

***Nutrition: A Functional Approach, Cdn. Ed. 3e* (Thompson/Manore/Sheeshka)  
Chapter 1: The Role of Nutrition in Our Health**

Multiple-Choice Questions

1) Which statement concerning the field of nutrition is FALSE?

- A) Nutrition is the study of how food nourishes the body.
- B) Nutrition encompasses how we consume, digest, metabolize, and store food.
- C) Nutrition is an ancient science that dates back to the 14th century.
- D) Nutrition involves studying the factors that influence eating patterns.

Answer: C

Page Ref: 4

Topic: What Is Nutrition?

Skill: Factual

2) Which of the following chronic diseases is NOT strongly associated with dietary choices?

- A) Alzheimer's disease
- B) cancer
- C) heart disease
- D) type 2 diabetes

Answer: A

Page Ref: 4

Topic: What Is Nutrition?

Skill: Factual

3) An increased risk for obesity, heart disease, and type 2 diabetes is associated with

- A) diets low in saturated fats.
- B) diets high in fibre, fruits, vegetables, and whole grains.
- C) caffeine consumption.
- D) an imbalance between food intake and daily activity.

Answer: D

Page Ref: 6

Topic: How Does Nutrition Contribute to Health?

Skill: Factual

4) Which of the following is TRUE of the 2004 Canadian Community Health Survey?

- A) Within each age category, the percentage of Canadian adults who were obese was lower in 2004 than in 1978–79.
- B) Approximately 23% of adults were obese compared to approximately 14% over 2 decades earlier.
- C) Over half of Canadians aged 18 and older were either underweight or below average.
- D) Diabetes was found to be more common among people with lower body weights.

Answer: B

Page Ref: 6

Topic: How Does Nutrition Contribute to Health?

Skill: Factual

5) All nutrients are divided into how many classes?

- A) two
- B) four
- C) six
- D) eight

Answer: C

Page Ref: 7

Topic: What Are Nutrients?

Skill: Factual

6) Which of the following is NOT a nutrient?

- A) water
- B) alcohol
- C) vitamins
- D) minerals

Answer: B

Page Ref: 7

Topic: What Are Nutrients?

Skill: Factual

7) To a scientist describing nutrients, the term "organic" means nutrients that

- A) contain both carbon and hydrogen.
- B) contain hydrogen and nitrogen.
- C) are natural, not synthetic.
- D) are synthetic, not natural.

Answer: A

Page Ref: 7

Topic: What Are Nutrients?

Skill: Factual

8) Macronutrients are nutrients that

- A) provide energy to support normal function and health.
- B) are needed in relatively small quantities in the body.
- C) consist of vitamins and minerals.
- D) are inorganic nutrients.

Answer: A

Page Ref: 8

Topic: What Are Nutrients?

Skill: Factual

9) What is the primary source of fuel for the brain?

- A) proteins
- B) fats
- C) carbohydrates
- D) vitamins

Answer: C

Page Ref: 9

Topic: What Are Nutrients?

Skill: Factual

10) Of the following nutrients, which contains nitrogen?

- A) carbohydrates
- B) proteins
- C) lipids
- D) water

Answer: B

Page Ref: 11

Topic: What Are Nutrients?

Skill: Factual

11) Which of the following is an example of an inorganic nutrient?

- A) vitamin A (vitamin)
- B) stearic acid (fat)
- C) dietary fiber (carbohydrate)
- D) calcium (mineral)

Answer: D

Page Ref: 12

Topic: What Are Nutrients?

Skill: Conceptual

12) Jane consumed a breakfast that contained 85 grams of carbohydrate, 20 grams of protein, and 18 grams of fat. How many kilocalories did Jane eat at breakfast?

- A) 123 kilocalories
- B) 152 kilocalories
- C) 582 kilocalories
- D) 1,007 kilocalories

Answer: C

Page Ref: 10

Topic: What Are Nutrients?

Skill: Applied

13) For dinner, Carol consumes 250 grams of carbohydrate, 50 grams of protein, and 30 grams of fat. In addition, Carol decides that she wants a glass of wine with her meal. If she drinks one glass of wine containing 10 grams of alcohol, how many total kilocalories does she consume in this meal?

- A) 340 kilocalories
- B) 1,540 kilocalories
- C) 1,806 kilocalories
- D) 2,820 kilocalories

Answer: B

Page Ref: 10

Topic: What Are Nutrients?

Skill: Applied

14) Which of the following are examples of carbohydrate-rich foods?

- A) butter and corn oil
- B) beef and pork
- C) wheat and lentils
- D) bacon and eggs

Answer: C

Page Ref: 9

Topic: What Are Nutrients?

Skill: Conceptual

15) Which dietary standard, expressed as percentages of total energy, defines the recommended intake range for the macronutrients?

- A) Tolerable Upper Intake Level (UL)
- B) Recommended Dietary Allowance (RDA)
- C) Estimated Average Requirement (EAR)
- D) Acceptable Macronutrient Distribution Range (AMDR)

Answer: D

Page Ref: 15

Topic: What Are Nutrients?

Skill: Factual

16) Which of the following nutrients is NOT organic?

- A) vitamins
- B) carbohydrates
- C) proteins
- D) water

Answer: D

Page Ref: 7

Topic: What Are Nutrients?

Skill: Factual

17) Lauren's friend has recommended that she take a vitamin C supplement before undergoing oral surgery. Lauren is concerned about consuming too much of the supplement. Which of the following nutrient standards would assist Lauren in determining the highest amount of the supplement that would be safe for her to consume?

- A) Tolerable Upper Intake Level (UL)
- B) Recommended Dietary Allowance (RDA)
- C) Estimated Average Requirement (EAR)
- D) Acceptable Macronutrient Distribution Range (AMDR)

Answer: A

Page Ref: 15

Topic: What Are Nutrients?

Skill: Applied

18) Which of the following nutrients is the MOST energy dense?

- A) carbohydrate
- B) fat
- C) protein
- D) vitamins

Answer: B

Page Ref: 10

Topic: What Are Nutrients?

Skill: Conceptual

19) Which of the following is a micronutrient?

- A) carbohydrates
- B) vitamins
- C) lipids
- D) alcohol

Answer: B

Page Ref: 12

Topic: What Are Nutrients?

Skill: Factual

20) Which of the following BEST describes minerals?

- A) micronutrients that are broken down easily during digestion
- B) micronutrients that are easily destroyed by heat and light
- C) inorganic micronutrients found in a variety of foods
- D) nutrients that are needed in large amounts by the body

Answer: C

Page Ref: 12

Topic: What Are Nutrients?

Skill: Conceptual

21) An important source of energy for muscles during times of rest and low-intensity exercise is

- A) protein.
- B) vitamins.
- C) fat.
- D) water.

Answer: C

Page Ref: 11

Topic: What Are Nutrients?

Skill: Factual

22) The building blocks of proteins are called

- A) fatty acids.
- B) amino acids.
- C) saccharides.
- D) nitrogen fragments.

Answer: B

Page Ref: 11

Topic: What Are Nutrients?

Skill: Factual

23) Which of the following is NOT a primary function of dietary protein?

- A) building new cells and tissues
- B) repairing damaged structures
- C) regulating metabolism and fluid balance
- D) serving as a primary source of energy for the body

Answer: D

Page Ref: 11

Topic: What Are Nutrients?

Skill: Factual

24) Proteins are NOT found in

- A) meats, fish, and poultry.
- B) dairy products.
- C) seeds, nuts, and legumes.
- D) water.

Answer: D

Page Ref: 11

Topic: What Are Nutrients?

Skill: Conceptual

25) What two groups are vitamins classified into?

- A) fat soluble and water soluble
- B) macrosoluble and microsoluble
- C) nonnutritive and nutritive
- D) trace and major

Answer: A

Page Ref: 12

Topic: What Are Nutrients?

Skill: Factual

26) Vitamin C and the B vitamins are termed

- A) nonessential vitamins.
- B) water-soluble vitamins.
- C) fat-soluble vitamins.
- D) trace vitamins.

Answer: B

Page Ref: 12

Topic: What Are Nutrients?

Skill: Conceptual

27) Which of the following is FALSE?

- A) Fats are soluble in water.
- B) Fats are an important energy source for our bodies at rest and during low-intensity exercise.
- C) Fats are composed of carbon, hydrogen, and oxygen.
- D) Fats yield more calories per gram than carbohydrate or protein.

Answer: A

Page Ref: 10-11

Topic: What Are Nutrients?

Skill: Conceptual

28) Which of the following describes the vitamins A, D, E, and K?

- A) excreted via the urine
- B) potentially toxic
- C) soluble in water
- D) not stored to any extent in the body

Answer: B

Page Ref: 12

Topic: What Are Nutrients?

Skill: Factual

29) Inorganic nutrients that are NOT broken down by the human body or destroyed by heat or light are called

- A) vitamins.
- B) minerals.
- C) proteins.
- D) fats.

Answer: B

Page Ref: 12

Topic: What Are Nutrients?

Skill: Factual

30) Overconsumption of which nutrient has the greatest potential for toxicity?

- A) vitamin D
- B) vitamin C
- C) thiamin
- D) niacin

Answer: A

Page Ref: 12

Topic: What Are Nutrients?

Skill: Conceptual

31) What is the standard used to estimate the daily nutrient needs of half of all healthy individuals?

- A) Estimated Average Requirement (EAR)
- B) Adequate Intake (AI)
- C) Recommended Dietary Allowance (RDA)
- D) Tolerable Upper Intake Level (UI)

Answer: A

Page Ref: 14

Topic: What Are Nutrients?

Skill: Factual

32) The Dietary Reference Intakes (DRIs) were established to refocus nutrient recommendations toward preventing

- A) nutrient deficiencies.
- B) infectious diseases.
- C) poverty.
- D) chronic diseases.

Answer: D

Page Ref: 13

Topic: What Are Nutrients?

Skill: Recall

33) Which of the following is NOT a function of water in the body?

- A) helps to regulate nervous impulses and muscle contraction
- B) helps to transport nutrients and oxygen
- C) helps to excrete waste products
- D) provides a source of energy to work and play

Answer: D

Page Ref: 13

Topic: What Are Nutrients?

Skill: Factual

34) According to the Acceptable Macronutrient Distribution Range (AMDR), up to what percentage of your daily calories should be provided by carbohydrate?

- A) 35%
- B) 65%
- C) 70%
- D) 75%

Answer: B

Page Ref: 15

Topic: What Are Nutrients?

Skill: Factual

35) The highest average amount of a nutrient that can be consumed without a risk of adverse health effects to almost all individuals in a particular age and gender group is called the

- A) Acceptable Macronutrient Distribution Range (AMDR).
- B) Recommended Daily Allowance (RDA).
- C) Adequate Intake (AI).
- D) Tolerable Upper Intake Level (UL).

Answer: D

Page Ref: 15

Topic: What Are Nutrients?

Skill: Factual

36) What is the leading federal agency in Canada that protects human health and safety?

- A) Canadian Food Inspection Agency
- B) Dieticians of Canada
- C) Health Canada
- D) Public Health Agency of Canada

Answer: C

Page Ref: 22-24

Topic: Nutrition Advice: Who Can You Trust?

Skill: Factual

37) Your grandmother has recently been diagnosed with type 2 diabetes. Which of the following professionals is MOST likely to be qualified to offer your grandmother assistance in planning her diabetic diet?

- A) registered dietitian (RD)
- B) PhD in exercise science
- C) medical doctor (MD)
- D) nutritionist

Answer: A

Page Ref: 21-22

Topic: Nutrition Advice: Who Can You Trust?

Skill: Applied

38) Which of the following professional titles has NO definition or laws regulating it?

- A) registered dietitian
- B) medical doctor
- C) nutritionist
- D) licensed nutritionist

Answer: C

Page Ref: 21-22

Topic: Nutrition Advice: Who Can You Trust?

Skill: Factual

39) The type of study that compares a group of individuals with a disease to another similar but healthy group is called a(n)

- A) double-blind study.
- B) clinical trial.
- C) intervention study.
- D) case control study.

Answer: D

Page Ref: 19

Topic: Research Study Results: Who Can We Believe?

Skill: Factual

40) The group given a specific treatment or intervention during an experiment is called what?

- A) the experimental group
- B) the control group
- C) the double-blind group
- D) the blind group

Answer: A

Page Ref: 17

Topic: Research Study Results: Who Can We Believe?

Skill: Factual

41) Dr. Sullivan is conducting a clinical trial to determine if vitamin Z can improve test performance of students in an introductory college nutrition course. Dr. Sullivan puts all the students' names in a hat and draws names to determine if they will be placed in the control or the experimental group. The experimental group receives a capsule of vitamin Z and the control group a "sugar pill" that tastes and looks identical to the vitamin Z capsule. Neither Dr. Sullivan nor the participants knows who is receiving which treatment. This experiment is BEST described as

- A) single-blind, random selection.
- B) double-blind, placebo-controlled.
- C) single-blind, random selection, placebo-controlled.
- D) double-blind, random selection, placebo-controlled.

Answer: D

Page Ref: 19-20

Topic: Research Study Results: Who Can We Believe?

Skill: Applied

42) What is the first step of the scientific method?

- A) Formulate a hypothesis.
- B) Design and conduct an experiment.
- C) Collect and analyze data.
- D) Observe a phenomenon.

Answer: D

Page Ref: 16

Topic: Research Study Results: Who Can We Believe?

Skill: Factual

43) The second step of the scientific method is

- A) observation of a phenomenon.
- B) development of a theory.
- C) testing a research question or hypothesis.
- D) collecting data.

Answer: C

Page Ref: 16

Topic: Research Study Results: Who Can We Believe?

Skill: Factual

44) The Canadian Community Health Survey is an example of

- A) a double-blind study.
- B) a clinical trial.
- C) an epidemiological study.
- D) a case control study.

Answer: C

Page Ref: 19

Topic: Research Study Results: Who Can We Believe?

Skill: Applied

45) The chemicals found in foods that are critical to human growth and function are called

- A) antibodies.
- B) bacteria.
- C) nutrients.
- D) carcinogens.

Answer: C

Page Ref: 7

Topic: How Does Nutrition Contribute to Health?

Skill: Conceptual

46) What term is commonly used to describe foods that are grown without the use of synthetic pesticides?

- A) organic
- B) inorganic
- C) genetically modified organism (GMO)
- D) vegetarian

Answer: A

Page Ref: 7

Topic: What Are Nutrients?

Skill: Factual

47) The primary source of fuel for the body is

- A) carbohydrates.
- B) fats and oils.
- C) proteins.
- D) vitamins and minerals.

Answer: A

Page Ref: 9

Topic: What Are Nutrients?

Skill: Conceptual

48) Amino acids are the smallest unit of a

- A) carbohydrate.
- B) lipid.
- C) protein.
- D) vitamin.

Answer: C

Page Ref: 11

Topic: What Are Nutrients?

Skill: Conceptual

49) In the United States and Canada, what set of standards defines the recommended intake values for various nutrients for healthy people?

- A) Estimated Average Requirement (EAR)
- B) Tolerable Upper Intake Level (UL)
- C) Dietary Reference Intakes (DRIs)
- D) Acceptable Macronutrient Distribution Range (AMDR)

Answer: C

Page Ref: 13

Topic: What Are Nutrients?

Skill: Factual

50) What is the term for an imitation treatment that has no known physical effect or therapeutic value on the subjects in a research study?

- A) theory
- B) placebo
- C) single-blind trial
- D) double-blind trial

Answer: B

Page Ref: 20

Topic: Research Study Results: Who Can We Believe?

Skill: Factual

51) What is another name for an epidemiological study?

- A) a single-blind study
- B) a double-blind study
- C) a model study
- D) an observational study

Answer: D

Page Ref: 19

Topic: Research Study Results: Who Can We Believe?

Skill: Factual

52) A hypothesis or group of related hypotheses that have been confirmed through repeated scientific experiments is known as a(n)

- A) phenomenon.
- B) experiment.
- C) theory.
- D) fact.

Answer: C

Page Ref: 18

Topic: Research Study Results: Who Can We Believe?

Skill: Conceptual

## True/False Questions

1) The earliest discoveries in the field of nutrition focused on nutritional deficiencies and illness.

Answer: TRUE

Page Ref: 4

Topic: What Is Nutrition?

Skill: Factual

2) "Health" is a multidimensional process that includes one's physical, emotional, social, occupational, and spiritual health.

Answer: TRUE

Page Ref: 5

Topic: What Is Nutrition?

Skill: Factual

3) Cryogenics is a new area of research that seeks to uncover the links between our genes, our environment, and our diet.

Answer: FALSE

Page Ref: 4

Topic: What Is Nutrition?

Skill: Factual

4) In Canada, diseases related to overnutrition (heart disease, stroke, type 2 diabetes) are more common than nutrient deficiency diseases.

Answer: TRUE

Page Ref: 6

Topic: What Is Nutrition?

Skill: Recall

5) Macronutrients are nutrients that contain inorganic components.

Answer: FALSE

Page Ref: 8

Topic: What Are Nutrients?

Skill: Factual

6) Essential nutrients are nutrients the body can manufacture in sufficient quantities to meet its needs.

Answer: FALSE

Page Ref: 7

Topic: What Are Nutrients?

Skill: Factual

7) Protein is the primary source of fuel for our brain.

Answer: FALSE

Page Ref: 9

Topic: What Are Nutrients?

Skill: Factual

8) Vitamins provide 4 kilocalories per gram.

Answer: FALSE

Page Ref: 12

Topic: What Are Nutrients?

Skill: Factual

9) Because water does not provide any calories to the body, scientists do not consider it a nutrient.

Answer: FALSE

Page Ref: 13

Topic: What Are Nutrients?

Skill: Conceptual

10) A beverage that contains 20 grams of alcohol mixed with a diet soda has approximately 140 kilocalories.

Answer: TRUE

Page Ref: 9

Topic: What Are Nutrients?

Skill: Applied

11) The macronutrients include carbohydrates, lipids, and proteins.

Answer: TRUE

Page Ref: 8

Topic: What Are Nutrients?

Skill: Factual

12) Fat is an important energy source for our bodies during low-intensity exercise.

Answer: TRUE

Page Ref: 10

Topic: What Are Nutrients?

Skill: Factual

13) Protein's primary role is to provide energy for the body.

Answer: FALSE

Page Ref: 11

Topic: What Are Nutrients?

Skill: Factual

14) Protein is the only macronutrient that contains the element nitrogen.

Answer: TRUE

Page Ref: 11

Topic: What Are Nutrients?

Skill: Factual

15) Cholesterol is one form of lipid that can be synthesized by the body.

Answer: TRUE

Page Ref: 11

Topic: What Are Nutrients?

Skill: Factual

16) Poor nutrition is strongly associated with three chronic diseases that are among the top ten causes of death in the United States.

Answer: TRUE

Page Ref: 6

Topic: How Does Nutrition Contribute to Health?

Skill: Factual

17) Minerals maintain their chemical structure and are not broken down during digestion.

Answer: TRUE

Page Ref: 12

Topic: What Are Nutrients?

Skill: Conceptual

18) Vitamins assist with the regulation of many body processes.

Answer: TRUE

Page Ref: 12

Topic: What Are Nutrients?

Skill: Factual

19) Because they are needed in relatively large quantities, vitamins and minerals are considered macronutrients.

Answer: FALSE

Page Ref: 12

Topic: What Are Nutrients?

Skill: Conceptual

20) The Dietary Reference Intakes (DRIs) are dietary standards that should be applied only to healthy individuals.

Answer: TRUE

Page Ref: 13

Topic: What Are Nutrients?

Skill: Conceptual

21) Fat-soluble vitamins are considered nonessential because the human body needs them in relatively small amounts and can synthesize them in the liver.

Answer: FALSE

Page Ref: 12

Topic: What Are Nutrients?

Skill: Factual

22) Rich sources of carbohydrate include legumes, milk, rice, wheat, fruits, and vegetables.

Answer: TRUE

Page Ref: 10

Topic: What Are Nutrients?

Skill: Conceptual

23) A double-blind experiment is one in which neither the researchers nor participants know which group is assigned to which treatment.

Answer: TRUE

Page Ref: 20

Topic: Research Study Results: Who Can We Believe?

Skill: Factual

24) The term nutritionist has no precise definition or laws regulating it.

Answer: TRUE

Page Ref: 21-22

Topic: Nutrition Advice: Who Can You Trust?

Skill: Factual

25) In the second half of the 20<sup>th</sup> century, nutrition researchers failed to find a link between nutrition and the development of chronic diseases.

Answer: FALSE

Page Ref: 4-7

Topic: How Does Nutrition Contribute to Health?

Skill: Conceptual

26) For an experiment to be consistent with the principles of the scientific method, it must be repeatable.

Answer: TRUE

Page Ref: 18

Topic: Research Study Results: Who Can We Believe?

Skill: Factual

27) The energy derived from food is expressed in units called kilocalories.

Answer: TRUE

Page Ref: 9

Topic: What Are Nutrients?

Skill: Factual

28) A placebo is the misrepresentation of a product, program, or service for financial gain.

Answer: FALSE

Page Ref: 20

Topic: Research Study Results: Who Can We Believe?

Skill: Factual

29) A Registered Dietitian is a health professional who has earned a bachelor's degree, has completed extensive nutrition-related course work, and has successfully completed a national dietetics exam.

Answer: TRUE

Page Ref: 21

Topic: Nutrition Advice: Who Can You Trust?

Skill: Factual

30) The term *nutritionist* has no definition or laws regulating it in most parts of Canada.

Answer: TRUE

Page Ref: 21

Topic: Nutrition Advice: Who Can You Trust?

Skill: Factual

31) Health Canada is responsible for the health and safety of Canadians.

Answer: TRUE

Page Ref: 22

Topic: Nutrition Advice: Who Can You Trust?

Skill: Factual

### Essay Questions

1) Compare and contrast early nutrition discoveries to current trends in nutrition research and health promotion. Why has the focus shifted?

Answer: Beginning in the mid-1700s, early research in nutrition focused on making the link between nutrition deficiencies and illness. At that time, the research could pinpoint a nutrient deficiency disease and foods that could prevent it, but could not identify the exact nutrient(s) responsible. Later in the 20th century, researchers were able to identify more specifically the nutrients involved in deficiency diseases. These discoveries have aided nutrition experts in developing guidelines for diets that can prevent deficiency diseases.

Today, an ample food supply and the ability to fortify foods with nutrients have ensured that the majority of deficiency diseases are no longer of concern in developed countries. Instead, we are now seeing a rise in chronic diseases such as obesity, cancer, diabetes and heart disease. Thus, a lot of the research today focuses on how a nutritious diet can reduce the risk for certain chronic diseases. We now know that nutrition appears to play a role in many diseases. Its role can vary from mild influence, to a strong association, to directly causing a disease.

Over the last century we have seen a shift away from the prevention of deficiency diseases caused by undernutrition (a diet that lacks energy or specific essential nutrients) toward the prevention of chronic diseases. Certain chronic diseases such as type 2 diabetes, heart disease and certain cancers have resulted, in part, from overnutrition (a diet that has an imbalance of fats, carbohydrates, and proteins or simply too much energy).

Page Ref: 4-7

Topic: What Is Nutrition?

Skill: Applied

2) Define health as it is defined today. How does this view of health compare to earlier definitions?

Answer: Traditionally, health simply referred to the absence of disease. Today, the definition of health has been expanded and according to the World Health Organization, health is a state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity. Health is now considered a multi-dimensional process that includes physical activity and occupational, social, emotional, intellectual, and spiritual health. Further, health is not an endpoint in our lives but an active process we can work on every day.

Page Ref: 5

Topic: How Does Nutrition Contribute to Health?

Skill: Applied

3) Align the Scientific Method with the series of trials Dr. Goldberger performed to confirm his suspicions that pellagra is a result of a nutrient deficiency.

Answer:

Observations: Pellagra, thought to be an infectious disease, would strike poorer people such as children in orphanages, prisoners, poor labourers but not more affluent people such as nurses and guards.

Hypothesis: Pellagra is caused by a dietary deficiency

Experiment: Fed orphans and prisoners a nutrient-rich diet instead of the corn-based diet they had been used to.

Data/Observations: The orphans and prisoners who were fed this diet recovered.

Repeat Experiment: #1: Goldberger fed 10 healthy inmates a corn-based diet and they developed pellagra. #2: Goldberger and his colleagues injected and ingested the scabs and secretions from the affected people and he and his colleagues remained healthy.

Accept Hypothesis: Pellagra is caused by a dietary deficiency.

Theory: Pellagra is caused by a dietary deficiency.

Page Ref: 5, 16-18

Topic: How Does Nutrition Contribute to Health?

Skill: Applied

4) Describe the primary link between poor nutrition and mortality. List the potential conditions associated with this primary link and the risks that face many Canadians.

Answer: The primary link between poor nutrition and mortality is obesity. It is a well-established risk factor for heart disease, stroke, type 2 diabetes and possibly some forms of cancer. While obesity is the result of overnutrition, it may also contribute to undernutrition due to the lack of vitamin and mineral rich foods such as fresh fruits and vegetables, whole grains and other unrefined foods. In other words, there is an excess of macronutrients but a lack of micronutrients.

The prevalence of obesity in adults has risen from 13.8% in 1978 to 17.6% in 2008.

Additionally, 33.1% were considered to be overweight, meaning that over half of all adult Canadians are at risk for obesity-related conditions. The future does not seem to be any brighter for the younger generation since 20% of adolescents aged 12-17 were obese or overweight in 2008.

Page Ref: 6-7

Topic: How Does Nutrition Contribute to Health?

Skill: Conceptual

5) The Dietary Reference Intakes (DRIs) for most nutrients consist of four separate values: Estimated Average Requirement (EAR), Recommended Dietary Allowance (RDA), Adequate Intake (AI), and Tolerable Upper Level (UL). Explain what each of these values represents.

Answer:

Estimated Average Requirement (EAR)

- Represents the average daily nutrient intake level estimated to meet the requirement of half of the healthy individuals in a particular life stage and gender group
- The EAR is used by scientists to statistically define the Recommended Dietary Allowance (RDA) for a given nutrient

Recommended Dietary Allowance (RDA)

- Represents the average daily nutrient intake level that meets the nutrient requirements of nearly all healthy individuals (97%-98%) in a particular life stage and gender group
- The RDA is statistically determined from the EAR

Adequate Intake (AI)

- A recommended average daily nutrient intake level based on observed or experimentally determined estimates of nutrient intake by a group of healthy people
- These estimates are assumed to be adequate and are used when an RDA cannot be determined

Tolerable Upper Intake Level (UL)

- The highest average daily nutrient intake level likely to pose no risk of adverse health effects to almost all individuals in a particular life stage and gender group.
- A helpful guide to assist you in determining the highest average intake level that is deemed safe for a given nutrient

Page Ref: 13-16

Topic: What Are Nutrients?

Skill: Applied

6) Outline the similarities and differences between the three macronutrients.

Answer:

Similarities

- carbohydrates, fats and proteins are all organic, i.e., they contain carbon and hydrogen
- they all provide energy when they are metabolized

Differences

- proteins contain nitrogen, whereas fats and carbohydrates do not
- energy provision is a primary function of fats and carbohydrates, whereas it is a secondary function for proteins

Page Ref: 8-11

Topic: What Are Nutrients?

Skill: Conceptual

7) List the six classes of nutrients. For each class of nutrients, note whether it is organic or inorganic and how many kilocalories per gram it provides, if any.

Answer: Carbohydrates: organic, 4 kcal/g

Fat/Lipids: organic, 9 kcal/g

Protein: organic, 4 kcal/g

Water: inorganic, 0 kcal/g

Vitamins: organic, 0 kcal/g

Minerals: inorganic, 0 kcal/g

Page Ref: 7-13

Topic: What Are Nutrients?

Skill: Factual

8) Calculate the energy contributions of carbohydrate, protein and fat in the following scenario. Heidi is a registered dietitian working at a Sports Clinic. She does a personal diet analysis for you and finds that, on average, you consume approximately 3450 kcal per day. From your diet analysis, you also learn that you consume 419 grams of carbohydrate, 180 grams of protein and 117 grams of fat. Calculate your percentage of total energy from carbohydrate, protein and fat.

Answer:

For carbohydrate:

$$419 \text{ g} \times 4 \text{ g/kcal} = 1676 \text{ kcal from carbohydrate}$$

$$[1676 \text{ kcal}/3450 \text{ kcal}] \times 100 = 48.6\%$$

For protein:

$$180 \text{ g} \times 4 \text{ g/kcal} = 720 \text{ kcal from protein}$$

$$[720 \text{ kcal}/3450 \text{ kcal}] \times 100 = 20.8\%$$

For fat:

$$117 \text{ g} \times 9 \text{ g/kcal} = 1053 \text{ kcal from fat}$$

$$[1053 \text{ kcal}/3450 \text{ kcal}] \times 100 = 30.5\%$$

The contribution of energy from carbohydrate, protein and fat are approximately 49%, 21%, and 31% respectively.

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Topic: What Are Nutrients?

Skill: Applied

9) One recent Sunday morning you ran a 10 km run. To replenish your energy following the run, you drank a bottle of water and ate an energy bar that provided 261 kcal, including 44 grams carbohydrate and 5 grams fat. What is the approximate number of grams of protein you consumed at the end of the run?

Answer:

For carbohydrate:

$$44 \text{ g} \times 4 \text{ kcal /g} = 176 \text{ kcal from carbohydrate}$$

For fat:

$$5 \text{ g} \times 9 \text{ kcal /g} = 45 \text{ kcal from fat}$$

Total kcal: 261 kcal

Total kcal from carbohydrates and fat: 221 kcal

$$261 \text{ kcal} - 221 \text{ kcal} = 40 \text{ kcal for protein}$$

For protein:

$$40 \text{ kcal} / 4 \text{ kcal/g} = 10 \text{ grams of protein}$$

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Topic: What Are Nutrients?

Skill: Applied

10) Classify the following list into water-soluble and fat-soluble vitamins. What is the difference between the two types of vitamins?

Vitamin A, thiamin, niacin, vitamin D, vitamin B<sub>6</sub>, vitamin E, vitamin B<sub>12</sub>, vitamin C, riboflavin, pantothenic acid, vitamin K, biotin and folate.

Answer:

Water-soluble vitamins:

Thiamin; niacin; vitamin B<sub>6</sub>; vitamin B<sub>12</sub>; vitamin C; riboflavin; pantothenic acid; biotin; folate

Fat-soluble vitamins:

Vitamin A; vitamin D; vitamin E; vitamin K

Vitamins are classified as fat-soluble or water-soluble. Their solubility in water or fat affects how vitamins are absorbed, transported, and stored in our bodies. Fat-soluble vitamins are absorbed in our intestines along with dietary fat. They are then transported to the liver or other organs, where they are either used or stored for later use. Our ability to store fat-soluble vitamins sets them apart from the water-soluble vitamins. Because of our ability to store these vitamins, we do not have to consume the recommended intakes of these nutrients on a daily or weekly basis.

In contrast to fat-soluble vitamins, water-soluble vitamins dissolve in water and are absorbed through the intestinal wall directly into the bloodstream. These vitamins then travel to the cells of the body where they are needed. Due to the fact that water-soluble vitamins dissolve in water, we cannot store large amounts of them and our kidneys filter out any excess in our urine.

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Topic: What Are Nutrients?

Skill: Factual

11) Compare and contrast between major minerals and trace minerals. List 3 examples of each.  
Answer: Minerals are classified according to the amounts we need in our diet and how much of the mineral is found in our bodies. For major minerals, we need to consume at least 100 milligrams (mg) per day in our diets. In contrast, trace minerals are those we need to consume in amounts less than 100 mg per day. We need to consume a larger quantity of major minerals because the total amount found in our bodies is at least 5 grams (or 5000 mg) whereas the amount of trace minerals found in our bodies is less than 5 grams.

Examples of major minerals:

calcium, phosphorus, magnesium, sodium, potassium, chloride, sulfur

Examples of trace minerals:

iron, zinc, copper, manganese, fluoride, chromium, molybdenum, selenium, iodine

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Topic: What Are Nutrients?

Skill: Factual

12) Define the EER and list which factors are used to predict the EER.

Answer: The Estimated Energy Requirement (EER) is defined as the average dietary energy intake that is predicted to maintain energy balance in a healthy adult. This dietary intake is defined by a person's age, gender, weight, height, and level of physical activity that is consistent with good health.

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Topic: What Are Nutrients?

Skill: Factual

13) Define AMDR and describe the purpose of AMDR.

Answer: The Acceptable Macronutrient Distribution Ranges (AMDR) are ranges of intakes for energy-yielding nutrients that are associated with reduced risk of chronic disease while providing adequate intakes of essential nutrients. The AMDR are expressed as a percentage of total energy (Calorie) intake. Each AMDR has an upper and lower boundary. If we consume nutrients above or below the range, there is a potential for increased risk for chronic disease and for increased risk of consuming inadequate levels of nutrients essential for health. The AMDR for adults for carbohydrate, fat and protein are 45–65%, 20–35%, and 10–35%, respectively.

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Topic: What Are Nutrients?

Skill: Factual

14) Describe why humans do not make very good experimental models.

Answer: Humans do not make very good experimental models because they have long life spans and it is difficult to control all the variables that can affect the outcome of an experiment.

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Topic: Research Study Results: Who Can We Believe?

Skill: Conceptual

15) There is clearly a relationship between nutrition and human disease. Classify the diseases below into one of the following categories: 1) diseases in which nutrition plays some role 2) diseases with a strong nutritional component, or 3) diseases caused by nutritional deficiencies or toxicities.

Osteoporosis; other vitamin/mineral deficiencies; scurvy; some forms of cancer; obesity; osteoarthritis; type 2 diabetes; pellagra; iron deficiency anemia; heart disease; nutrient toxicities; high blood pressure

Answer:

Diseases in which nutrition plays some role:

- osteoporosis
- osteoarthritis
- some forms of cancer

Diseases with a strong nutritional component:

- type 2 diabetes
- heart disease
- high blood pressure
- obesity

Diseases caused by nutritional deficiencies or toxicities:

- pellagra
- scurvy
- iron-deficiency anemia
- other vitamin and mineral deficiencies
- nutrient toxicities

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Topic: How Does Nutrition Contribute to Health?

Skill: Factual

16) List and describe the steps involved in the scientific method.

Answer: The scientific method is a multi-step process that involves observation, experimentation, and development of a theory.

Step 1: Observation

- Observation and description of a phenomenon (i.e., you may notice a pattern developing)
- Observation leads you to question the relationship that might exist
- Develop a hypothesis (or research question) as a possible explanation for your observation

Step 2: Experimentation

- Conduct a scientific study to test the research question or hypothesis
- Attempt to control for factors that may coincidentally influence the results

Step 3: Development of a Theory

- If the results of multiple experiments consistently support a hypothesis, then it is possible to develop a theory
- If multiple experiments do not support a hypothesis, then the hypothesis is rejected or modified
- A theory represents a hypothesis that have been confirmed through repeated scientific experiments; theories are strongly accepted principles, but they can be challenged and changed as a result of applying the scientific method.

Page Ref: 16-17

Topic: Research Study Results: Who Can We Believe?

Skill: Applied

17) Describe the information provided by each of the following research studies:  
Epidemiological studies, laboratory studies, case control studies and clinical trials.

Answer:

Epidemiological Studies:

- Inform researchers of existing relationships
- Also known as observational studies
- Involve assessing nutritional habits, disease trends, or other health phenomenon of large populations and determining the factors that may influence these phenomena
- Help researchers study populations and health trends in large groups
- Can only indicate relationships between factors, and the results do not indicate a cause-and-effect relationship

Laboratory Studies:

- Generally involve experiments with animals
- Animal studies provide preliminary information that can assist researchers in designing and implementing human studies
- Used to conduct research that cannot be done with humans (when it is unethical)
- Limited in that the results from animal studies may not apply directly to humans
- Guide researchers in determining how to proceed to design experiments with humans

Case Control Studies:

- Epidemiological studies done on a smaller scale
- Involve comparing a group of individuals with a particular condition to a similar group without this condition
- This comparison allows the researcher to identify factors other than the defined condition that differ between the two groups
- By identifying these factors, researchers can gain a better understanding of things that may cause and help prevent disease

Clinical Trials

- Tightly controlled experiments in which an intervention is given to determine its effect on a given disease or health condition
- Interventions may include medications, nutritional supplements, controlled diets, or exercise programs
- Include an experimental group, who are given the intervention, and a control group, who are not given the intervention
- The responses of the intervention group are compared to those of the control group

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Topic: Research Study Results: Who Can We Believe?

Skill: Applied

18) Your friend Cathy wants some nutrition advice. She tells you about an ad for a local *certified nutritionist*. Based on what you have learned in your nutrition class, what do you recommend?

Answer: A certified nutritionist is not a regulated or protected title in Canada. This means that anyone can call themselves a nutritionist irrespective of their level of training and knowledge of nutrition. In contrast, a Registered Dietitian (RD) is a health professional that must receive a bachelor's degree in foods and nutrition from a university program accredited by the Dietitians of Canada (DC) followed by successful completion of a dietetic internship or equivalent practicum experience.

To become a RD, the intern must then successfully pass the Canadian Dietetic Registration Examination and become registered with a provincial regulatory body. Provincially mandated colleges or registration boards ensure public safety by monitoring the competence of members, protecting the public from unsafe or unethical dietetic practice, responding to complaints from the public, and disciplining members when necessary.

My advice to my friend would be to check the Dietitians of Canada website for a qualified and registered nutrition professional in her city and to be wary of nutrition professionals without a professional designation like RD, PDt, RDt or Dt.P.

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Topic: Nutrition Advice: Who Can You Trust?

Skill: Applied

19) List 2 government health agencies (federal, provincial/territorial or municipal) affiliated with Health Canada that provide trustworthy information relating to health and/or nutrition.

Answer: Office of Nutrition Policy and Promotion, Health Products and Food Branch, Health Canada;

Natural Health Products Directorate, Health Products and Food Branch, Health Canada; Canadian Food Inspection Agency, Bureau of Food Safety and Consumer Protection; Public Health Agency of Canada

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Topic: Nutrition Advice: Who Can You Trust?

Skill: Factual

20) How would you answer the following question, 'Should medical doctors be our primary source of nutrition information?'

Answer: A medical doctor (MD) is educated, trained, and licensed to practise medicine in Canada. However, an MD typically has limited experience and training in the area of nutrition. MDs should be one of the first health professionals that you see for an accurate medical diagnosis. Registered Dietitians (RD) and Public Health Nutritionists have specific training in nutrition and are qualified to speak about issues relating to food and nutrition. If you are sick and require a dietary plan to treat an illness or disease, most medical doctors will refer you to a RD to assist you in meeting your dietary needs. Thus, doctors should not be our primary source of nutrition information but are essential for providing medical direction and making referrals to those specializing in particular aspects of health, such as Registered Dietitians.

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Topic: Nutrition Advice: Who Can You Trust?

Skill: Applied

21) Describe the training and education of a Registered Dietitian.

Answer: A Registered Dietitian (RD) is a health professional with a bachelor's degree in foods and nutrition from a university program accredited by the Dietitians of Canada (DC), followed by successful completion of a dietetic internship or equivalent practicum experience. To become a RD, the intern must then successfully pass the Canadian Dietetic Registration Examination and become registered with a provincial regulatory body. Provincially mandated colleges or registration boards ensure public safety by monitoring the competence of members, protecting the public from unsafe or unethical dietetic practice, responding to complaints from the public, and disciplining members when necessary. The title dietitian is legally protected in each province so that only qualified practitioners with the appropriate education can use it.

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Topic: Nutrition Advice: Who Can You Trust?

Skill: Applied

22) List 3 considerations you should make when trying to find reliable nutrition information using the Internet.

Answer:

1. Consider the website's address. Website addresses ending in .org (organization), .edu (educational institution) or .gov (government) will be more dependable sources of information.

2. Look for the credentials of the person writing the article.

3. Check to see when the website was last updated as websites should be updated often.

4. Consider whether the website is providing a public information service or if it is selling a product.

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Topic: Nutrition Advice: Who Can You Trust?

Skill: Conceptual

## Nutrition Debate Questions

1) Nutrigenomics is a scientific discipline that studies the genetic variations in plant and animal foods and the effect on nutrient composition.

Answer: FALSE

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Topic: Nutrition Debate: Nutrigenomics

Skill: Factual

2) Nutrition researchers studying agouti mice discovered a link between

A) vitamin C deficiency and scurvy.

B) level of physical activity and obesity.

C) diet and gene expression.

D) niacin deficiency and pellagra.

Answer: C

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Topic: Nutrition Debate: Nutrigenomics

Skill: Factual

3) What is the theory behind nutrigenomics? What evidence exists to support nutrigenomics?

Answer: Answers will vary.

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Topic: Nutrition Advice: Who Can You Trust?

Skill: Factual

## Questions from Chapter Boxes

1) Which of the following is an example of disease that is directly caused by a nutritional deficiency?

- A) pellagra
- B) cancer
- C) type 2 diabetes
- D) heart disease

Answer: A

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Topic: How Does Nutrition Contribute to Health?

Skill: Factual

2) Prevalent among U.S. Southerners during the early 1900s, pellagra was first thought to be an infectious disease. Today we know that it is caused by a deficiency of

- A) vitamin A.
- B) vitamin C.
- C) protein.
- D) niacin.

Answer: D

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Topic: How Does Nutrition Contribute to Health?

Skill: Factual

3) Joan's dinner contains 210 grams of carbohydrate, 60 grams of protein, and 52 grams of fat. What percent of kilocalories in this meal comes from carbohydrate?

- A) 22%
- B) 25%
- C) 35%
- D) 54%

Answer: D

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Topic: What Are Nutrients?

Skill: Applied

4) A slice of pumpkin bread contains 5 grams of fat, 40 grams of carbohydrate, and 5 grams of protein. What percent of the bread's calories are from fat?

- A) 10%
- B) 20%
- C) 40%
- D) 75%

Answer: B

Page Ref: 10

Topic: What Are Nutrients?

Skill: Applied