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

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

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

## Worksheet 2-4: Estimating Amounts

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

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

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



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

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

Record your eating and drinking intakes for one day. Use the website: [www.supertracker.usda.gov](http://www.supertracker.usda.gov) to enter your intakes. You can see how your diet compares to the latest guidelines.

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

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

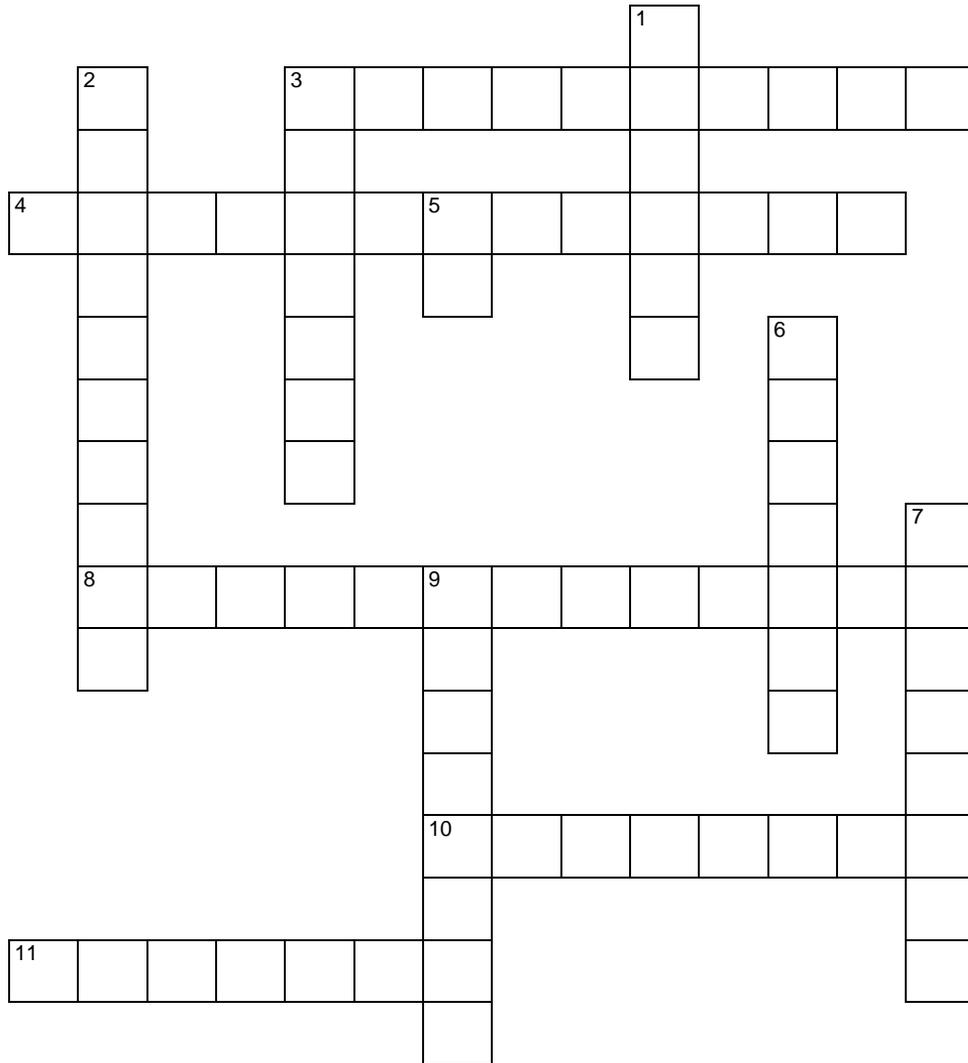
Name	Website URL
Arby's	<a href="http://www.arbys.com">http://www.arbys.com</a>
Burger King	<a href="http://www.bk.com">http://www.bk.com</a>
McDonald's	<a href="http://www.mcdonalds.com">http://www.mcdonalds.com</a>
Pizza Hut	<a href="http://www.pizzahut.com/nutrition.html">http://www.pizzahut.com/nutrition.html</a>
Subway	<a href="http://www.subway.com">http://www.subway.com</a>
Taco Bell	<a href="http://www.tacobell.com/nutrition">http://www.tacobell.com/nutrition</a>
Wendy's	<a href="http://www.wendys.com/food">http://www.wendys.com/food</a>
KFC	<a href="http://www.kfc.com">http://www.kfc.com</a>

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

Food	Source of Food	Total Calories	Total Fat (g)	Total Carbohydrate (g)

You can fill out the table to compare foods to each other for calorie, fat, or carbohydrate content. You can also compare the protein, vitamin, or mineral content of foods as well.

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



Across	Down
<p>3. Bacteria found in yogurt that can aid digestive health</p> <p>4. Healthy ranges for intakes of proteins, carbohydrates, and fats are known as Acceptable _____ Distribution Ranges.</p> <p>8. The difference in calories needed for the body's energy needs and those needed to ensure adequacy is called the _____ calorie allowance.</p> <p>10. The intake value set for a nutrient that does not have sufficient data to establish an RDA is called the _____ Intake.</p> <p>11. The information on the Nutrition Facts panel of a food label is based on a specified _____ size.</p>	<p>1. The Dietary Guidelines for Americans state that _____ should be consumed in quantities less than 2300 mg per day and less than 1500 mg per day for those 51 years and older.</p> <p>2. Antioxidants that help protect the brain and enhance its function</p> <p>3. The AMDR for _____ is set between 10% and 35% of total calories.</p> <p>5. The nutrition guideline that is useful for those who take supplements safely</p> <p>6. The USDA's interactive meal planning/diet analysis tool</p> <p>7. Substance found in tomatoes with anti-cancer properties</p> <p>9. A diet planning tool used by diabetics or those who want to control calories is called the _____ System.</p>

## Handout 2-1: Most Frequently Eaten Raw Fruits, Vegetables, and Fish/Shellfish<sup>8</sup>

Fruits	Vegetables	Fish
Banana	Potato	Shrimp
Apple	Iceberg lettuce	Cod
Watermelon	Tomato	Pollock
Orange	Onion	Catfish
Cantaloupe	Carrot	Scallops
Grape	Celery	Salmon
Grapefruit	Sweet corn	(Atlantic/coho/Chinook/ sockeye, chum/pink)
Strawberry	Broccoli	Flounder/sole
Peach	Green cabbage	Oysters
Pear	Cucumber	Orange roughy
Nectarine	Bell pepper	Ocean perch
Honeydew melon	Cauliflower	Rockfish
Plum	Leaf lettuce	Clam
Avocado	Sweet potato	Haddock
Lemon	Mushroom	Blue crab
Pineapple	Green onion	Rainbow trout
Tangerine	Green (snap) bean	Halibut
Sweet cherry	Radish	Lobster
Kiwifruit	Summer squash	Swordfish
Lime	Asparagus	Tilapia
		Tuna

<sup>8</sup> Source: FDA, <http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcr/CFRSearch.cfm?fr=101.44> (accessed 2-21-2013)