**The Science of Nutrition**

**Multiple Choice**

**What Do We Mean by “Nutrition”?** (pp. 5-8)

a A 6 1. Which of the following ingredients in a box of toaster pastries would contribute macronutrients to one’s diet?

a. Water, high-fructose corn syrup, egg yolk

b. Niacin, folic acid, sucralose

c. Riboflavin, salt, sodium benzoate

d. Thiamin mononitrate, soybean oil, sugar

c K 5 2. The term “nutrition” refers to the science of how living organisms obtain and use \_\_\_\_\_ to support all the processes required for their existence.

a. sunlight

b. proteins

c. food

d. chlorophyll

d K 5 3. What is the term for substances in food that are used by the body for at least one of the following: energy, structure, or regulation of chemical reactions in the body?

a. Calories

b. Vitamins

c. Minerals

d. Nutrients

a K 6 4. A “nonessential nutrient” is one that the body\_\_\_\_\_.

a. can make in the amount needed

b. doesn’t need

c. cannot use

d. stores for later use

c K 5-6 5. Nutrients considered essential must \_\_\_\_.

a. be synthesized by the body daily

b. be stored in the body

c. come from the food we eat

d. be consumed from organic foods

c K 6 6. If a toddler’s only source of a nutrient is from food but an adult can make the nutrient in an amount sufficient to meet his needs, the nutrient is considered to be \_\_\_\_\_.

a. nonessential

b. essential

c. conditionally essential

d. partially essential

b K 6 7. Macronutrients include carbohydrates, proteins, lipids, and \_\_\_\_\_.

a. calories

b. water

c. vitamins

d. minerals

a K 8 8. Which term is used to describe foods such as soy milk and tomatoes that, when consumed, do more to promote health than simply helping the body meet its basic nutritional needs?

a. Functional

b. Essential

c. Organic

d. Biodiverse

a K 7 9. Which U.S. government agency certifies foods as grown and processed “organically”?

a. Department of Agriculture

b. Food and Drug Administration

c. Department of Health and Human Services

d. Federal Trade Commission

b K 7 10. Foods are considered “organic” if they are produced, gown, and harvested without the use of most conventional pesticides, fertilizers made with synthetic ingredients, bioengineering, or \_\_\_\_\_\_.

a. distilled water

b. ionizing radiation

c. ultraviolet light

d. greenhouses

c K 7 11. A U.S. government agency certifies that foods labeled as “organic” are \_\_\_\_\_ as compared to foods not labeled as “organic.”

a. more nutritious

b. safer to eat

c. grown in a specified way

d. fresher

c K 7 12. To be labeled as “organic,” crackers must have at least \_\_\_\_\_% organic ingredients.

a. 50

b. 65

c. 70

d. 85

d K 8 13. What do scientists call the health-promoting substances found in plants?

a. Zoonutrients

b. Organics

c. Functionals

d. Phytochemicals

**What Are the Major Nutrient Classes?** (pp. 8-10)

d K 8 14. What do most cells use as their primary source of energy?

a. Fatty acids

b. Proteins

c. Sucrose

d. Glucose

b K 9 15. What do proteins contain that carbohydrates do not?

a. Carbon

b. Nitrogen

c. Hydrogen

d. Oxygen

d K 9 16. Approximately how much of a human’s total body weight is water?

a. 20%

b. 35%

c. 45%

d. 60%

c K 10 17. Which nutrients function as antioxidants that protect your body from the damaging effects of toxic compounds such as air pollution?

a. Carbohydrates

b. Proteins

c. Vitamins

d. Minerals

b A 10 18. Someone who eats a diet that contains very little fat could be at risk for developing a deficiency of which vitamin?

a. C

b. E

c. B1

d. B12

a K 10 19. Like vitamins, \_\_\_\_\_cannot be used for energy, although many are involved in energy-producing reactions.

a. minerals

b. carbohydrates

c. lipids

d. proteins

**How Do Foods Provide Energy?** (pp. 10-13)

a K 10 20. How many kcalories would one get from consuming one gram of vitamin A?

a. 0

b. 4

c. 7

d. 9

c K 10 21. The body’s cells transfer the chemical energy from the carbohydrates, proteins, and lipids in food into \_\_\_\_\_.

a. kcalories

b. phytochemicals

c. adenosine triphosphate

d. nucleic acids

c K 11 22. How many calories are in a Calorie or a kcalorie?

a. 10

b. 100

c. 1,000

d. 10,000

|  |
| --- |
| **Toaster Coasters label** |
|  | **Ingredients:** Enriched flour, bleached (wheat flour, malted barley flour, niacin, ferrous sulfate, thiamin mononitrate, riboflavin, folic acid), water, partially hydrogenated soybean and cottonseed oil, high fructose corn syrup, sugar, huckleberries (10% of filling), maltodextrin, corn starch, modified corn starch, dry yeast, salt dextrose, whey, egg yolk, baking powder, citric acid, xanthan gum, mono and diglycerides, potassium sorbate and sodium benzoate (preservative), natural and artificial flavor, guar gum, polysorbate 60, locust bean gum, colored with (red 40, yellow 5, blue 1, artificial color), sucralose.MAY CONTAIN WHEAT, MILK AND EGG PRODUCTS |

*Refer to the Toaster Coasters label to answer questions 23-25.*

a A 12 23. Which of the following is an accurate conclusion from the information on this food label?

a. Roughly 42% of the Calories in a Toaster Coaster come from fat.

b. Roughly 9% of the carbohydrate Calories in a Toaster Coaster come from sugar.

c. Everything contained in a Toaster Coaster is considered a nutrient.

d. Someone who should consume 2500 kcalories each day would get 9% of their carbohydrate Calories from consuming 1 Toaster Coaster.

c A 11 24. Carlos ate half a box of Toaster Coasters before class yesterday. How many Calories did Carlos consume?

a. 380

b. 430

c. 570

d. 760

b A 10 25. Which ingredients in a box of Toaster Coasters would provide the body with energy?

a. Salt, water, sugar

b. Enriched flour, cottonseed oil, huckleberries

c. Egg yolk, citric acid, dry yeast

d. Sodium benzoate, corn starch, malted barley flour

c A 11-12 26. Approximately how many Calories would be provided by a food that contains 2 grams of protein, 8 grams of carbohydrate, and 5 grams of fat?

a. 135

b. 110

c. 85

d. 60

a A 11-12 27. If Food A provides 10 grams of fat and 5 grams of protein, and Food B provides 5 grams of fat and 10 grams of protein, Food A will provide \_\_\_\_\_ percent of the number of total kcalories provided by Food B.

a. 129

b. 100

c. 77

d. 55

c A 11-12 28. A drink that contains 10 grams of carbohydrate and 15 grams of alcohol would provide \_\_\_\_\_ kcalories.

a. 100

b. 190

c. 145

d. 175

b K 11-12 29. Gram per gram, which of the following provides the most Calories?

a. Alcohol

b. Lipids

c. Proteins

d. Carbohydrates

a A 12 30. The popcorn you ate contained 420 Calories and 200 of these were from fat. About what percent of the Calories came from fat?

a. 47

b. 41

c. 36

d. 32

b K 11 31. A device for measuring the amount of energy in a food is called a \_\_\_\_\_.

a. scale

b. bomb calorimeter

c. energy chamber

d. Calorie compartment

b A 11-12 32. You have just purchased a food containing 9 grams of protein, 6 grams of fat, and 13 grams of carbohydrate per serving. Each serving contains:

a. 112 kcalories

b. 142 kcalories

c. 177 kcalories

d. 222 kcalories

c A 12 33. A meal you had from a restaurant contained about 1,000 kcalories. How many additional kcalories would 11 grams of alcohol add to your meal?

a. 0

b. 44

c. 77

d. 99

c A 11-12 34. A sandwich you ate contained 20 grams of CHO, 32 grams of protein, and 10 grams of fat. What percentage of the kcalories in the sandwich came from protein?

a. 27%

b. 30%

c. 43%

d. 57%

b A 12-13 35. If Joe requires 2800 kcalories per day, about how many of those kcalories should come from fat or lipids?

a. 280-550

b. 560-980

c. 1000-1150

d. 1260-1820

d A 12-13 36. Jen is considering following a 1500-kcalorie diet that includes 500 kcalories from carbohydrates. This diet \_\_\_\_\_.

a. provides the recommended amount of carbohydrate

b. is acceptable if the protein intake is roughly 10%-35% of kcalories

c. is acceptable if the fat content is roughly 10%-15% of kcalories

d. provides less than the recommended amount of carbohydrate

b A 11-12 37. A convenience meal contains 20 g of fat, 32 g of carbohydrate, and 19 g of protein. How many kcalories does the meal provide?

a. 284

b. 384

c. 479

d. 544

**How Is Nutrition Research Conducted?** (pp. 13-19)

d A 14 38. Mr. Sawyer has type 2 diabetes, as did his father. He weighs about 30 pounds more than he should, due in part to his love of sweets. He often has dessert with lunch and dinner. He is employed full-time as a highway construction worker and has health insurance. What type of nutrition-health relationship is this?

a. Simple because he has only one disease

b. Simple because his diabetes is hereditary rather than diet related

c. Complex because he is overweight and diabetic

d. Complex because he is genetically predisposed to develop diabetes

b K 13 39. After making a precise observation, the next step in testing theories using the scientific method would be to \_\_\_\_\_.

a. conduct experiments

b. propose a hypothesis

c. make an observation

d. draft the conclusions

a K 13 40. In applying the scientific method, it is important that the observation is \_\_\_\_\_ and \_\_\_\_\_.

a. accurate, complete

b. simple, repeated

c. interesting, useful

d. noteworthy, expected

d A 14 41. Since we know that if someone takes in more kcalories than they use they will gain weight, this is considered to be an example of a \_\_\_\_\_.

a. positive correlation

b. simple relationship

c. complex correlation

d. cause-and-effect relationship

d A 17 42. Maria has been asked to be a subject in a study to determine if additional vitamin A will promote the growth of healthy, strong fingernails. Since she wants the study to be as close to the “ideal” nutrition intervention study as possible, she will want to be sure that:

a. only the researcher knows which participants receive vitamin A.

b. all of the participants are between 18 and 25 years of age.

c. her chances of getting vitamin A are better than those of anyone else.

d. half of the participants get something that looks like additional vitamin A but isn’t.

b A 14 43. Which of the following is an example of a positive correlation?

a. The less John eats, the more muscle mass he loses

b. The longer Michelle exercises, the more water she needs

c. The more vitamins Sam consumes, the less energy he has

d. The more kcalories Mike eats, the less energy he uses

c A 14 44. Which of the following statements is an example of a “simple relationship”?

a. Avoiding exercise can reduce one’s life expectancy.

b. Eating organic foods may improve nutritional status.

c. Consuming inadequate vitamin C results in a deficiency.

d. Consuming inadequate calcium may result in osteoporosis.

a K 14 45. Researchers should not recommend that all children eat less to decrease their risk for obesity because the link between energy intake and risk of childhood obesity is \_\_\_\_\_.

a. an interaction

b. a simple relationship

c. a lifestyle factor

d. undocumented

b K 14 46. Which of the following is an example of an environmental factor that influences health?

a. Consuming a varied diet

b. Exposure to pesticides

c. Exercising moderately

d. One’s ethnicity

b K 15 47. Before a hypothesis becomes a scientific finding, what has to occur?

a. Debate, presentation of opposing views, and generalization

b. Experimentation, data collection, and interpretation of data

c. Meta-analysis, summary, and proponent arguments

d. Peer review, delineation of pros and cons, preparation of a bibliography

d K 15 48. The type of study that includes scientists making observations and recording information without actually asking the subjects to change their behaviors or undergo any sort of treatment is called a(n) \_\_\_\_\_ study.

a. controlled

b. experimental

c. prescribed

d. epidemiologic

c A 15 49. If you wanted to determine the relationships among age, gender, activity level, alcohol consumption, and body weight among the students attending the universities in your state, an \_\_\_\_\_ study would be appropriate.

a. intervention

b. efficacy

c. epidemiologic

d. intercession

a K 16 50. The Framingham Study investigated the relationship between lifestyle factors and which other variable?

a. Heart health

b. Cancer

c. Obesity

d. Longevity

d K 16 51. One of the limitations of epidemiologic studies is that the results cannot be interpreted as proving a(n) \_\_\_\_\_.

a. association

b. positive correlation

c. negative correlation

d. relationship to be causal

b A 15-16 52. The nutrition researchers at Excellent State U conducted an epidemiologic study of the students’ consumption of snacks from campus vending machines. They found that most first-year students purchased snacks from the vending machines and that the average weight gain for first-year students was 15-25 pounds during the year. Which of the following is an appropriate conclusion?

a. Eating snacks from vending machines causes students to gain weight.

b. For first-year students, there may be an association between purchasing snacks from vending machines and gaining weight.

c. For first-year students, eating snacks from vending machines causes a weight gain of 15-25 pounds.

d. For college students, there may be an association between purchasing snacks from vending machines and gaining 15-25 pounds during their first year.

a K 16 53. NHANES simultaneously monitors nutrition and \_\_\_\_\_ in the U.S.

a. health of the population

b. weight gain among adults over 21

c. the incidence of diabetes in children over the age of 2

d. the incidence of vitamin and mineral deficiencies in low-income groups

d K 16 54. What is the large, ongoing epidemiologic study to simultaneously monitor nutrition and health in the U.S. population called?

a. Nutrition, Health, and Nurturing Exploratory Study

b. Nationwide Historic and Nutritional Examination Study

c. Nationwide Home and Nutritional Exploratory Survey

d. National Health and Nutrition Examination Survey

c K 16 55. When a hypothesis suggests a causal relationship, what type of study will the scientist most likely conduct?

a. Exacting

b. Interpretive

c. Intervention

d. Epidemiologic

c A 15 56. You are involved in a study observing the eating and health behaviors of African Americans across the United States. You are conducting a(n):

a. Hawthorn study.

b. intervention study.

c. epidemiologic study.

d. cell culture study.

b A 17 57. While you are studying the impact of increasing soy intake on bone health, some of your subjects decide on their own to begin to consume more cow’s milk because of their participation in the study. This phenomenon is the \_\_\_\_\_effect.

a. placebo

b. Hawthorn

c. intervention

d. random

c A 17 58. Professor Eatwell plans to study the effect of zinc supplements on young adults’ susceptibility to the cold virus. She will give some of the young adults zinc supplements while the \_\_\_\_\_ group will get supplements that do not contain zinc.

a. investigation

b. research

c. control

d. experimental

a A 18-19 59. Suppose a human intervention study provides evidence that when adults consume 5 servings of fruits and vegetables their blood lipid levels are positively impacted. The most appropriate conclusion the researchers could make would be that this relationship between diet and blood lipids:

a. will be true for other adults as well.

b. applies only to the adults tested.

c. will be true for other adults and children living in the same area.

d. causes blood lipid levels to decrease in proportion to the number of servings of fruits and vegetables consumed.

d A 17 60. Mia is a participant in a human intervention study designed to test the effectiveness of losing weight by eating a diet that contains 25% of one’s required kcalories from fat. Because she is in this study, Mia has decided to increase the amount of exercise she gets and to reduce the amount of beer she drinks. Mia’s behavior is an example of \_\_\_\_\_.

a. the Sanders effect

b. subject bias

c. a confounding variable

d. the Hawthorne effect

b A 17 61. Mark is a participant in a human intervention study that is testing the impact of selenium supplements on the performance of endurance athletes. Though Mark does not know if he is receiving selenium or an inactive sugar pill, he is sure that it is the tablet that he is taking that has helped him shave several minutes off his usual marathon time. What effect is Mark experiencing?

a. Thornburg

b. Placebo

c. Predisposition

d. Hawthorne

a K 18 62. Random assignment of participants to treatment or control groups is important because it distributes \_\_\_\_\_ equally among study groups.

a. confounding variables

b. men and women

c. subjects with different ethnic backgrounds

d. consequence factors

d K 17 63. What is a “fake” or imitation treatment called?

a. Replica

b. Synthetic

c. Mock

d. Placebo

c K 17 64. Which term describes a study where neither the researcher nor the participants know who is in the treatment group and who is not?

a. Randomized-trial

b. Placebo-controlled

c. Double-blind

d. Researcher-protected

b K 19 65. Studying phenomena within living organisms is referred to as studies conducted \_\_\_\_\_.

a. *in vitro*

b. *in vivo*

c. randomly

d. organically

a K 17 66. Scientists use many techniques to decrease bias in studies. What do scientists call the technique in which the participants do not know if they are receiving the actual treatment or a fake?

a. Blinding

b. Randomization

c. Use of control groups

d. Use of placebos

**Are All Nutrition Claims Believable?** (pp. 19-22)

a A 20 67. Chris turned in a paper on the benefits of organically raised produce; however, he lost points because his references included several articles that quoted data from other studies. What was Chris’s error?

a. He chose references that were not primary sources.

b. The research was not conducted by a scientist.

c. The references he chose included funding source bias.

d. The research was not supported by reputable organizations.

d K 20 68. The first place that information was reported or published is called the \_\_\_\_\_.

a. foundation document

b. principal document

c. key source

d. primary source

c K 20 69. Which of the following publications is the preferred source for reputable information about nutrition and other sciences?

a. Daily newspapers

b. Books written by well-known authors

c. Peer-reviewed journals

d. Product information inserts

a K 21 70. If a group of farmers who grow oranges helps fund a university-based research project to determine the amount of vitamin C contained in fresh vs. frozen orange juice, it is appropriate to \_\_\_\_\_.

a. determine if the funding group influenced the research findings

b. discount the research as being biased

c. trust the findings since the research was university based

d. discount the research because it was not government funded

c K 21 71. What is the name of a searchable biomedical database that can be used to find out important details about the source of a study?

a. NutrInfo

b. StudySource

c. PubMed

d. BioBase

**Nutrition and Health: What Is the Connection?** (pp. 22-28)



*Refer to the figure to answer questions 72 and 73.*

b A 23-24 72. According to the figure, the greatest gains in life expectancy occurred \_\_\_\_\_.

a. before 1900

b. between 1900 and 1950

c. between 1960 and 1980

d. after 2000

b A 23 73. According to the figure, the infant mortality rate decreased:

a. from 1900-1950 and then increased slightly between 1950 and 1960.

b. from 100 deaths per 1000 births per year in 1900 to about 30 in 1950.

c. from 75 deaths per 1000 births per year in 1960 to about 15 in 1980.

d. more between 1990 and 2000 than between 1970 and 1980.

b A 24-25 74. According to the figure, which of the following is an accurate statement? Per 100,000 people per year,

a. fewer people died from diarrhea in 1902 than from accidents in 2007.

b. fewer people died from cancer in 1950 than in 2007.

c. more people died from heart disease in 2007 than in 1950.

d. more people died from strokes in 1950 than in 1902.



d K 23 75. What is used to measure and assess illness over a span of time?

a. Mortality rates

b. Migration patterns

c. Infection patterns

d. Morbidity rates

a K 23 76. The number of people who are newly diagnosed with a disease in a given period of time is referred to as the \_\_\_\_\_ of that disease.

a. incidence

b. prevalence

c. pervasiveness

d. inclusion

c K 26 77. The major causes of disability and death in the U.S. are currently:

a. smoking and accidents.

b. HIV/AIDS and infectious diseases.

c. heart disease and cancer.

d. diabetes and obesity.

b K 24 78. Which term refers to contagious diseases that are caused by pathogens?

a. Chronic

b. Infectious

c. Persistent

d. Acute

c K 24 79. In the U.S. today, we are facing a rising incidence of illnesses that develop slowly and continue for a long time. Which term refers to this type of disease?

a. Persistent

b. Malnutrition

c. Chronic

d. Infectious

c K 27 80. What do researchers call the shift from undernutrition to overnutrition or unbalanced nutrition as a society becomes more industrialized?

a. Negative shift

b. Nutrition evolution

c. Nutrition transition

d. Positive shift

d K 23 81. You are teaching students about the statistical prediction of years of life remaining for a person at a particular age. This concept is called:

a. morbidity rate.

b. mortality rate.

c. longevity.

d. life expectancy.

a K 22 82. In the U.S., the Centers for Disease Control and Prevention (CDC) is responsible for

a. monitoring health trends and compiling health-related statistics.

b. preventing epidemics.

c. monitoring the safety of the food supply.

d. preventing the importation of contaminated food.

a K 24-25 83. At the turn of the 20th century, \_\_\_\_\_ diseases were the leading causes of death, rather than \_\_\_\_\_ ones.

a. infectious, chronic

b. vitamin-deficiency, infectious

c. chronic, infectious

d. vitamin-deficiency, chronic

d A 26 84. You are studying disease incidence and prevalence in America. Overall, you would expect the 21st century to be characterized by increased \_\_\_\_\_ and \_\_\_\_\_.

a. infectious diseases, chronic diseases

b. infectious diseases, mortality rates

c. mortality rates, life expectancy

d. chronic diseases, life expectancy

b A 26 85. The major nutrition issues in the U.S. are now \_\_\_\_\_ and \_\_\_\_\_.

a. vitamin deficiencies, food shortages

b. over consumption, poor food choices

c. fraudulent nutrition claims, food spoilage

d. *trans* fats, contamination of the food supply

d K 26 86. Researchers estimate that \_\_\_\_\_% of adults in the U.S. aged 20 and over are either overweight or obese.

a. 30

b. 40

c. 60

d. 70

**True/False**

**Answer, level, page**

F K 5 1. All nutritional scientists are dietitians.

F K 5 2. All compounds in food are nutrients.

T K 6 3. Nonessential nutrients do not need to be eaten to maintain health, as the body can make them in amounts needed to satisfy its physiological requirements.

F K 6 4. Vitamins and minerals are organic chemicals.

T K 7 5. When a food is labeled as being “Certified Organic” it has been grown and processed according to national organic standards.

F K 8 6. Phytochemicals are essential nutrients.

F K 8-9 7. Carbohydrates contain C, H, O, and N while lipids contain only C, H, and O.

F K 9-10 8. All nutrients primarily play a structural role in the body.

T K 9 9. Lipids include a variety of fats and oils.

F K 6, 9 10. All inorganic substances in the human body are called minerals.

T K 11 11. Gram per gram, fat provides more energy than either carbohydrate or protein.

T K 13 12. The first step of the scientific method is to make an appropriate and accurate observation.

F K 15 13. Epidemiologic studies investigate causal relationships.

T K 17 14. Control groups in an intervention study do not receive the treatment or intervention.

T A 17 15. In your intervention study, group A received a nutrient supplement, while group B received a capsule that did not contain that nutrient. Group B received a placebo.

T K 20 16. A peer-reviewed journal contains articles that were read and “approved” by a group of scientists knowledgeable in that area of study.

F A 20 17. A health claim is probably reputable if it is published in a magazine published by a natural health food store.

F K 23 18. For a given period of time, the morbidity rate refers to the number of deaths while the mortality rate relates to the number of illnesses.

F K 24 19. A chronic disease is an infectious illness that results in death.

F A 16 20. NHANES is an intervention study to assess U.S. diet and health trends.

**Discussion**

1. Why is it recommended that people meet their nutritional needs by eating a variety of foods rather than by taking several supplements?

**Answer (key points):** Scientists are still learning about the substances other than traditional macro- and micronutrients that are present in foods. These substances in food may reduce the risk for developing certain diseases. Supplements typically include primarily well-known nutrients and often provide these in mixtures and quantities that are inferior to the mixtures and quantities of nutrients one can get from eating a varied diet. (pp. 7-8)

2. What are the costs and benefits of eating “organic” foods?

**Answer (key points):** (p. 7)

|  |  |
| --- | --- |
| (Some of the) Benefits of eating organic foods | (Some of the) Costs of eating organic foods |
| * Free of most conventional pesticides
* Using less conventional pesticides is good for the environment
* Free of most fertilizers made with synthetic ingredients
* Foods are not bioengineered
* Foods have not received ionizing radiation
* Organic meat, eggs, and dairy are from animals raised without growth-producing hormones and antibiotics
* Taste, color, appearance, and other aesthetic factors may be far superior to non-organics
* Using less antibiotics may deter the development of “super bugs” that are resistant to antibiotics
 | * May be more expensive than non-organic options due to increased costs of production, decreased yield, slower rate of growth, increased losses of crops to insects and diseases, and shorter shelf-life
* “Natural” fertilizers such as manure may be sources of disease-causing organisms
* Aesthetically, may show increased evidence of pest infestation and damage
* May result in decreased availability of some foods in some areas because of the opportunities for spoilage associated with shipping, handling, and storage of some organic foods
 |

3. Why are nutrition researchers interested in phytochemicals, zoonutrients, and functional foods?

**Answer (key points):** Although not considered nutrients, these substances/foods may help reduce risk for developing certain diseases such as heart disease and cancer. They may improve health. (pp. 7-8)

4. What are the similarities and differences in structure and function among the six classes of nutrients?

**Answer (key points):** (pp. 8-10)

| **Nutrient** | **Provide(s) Structure** | **Provide(s) Energy** | **Regulate(s) Reactions** | **Composition** | **Additional Considerations** |
| --- | --- | --- | --- | --- | --- |
| Protein | x | x | x | C, H, O, N plus sulfur and selenium | Role in communications, movement, immunity |
| Lipids | x | x |  | C, H, O | Cell membranes, nervous and reproductive systems |
| Carbohydrates | x | x | x | C, H, O | Fiber |
| Vitamins |  |  | x | C, H, O plus phosphorous and sulfur | Antioxidants |
| Minerals | x |  | x | Elements | Water balance |
| Water |  |  | x | H2O | Temperature regulation, protects internal organs, insulation |

5. What does the body use the energy from food for?

**Answer (key points):** Cells in the body use energy from food to make adenosine triphosphate (ATP), which the body can then use for its functions—e.g., movement, digestion, body temperature, breathing, heart beat, etc. (pp. 10-11)

6. What are Calories and what nutrients provide them?

**Answer (key points):** Calories are the units used to measure the amount of energy in foods. Protein, fat, and CHO (and alcohol) provide Calories or kcalories. (pp. 11-12)

7. Why is the scientific method used to test theories?

**Answer (key points):** To provide a safeguard that conclusions are likely valid. Each step has safeguards to protect against errors and the human tendency to overlook results that contradict expectations. (pp. 13-15)

8. What are some of the questions that should be asked before one accepts a finding as true?

**Answer (key points):** Was the study epidemiologic, intervention, or animal and cell-culture?

Was the study randomized to control for confounding variables?

Was the study double-blind to control for researcher and subject bias?

Was the study placebo-controlled to control for the placebo and Hawthorne effects? (pp. 15-21)

9. What is the difference between things that are related by cause-and-effect versus things related by correlations? Give examples of things related in each way.

**Answer (key points):** “Cause and effect” describes a situation where one factor causes another factor. Examples: Consuming excess energy causes weight gain; dropping a glass on a tile floor causes it to break; overcooking a food causes it to burn.

When two factors are correlated, a change in one is related to, but does not cause, a change in the other. Examples: The time spent watching TV is correlated with obesity in children. Driving at excess speeds is correlated with the likelihood of having an accident. The time that raw meat is left at room temperature is associated with the likelihood of it spoiling. (p. 14)

10. Why do nutrition professionals sometimes change their recommendations for what people should do to optimize nutrition and health?

**Answer (key points):** Relationships initially thought to be simple often turn out to be more complex. Often, scientific researchers first focus on simple relationships and then later explore the many interactions that exist among factors. As more is leaned about interactions, dietary recommendations may need to be modified. (pp. 14-15)

11. Why are studies such as the Framingham Heart Study and the National Health and Nutrition Examination Survey (NHANES) important, and what have we learned from such studies?

**Answer (key points):** The Framingham study was important as an epidemiologic investigation. In the 1940s we did not know enough about diet and heart disease to formulate hypotheses and do intervention studies. This study provided first convincing evidence that what a person eats is related to his/her risk for heart disease.

NHANES is a large ongoing epidemiologic study to simultaneously monitor nutrition and health in the U.S. population. Through NHANES we are learning more about many factors—especially nutrition—that are important for fostering good health and long life in the U.S. population. (p. 16)

12. Since 2005, there have been several outbreaks of foodborne illnesses that have made people sick and resulted in the deaths of some. Why don’t scientists simply conduct intervention studies rather than those that are epidemiologic when some foods are thought to be contaminated so that they can be sure which foods are at fault and remove them from the food supply promptly?

**Answer (key points):** Conducting intervention studies would require that scientists give contaminated foods to the research subjects. Doing so would result in some subjects becoming ill and perhaps dying. Because of the risk of becoming ill, this is not an acceptable scientific approach. Thus scientists rely on epidemiologic studies, which may suggest an association but do not prove cause and effect. (p. 17)

13. What are the similarities and differences and the advantages and limitations of epidemiologic studies, intervention studies, and animal studies?

**Answer (key points):** (pp. 15-19)

|  |  |  |
| --- | --- | --- |
| **Type** | **Advantages/Strengths** | **Limitations** |
| Epidemiologic Studies | * Can be used to explore complex interactions that are poorly understood
* Often do not require extensive training of technology and lab personnel
 | * Difficult to control for confounding factors
* Can show associations; however, cannot prove cause and effect
 |
| Intervention Studies | * Provide evidence that a relationship is likely causal in nature
* Results can be directly applied to humans
 | * Require participants to undergo treatment
* Difficult to control for confounding variables
* Often impacted by Hawthorne effect, placebo effect, researcher and participant bias
* Costly and time consuming
 |
| Animal Studies | * Can study issues when it is not practical or ethical to use human subjects
* Can control more aspects of the animal subjects’ environment
 | * Results cannot be directly applied to humans
 |

14. How can scientific studies control for the Hawthorne effect, placebo effect, and researcher bias?

**Answer (key points):** To control for Hawthorne effect, placebo effect, and researcher bias, scientists use blinding (especially double-blinding); use randomization; and control for confounding variables. (p. 17)

15. What guidelines should consumers use to make sound decisions about nutrition claims?

**Answer (key points):** Assess the source of the information, the credibility of the research, source of funding (bias?), and appropriateness of the experimental design; and investigate whether public health organizations concur with the findings. (pp. 20-22)

16. What are the major health-related nutrition issues in the U.S., and what actions could individuals take to improve the situation?

**Answer (key points):** Chronic, degenerative diseases (heart disease, cancer, stroke).

Don’t use tobacco, be physically active, maintain good dietary habits including controlling Calories consumed, and manage body weight and body composition. (p. 26)

**Fill in the Blank**

1. A behavioral component of our lives over which we may or may not have control (such as diet and exercise) is termed a \_\_\_\_\_\_\_\_\_\_.
**Answer:** lifestyle factor (p. 14)

2. When two variables are linked by a \_\_\_\_\_\_\_\_\_\_, an alteration in one of the variables directly causes a change the other.
**Answer:** cause-and-effect relationship *or* causal relationship (p. 14)

3. The \_\_\_\_\_\_\_\_\_\_ is the phenomenon in which study results are influenced by an unexpected alteration of a behavior by the study participants.
**Answer:** Hawthorne effect (p. 17)

4. When the scientist conducting a study influences its results, that study is said to be flawed due to\_\_\_\_\_\_\_\_\_\_.
**Answer:** researcher bias (p. 17)

5. A \_\_\_\_\_\_\_\_\_\_ is grown in the laboratory and used for *in vitro* research.
**Answer:** cell culture system (p. 19)

6. In the U.S., the \_\_\_\_\_\_\_\_\_\_ is responsible for monitoring health trends and compiling health-related statistics.
**Answer:** Centers for Disease Control and Prevention (p. 22)

7. Individuals may or may not have control over \_\_\_\_\_\_\_\_\_\_, elements in their surroundings such as pollution and temperature.
**Answer:** environmental factors (p. 14)

8. \_\_\_\_\_\_\_\_\_\_ studies involve the investigation of natural phenomena in a living organism.
**Answer:** *In vivo* (p. 19)

9. Tom’s hemophilia could be considered a \_\_\_\_\_\_\_\_\_\_ because this condition was inherited from his parents and cannot be altered.
**Answer:** genetic factor (p. 14)

10. In an \_\_\_\_\_\_\_\_\_\_, the relationship between two factors is influenced or modified by another factor.
**Answer:** interaction (p. 14)

11. \_\_\_\_\_\_\_\_\_\_ studies involve the use of cells or environments that are not part of a living organism.
**Answer:** *In vitro* (p. 19)

12. The \_\_\_\_\_\_\_\_\_\_ is the phenomenon in which there is an apparent effect of the treatment because the individual expects or believes that it will work.
**Answer:** placebo effect (p. 17)

13. When a change in variable A is related to a change variable B, but researchers suspect variables C and D are also contributing to the change in B, the relationship between A and B is described as a(n) \_\_\_\_\_\_\_\_\_\_.
**Answer:** correlation *or* association (p. 14)

14. A \_\_\_\_\_\_\_\_\_\_ is a prediction about the relationship between variables.
**Answer:** hypothesis (p. 13)

15. A \_\_\_\_\_\_\_\_\_\_ relationship between two factors is not influenced or modified by another factor.
**Answer:** simple (p. 14)