

CHAPTER 1—INTRODUCTION TO BIOLOGICAL CONCEPTS AND RESEARCH

MULTIPLE CHOICE

1. The science of ____ explains the origin of life, the persistence of life, and studies the changes in living things.
- nanotechnology
 - mathematics
 - biology
 - chemistry
 - pharmacology

ANS: C PTS: 1 DIF: Easy
OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Comprehension
TOP: 1.0 WHY IT MATTERS

2. It is through ____ that we further our knowledge of living things.
- ideologies
 - biological research
 - philosophy
 - ethics
 - logic

ANS: B PTS: 1 DIF: Easy
OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Comprehension
TOP: 1.0 WHY IT MATTERS

3. The difference between living and nonliving matter depends not only on the kinds of atoms and molecules present, it also depends on ____.
- their electrons
 - their chemical interactions
 - their compounds
 - their organization and interactions
 - their chemical complexity

ANS: D PTS: 1 DIF: Moderate
OBJ: Bloom's Taxonomy: Comprehension
TOP: 1.1 WHAT IS LIFE? CHARACTERISTICS OF LIVING ORGANISMS

4. Living organisms must gather energy and materials from their surroundings to ____.
- build new biochemicals
 - grow
 - maintain and repair their parts
 - produce offspring
 - all of these

ANS: E PTS: 1 DIF: Moderate
OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Comprehension
TOP: 1.1 WHAT IS LIFE? CHARACTERISTICS OF LIVING ORGANISMS

5. A cell is minimally defined by which of the following:
- an organized chemical system.
 - specialized molecules.
 - a nucleus.
 - a membrane.
 - an organized chemical system and specialized molecules surrounded by a membrane.

ANS: E PTS: 1 DIF: Easy
OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Comprehension
TOP: 1.1 WHAT IS LIFE? CHARACTERISTICS OF LIVING ORGANISMS

6. The lowest level of biological organization that can survive and reproduce is the ____.
- proton
 - DNA
 - nucleus
 - tissue
 - cell

ANS: E PTS: 1 DIF: Moderate
OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Comprehension
TOP: 1.1 WHAT IS LIFE? CHARACTERISTICS OF LIVING ORGANISMS

7. As long as a cell has access to a usable energy source, has the necessary raw materials, and is in appropriate environmental conditions, the cell will:
- survive and reproduce.
 - stay in stasis.
 - not be in homeostasis.
 - remain dormant.
 - no longer be emergent.

ANS: A PTS: 1 DIF: Moderate
OBJ: Bloom's Taxonomy: Comprehension
TOP: 1.1 WHAT IS LIFE? CHARACTERISTICS OF LIVING ORGANISMS

8. Emergent properties are
- characteristics of nonliving matter.
 - exclusive to atoms but not molecules.
 - neither exclusive to molecules nor compounds.
 - characteristics that depend on the level of organization of matter but do not exist at lower levels of organization.
 - exclusive to multicellular organisms.

ANS: D PTS: 1 DIF: Moderate
OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Comprehension
TOP: 1.1 WHAT IS LIFE? CHARACTERISTICS OF LIVING ORGANISMS

9. Bacteria and protozoans are ____.
- multicellular organisms
 - unicellular organisms
 - both unicellular and multicellular organisms
 - the sole organisms of the oceans
 - precursors to cells

ANS: B PTS: 1 DIF: Easy
OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Comprehension

TOP: 1.1 WHAT IS LIFE? CHARACTERISTICS OF LIVING ORGANISMS

10. Every population of animals has an age structure. The individuals that make up the population are all of a specific age, but individuals do not have an age structure. Age structure is an example of a(n) _____.
a. emergent property.
b. environmental property.
c. hierarchical property.
d. organizational property.
e. cellular property.

ANS: A PTS: 1 DIF: Moderate
OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Comprehension
TOP: 1.1 WHAT IS LIFE? CHARACTERISTICS OF LIVING ORGANISMS

11. A group of organisms of the same species that live together in the same place make up a(n) _____.
a. cell
b. ecosystem
c. tissue
d. population
e. biosphere

ANS: D PTS: 1 DIF: Moderate
OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Comprehension
TOP: 1.1 WHAT IS LIFE? CHARACTERISTICS OF LIVING ORGANISMS

12. All the populations of different organisms that live in the same place form a(n) _____.
a. ecosystem
b. community
c. biosphere
d. organ
e. population

ANS: B PTS: 1 DIF: Moderate
OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Comprehension
TOP: 1.1 WHAT IS LIFE? CHARACTERISTICS OF LIVING ORGANISMS

13. The highest level of the hierarchy of life is the _____.
a. population
b. biosphere
c. ecosystem
d. multicellular organism
e. cell

ANS: B PTS: 1 DIF: Easy
OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Comprehension
TOP: 1.1 WHAT IS LIFE? CHARACTERISTICS OF LIVING ORGANISMS

14. Which of the following is NOT a logical hierarchy of biological organization?
- cells, tissues, organs, organ systems, organisms
 - family, order, class, phylum, kingdom
 - cells, molecules, organelles, tissues, systems
 - molecules, cells, tissues, organ systems, populations
 - organisms, populations, communities, ecosystems, biosphere

ANS: C

PTS: 1

DIF: Moderate

OBJ: Bloom's Taxonomy: Analysis

TOP: 1.1 WHAT IS LIFE? CHARACTERISTICS OF LIVING ORGANISMS

15. A(n) ____ includes the community and the nonliving environmental factors with which it interacts.
- community
 - biosphere
 - ecosystem
 - multicellular organism
 - earth

ANS: C

PTS: 1

DIF: Easy

OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Comprehension

TOP: 1.1 WHAT IS LIFE? CHARACTERISTICS OF LIVING ORGANISMS

16. Destruction of forest ecosystems in Brazil affects the amount of CO₂ taken up from the atmosphere. In consequence, altered levels of atmospheric CO₂ may affect the climate in the American midwest. A person who studies these types of interactions would probably be called a(n) ____.
- biosphere biologist
 - community biologist
 - ecosystem biologist
 - physiological ecologist
 - population biologist

ANS: A

PTS: 1

DIF: Moderate

OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Comprehension

TOP: 1.1 WHAT IS LIFE? CHARACTERISTICS OF LIVING ORGANISMS

17. The most fundamental and important molecule that distinguishes living systems from nonliving matter is ____.
- DNA
 - deoxyribonucleic acid
 - glucose
 - fructose
 - a and b only

ANS: E

PTS: 1

DIF: Moderate

OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Comprehension

TOP: 1.1 WHAT IS LIFE? CHARACTERISTICS OF LIVING ORGANISMS

18. ____ is a large, double-stranded, helical molecule that contains instructions for assembling a living organism from simpler molecules.
- a. RNA
 - b. DNA
 - c. ATP
 - d. NADPH
 - e. Protein

ANS: B

PTS: 1

DIF: Easy

OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Comprehension

TOP: 1.1 WHAT IS LIFE? CHARACTERISTICS OF LIVING ORGANISMS

19. ____ contain DNA, but are not considered to be alive because they cannot reproduce independently of their host.
- a. Prions
 - b. Eukaryotes
 - c. Prokaryotes
 - d. Viruses
 - e. Cells

ANS: D

PTS: 1

DIF: Moderate

OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Comprehension

TOP: 1.1 WHAT IS LIFE? CHARACTERISTICS OF LIVING ORGANISMS

20. The information in DNA is copied into molecules of ____.
- a. lipid
 - b. carbohydrates
 - c. hydrogen peroxide
 - d. oxygen
 - e. RNA

ANS: E

PTS: 1

DIF: Easy

OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Comprehension

TOP: 1.1 WHAT IS LIFE? CHARACTERISTICS OF LIVING ORGANISMS

21. What molecule carries out most of the activities of life, including the synthesis of all other biological molecules?
- a. carbohydrate
 - b. lipid
 - c. protein
 - d. nucleic acid
 - e. carbon

ANS: C

PTS: 1

DIF: Moderate

OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Comprehension

TOP: 1.1 WHAT IS LIFE? CHARACTERISTICS OF LIVING ORGANISMS

22. Metabolism describes the ability of a cell or organism to:
- a. extract energy from its surroundings.
 - b. maintain itself.
 - c. grow.
 - d. reproduce.
 - e. all of these

ANS: E

PTS: 1

DIF: Moderate

OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Comprehension
TOP: 1.1 WHAT IS LIFE? CHARACTERISTICS OF LIVING ORGANISMS

23. Photosynthesis and cellular respiration are examples of ____.
- a. anabolism
 - b. catabolism
 - c. synthesis
 - d. metabolism
 - e. cleavage

ANS: D PTS: 1 DIF: Difficult

OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Comprehension
TOP: 1.1 WHAT IS LIFE? CHARACTERISTICS OF LIVING ORGANISMS

24. Living systems have the capacity to detect environmental changes and compensate for them through controlled responses. This is possible because living systems have ____.
- a. diverse and varied receptors
 - b. nerves
 - c. photoreceptors
 - d. hormones
 - e. sensitivity

ANS: A PTS: 1 DIF: Difficult

OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Comprehension
TOP: 1.1 WHAT IS LIFE? CHARACTERISTICS OF LIVING ORGANISMS

25. Maintaining your body's internal temperature within narrow tolerable range is one example of:
- a. sebaceous glands working to lower your body temperature.
 - b. stasis.
 - c. homeostasis.
 - d. compensation.
 - e. hydrolysis.

ANS: C PTS: 1 DIF: Difficult

OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Comprehension
TOP: 1.1 WHAT IS LIFE? CHARACTERISTICS OF LIVING ORGANISMS

26. While running on a treadmill, your heart rate will increase and your breathing will be deeper and more rapid. Among other things, this helps ensure that your muscles get adequate supplies of O₂ as you exercise. These changes are the result of ____.
- a. compensatory mechanisms
 - b. developmental mechanisms
 - c. emergent properties
 - d. homeostatic mechanisms
 - e. multicellularity

ANS: D PTS: 1 DIF: Difficult

OBJ: Bloom's Taxonomy: Knowledge, Comprehension
TOP: 1.1 WHAT IS LIFE? CHARACTERISTICS OF LIVING ORGANISMS

27. The process by which parents produce offspring is called:

- a. reproduction.
- b. homeostasis.
- c. compensation.
- d. feeding.
- e. artificial selection.

ANS: A PTS: 1 DIF: Easy

OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Comprehension

TOP: 1.1 WHAT IS LIFE? CHARACTERISTICS OF LIVING ORGANISMS

28. Inheritance

- a. is the process by which genetic information is transmitted to offspring.
- b. occurs only in animals.
- c. is a process by which proteins are transmitted to offspring.
- d. is not a biological process.
- e. is the process by which genetic information is transmitted to offspring and occurs only in animals

ANS: A PTS: 1 DIF: Easy

OBJ: Bloom's Taxonomy: Knowledge

TOP: 1.1 WHAT IS LIFE? CHARACTERISTICS OF LIVING ORGANISMS

29. A series of programmed changes encoded in DNA, through which a fertilized egg divides into many cells that ultimately are transformed into an adult organism, is known as ____.

- a. inheritance
- b. compensation
- c. homeostasis
- d. transformation
- e. development

ANS: E PTS: 1 DIF: Moderate

OBJ: Bloom's Taxonomy: Knowledge

TOP: 1.1 WHAT IS LIFE? CHARACTERISTICS OF LIVING ORGANISMS

30. The sequential stages through which individuals develop, grow, maintain themselves, and reproduce are known as the ____.

- a. life cycle
- b. transformation
- c. catabolic reactions
- d. anabolic reactions
- e. central dogma

ANS: A PTS: 1 DIF: Moderate

OBJ: Bloom's Taxonomy: Knowledge

TOP: 1.1 WHAT IS LIFE? CHARACTERISTICS OF LIVING ORGANISMS

31. Populations of all organisms change from one generation to the next because their DNA changes over time. This is known as:
- artificial selection.
 - biological evolution.
 - natural selection.
 - artificial selection and natural selection only
 - developmental selection.

ANS: B

PTS: 1

DIF: Difficult

OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Comprehension

TOP: 1.1 WHAT IS LIFE? CHARACTERISTICS OF LIVING ORGANISMS

32. Our understanding of the evolutionary process reveals that:
- all organisms change through time.
 - all populations are related through a shared ancestry.
 - evolution has produced the spectacular diversity of life on Earth.
 - development has produced the spectacular diversity of life on Earth.
 - all organisms change through time and all populations are related through a shared ancestry

ANS: C

PTS: 1

DIF: Moderate

OBJ: Bloom's Taxonomy: Knowledge

TOP: 1.2 BIOLOGICAL EVOLUTION

33. In the mid-nineteenth century Charles Darwin and Alfred Russel Wallace observed many organisms. Based on these observations they arrived to an explanation on how populations change through time. They termed it:
- evolution.
 - natural selection.
 - creationism.
 - natural evolution.
 - genetics.

ANS: B

PTS: 1

DIF: Moderate

OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Comprehension

TOP: 1.2 BIOLOGICAL EVOLUTION

34. Biological evolution according to Darwin and Wallace states that
- organisms produce numerous offspring, but environmental factors limit the number of reproducing survivors.
 - heritable variations allow some individuals to outcompete others.
 - the offspring of successful individuals inherit the favorable characteristics of their parents.
 - a and b
 - a, b, and c

ANS: E

PTS: 1

DIF: Moderate

OBJ: Bloom's Taxonomy: Comprehension

TOP: 1.2 BIOLOGICAL EVOLUTION

35. DNA is
- composed of protein and lipid subunits.
 - organized into functional units called genes.
 - organized into functional units called chromosomes.
 - organized into functional units called ribosomes.
 - organized from information contained in proteins.

ANS: B PTS: 1 DIF: Moderate
OBJ: Bloom's Taxonomy: Knowledge TOP: 1.2 BIOLOGICAL EVOLUTION

36. Mutations
- are the basis of variability among individuals.
 - are the basis of homogeneity in a population.
 - are always bad for populations.
 - are always good for populations.
 - are always harmful for individuals.

ANS: A PTS: 1 DIF: Moderate
OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Comprehension
TOP: 1.2 BIOLOGICAL EVOLUTION

37. Mutations
- can be beneficial.
 - can be harmful.
 - can be neutral.
 - can be beneficial, harmful or neutral.
 - can evolve within an individual.

ANS: D PTS: 1 DIF: Moderate
OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Comprehension
TOP: 1.2 BIOLOGICAL EVOLUTION

38. Adaptations
- are characteristics that arise during an organism's lifetime and that help an organism survive longer or reproduce more.
 - occur primarily in the form of useful molecules.
 - are characteristics that arise via natural selection and that help an organism survive longer or reproduce more.
 - are characteristics that mainly enhance feeding.
 - are characteristics that arise during an organism's lifetime and that help an organism survive longer or reproduce more and are characteristics that arise via natural selection and that help an organism survive longer or reproduce more.

ANS: C PTS: 1 DIF: Moderate
OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Comprehension
TOP: 1.2 BIOLOGICAL EVOLUTION

39. Cryptic coloration means
- males and females look different.
 - blending with the background.
 - camouflage.
 - standing out against a background.
 - blending with the background and camouflage

ANS: E PTS: 1 DIF: Moderate

OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Comprehension
TOP: 1.2 BIOLOGICAL EVOLUTION

40. Why have scientists developed classification systems?
- To arrange living and dead organisms into groups reflecting their relationships and evolutionary origins.
 - To make sense of the past and present diversity of life on Earth.
 - To help scientists distinguish two different groups of organisms with the same common name.
 - To arrange living and dead organisms into groups that reflect their relationships and evolutionary origins and to make sense of the past and present diversity of life on Earth.
 - To arrange living and dead organisms into groups that reflect their relationships and evolutionary origins, to make sense of the past and present diversity of life on Earth, and to help scientists distinguish two different groups of organisms with the same common name.

ANS: A PTS: 1 DIF: Moderate

OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Comprehension
TOP: 1.3 BIODIVERSITY AND THE TREE OF LIFE

41. A group of organisms in which the individuals are so closely related in structure, biochemistry, and behavior that they can successfully interbreed is a(n) ____.
- kingdom
 - class
 - order
 - species
 - genus

ANS: D PTS: 1 DIF: Moderate

OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Comprehension
TOP: 1.3 BIODIVERSITY AND THE TREE OF LIFE

42. A group of similar species that share the most recent common ancestry is a(n) ____.
- kingdom
 - class
 - order
 - genus
 - species

ANS: D PTS: 1 DIF: Moderate

OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Comprehension
TOP: 1.3 BIODIVERSITY AND THE TREE OF LIFE

43. A randomly selected group of organisms from a family would show more genetic and anatomical variability than a similar group randomly picked from a ____.
- class
 - genus
 - order
 - phylum
 - kingdom

ANS: B PTS: 1 DIF: Moderate

OBJ: Bloom's Taxonomy: Analysis TOP: 1.3 BIODIVERSITY AND THE TREE OF LIFE

44. The scientific name of an organism is composed of two names. The first part identifies the ____ while the second part designates the ____.
- a. genus; species
 - b. species; genus
 - c. genera; genus
 - d. phylum; species
 - e. family; genus

ANS: A PTS: 1 DIF: Easy

OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Comprehension

TOP: 1.3 BIODIVERSITY AND THE TREE OF LIFE

45. Scientific names
- a. are always written in all capital letters and in italics.
 - b. are always written in italics in lower case.
 - c. are always written in lower case and underlined.
 - d. are always written in italics with both genus and species capitalized.
 - e. are always written in italics with only the genus capitalized.

ANS: E PTS: 1 DIF: Easy

OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Comprehension

TOP: 1.3 BIODIVERSITY AND THE TREE OF LIFE

46. Which of the following scientific names is written in the correct format?
- a. *Canis Familiaris*
 - b. *Canis Lupus*
 - c. *Canis latrans*
 - d. *canis Familiaris*
 - e. *c. Latrans*

ANS: C PTS: 1 DIF: Moderate

OBJ: Bloom's Taxonomy: Synthesis

TOP: 1.3 BIODIVERSITY AND THE TREE OF LIFE



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Use the figure above for the following question(s).

47. Which of the following represents a kingdom?
- Animalia
 - Chordata
 - Canis
 - Canidae
 - Mammalia

ANS: A PTS: 1 DIF: Moderate REF: Figure 1.10
 OBJ: Bloom's Taxonomy: Synthesis | Bloom's Taxonomy: Application
 TOP: 1.3 BIODIVERSITY AND THE TREE OF LIFE

48. In the illustration, which group is the most inclusive group?

- a. *Canis familiaris*
- b. Animalia
- c. Chordata
- d. Mammalia
- e. Eukarya

ANS: E

PTS: 1

DIF: Moderate

REF: Figure 1.10

OBJ: Bloom's Taxonomy: Analysis

TOP: 1.3 BIODIVERSITY AND THE TREE OF LIFE

49. In the illustration, which group is the least inclusive?

- a. *Canis familiaris*
- b. Animalia
- c. Chordata
- d. Mammalia
- e. Canidae

ANS: A

PTS: 1

DIF: Moderate

REF: Figure 1.10

OBJ: Bloom's Taxonomy: Analysis

TOP: 1.3 BIODIVERSITY AND THE TREE OF LIFE

50. The group that is the most inclusive and has recently been added to the classification scheme is ____.

- a. kingdom
- b. protista
- c. eukarya
- d. domain
- e. eukarya and domain

ANS: D

PTS: 1

DIF: Moderate

OBJ: Bloom's Taxonomy: Application

TOP: 1.3 BIODIVERSITY AND THE TREE OF LIFE

51. Which of the following pairs would be classified as prokaryotes?

- a. Animalia and Plantae
- b. Bacteria and Archaea
- c. Fungi and Plantae
- d. Bacteria, Archaea and Fungi
- e. Fungi, Plantae and Animalia

ANS: B

PTS: 1

DIF: Moderate

OBJ: Bloom's Taxonomy: Application

TOP: 1.3 BIODIVERSITY AND THE TREE OF LIFE

52. A cell that is observed under the microscope is found to have its DNA enclosed in a nucleus, and has other specialized internal compartments. The cell is a(n) ____.

- a. prokaryote
- b. bacterium
- c. eukaryote
- d. *E. coli*
- e. *P. aureus*

ANS: C

PTS: 1

DIF: Easy

OBJ: Bloom's Taxonomy: Application

TOP: 1.3 BIODIVERSITY AND THE TREE OF LIFE

53. A researcher in a lab finds a microscopic organism that has no nucleus, but has distinctive structural molecules and mechanisms of photosynthesis. The organisms are abundant in virtually every habitat on Earth. The researcher has identified an organism belonging to the domain ____.
- a. Bacteria
 - b. "Protist"
 - c. Eukarya
 - d. Animalia
 - e. Amoeba

ANS: A

PTS: 1

DIF: Moderate

OBJ: Bloom's Taxonomy: Analysis

TOP: 1.3 BIODIVERSITY AND THE TREE OF LIFE

54. A researcher in a lab finds a microscopic organism that is a producer. The organisms are found in extreme environments (i.e., hot springs). The researcher has identified an organism belonging to the domain ____.
- a. Bacteria
 - b. Archaea
 - c. Eukarya
 - d. Animalia
 - e. Amoeba

ANS: B

PTS: 1

DIF: Moderate

OBJ: Bloom's Taxonomy: Analysis

TOP: 1.3 BIODIVERSITY AND THE TREE OF LIFE

55. A student encounters an organism that resembles a plant and whose cells contain a nucleus. The organism is most likely classified as a(n) ____.
- a. Bacteria
 - b. Archaea
 - c. Eukarya
 - d. Animalia
 - e. Amoeba

ANS: C

PTS: 1

DIF: Easy

OBJ: Bloom's Taxonomy: Analysis

TOP: 1.3 BIODIVERSITY AND THE TREE OF LIFE

56. This kingdom includes the algae that are used to make sushi rolls.
- a. Plantae
 - b. Fungi
 - c. Animalia
 - d. "Protist"
 - e. Bacteria

ANS: D

PTS: 1

DIF: Difficult

OBJ: Bloom's Taxonomy: Analysis | Bloom's Taxonomy: Application

TOP: 1.3 BIODIVERSITY AND THE TREE OF LIFE

57. The pages of your textbook consist mainly of material made by multicellular, photosynthetic organisms that function as producers in ecosystems. These organisms belong to the kingdom ____.
- a. Plantae
 - b. Fungi
 - c. Animalia
 - d. "Protist"
 - e. Bacteria

ANS: A

PTS: 1

DIF: Moderate

OBJ: Bloom's Taxonomy: Analysis | Bloom's Taxonomy: Application
TOP: 1.3 BIODIVERSITY AND THE TREE OF LIFE

58. Shitake mushrooms are decomposers that break down biological molecules from dead organisms. These organisms belong to the ____ kingdom.
- Plantae
 - Fungi
 - Animalia
 - "Protist"
 - Bacteria

ANS: B PTS: 1 DIF: Moderate
OBJ: Bloom's Taxonomy: Analysis | Bloom's Taxonomy: Application
TOP: 1.3 BIODIVERSITY AND THE TREE OF LIFE

59. Cats, dogs, and fish are consumers that have the ability to move actively from one place to another. These organisms belong to the ____ kingdom.
- Plantae
 - Fungi
 - Animalia
 - "Protist"
 - Bacteria

ANS: C PTS: 1 DIF: Easy
OBJ: Bloom's Taxonomy: Analysis | Bloom's Taxonomy: Application
TOP: 1.3 BIODIVERSITY AND THE TREE OF LIFE

60. The most fundamental grouping in the classification of living organisms is the ____.
- class
 - genus
 - family
 - order
 - species

ANS: E PTS: 1 DIF: Easy
OBJ: Bloom's Taxonomy: Knowledge TOP: 1.3 BIODIVERSITY AND THE TREE OF LIFE

61. The observations you make and experimental data you collect in your biology laboratory class are examples of:
- statistical analysis.
 - hypothesis building.
 - biological dogma.
 - model systems.
 - biological research.

ANS: E PTS: 1 DIF: Easy
OBJ: Bloom's Taxonomy: Analysis | Bloom's Taxonomy: Application
TOP: 1.4 BIOLOGICAL RESEARCH

62. An approach in which scientists make observations about the natural world, develop tentative explanations about what they observe, and then test those explanations by collecting more information is referred to as ____.
- a. science
 - b. education
 - c. the scientific method
 - d. the method
 - e. the biological method

ANS: C PTS: 1 DIF: Moderate

OBJ: Bloom's Taxonomy: Comprehension

TOP: 1.4 BIOLOGICAL RESEARCH

63. If a biologist searches for explanations about natural phenomena solely to satisfy his or her curiosity and advance our collective knowledge of living systems, then, this researcher is a(n):
- a. applied researcher.
 - b. basic researcher.
 - c. general researcher.
 - d. simple researcher.
 - e. scientist.

ANS: B PTS: 1 DIF: Easy

OBJ: Bloom's Taxonomy: Analysis TOP: 1.4 BIOLOGICAL RESEARCH

64. Applied researchers conduct their work to:
- a. solve specific practical problems.
 - b. solve any problem they face.
 - c. answer all questions.
 - d. advance our collective knowledge of living systems.
 - e. prove hypotheses.

ANS: A PTS: 1 DIF: Moderate

OBJ: Bloom's Taxonomy: Analysis | Bloom's Taxonomy: Application

TOP: 1.4 BIOLOGICAL RESEARCH

65. If a researcher collects basic information on biological structures or the details of biological processes, then the researcher's approach is considered to be:
- a. science.
 - b. scientific.
 - c. descriptive science.
 - d. not scientific.
 - e. science and scientific only

ANS: C PTS: 1 DIF: Moderate

OBJ: Bloom's Taxonomy: Analysis | Bloom's Taxonomy: Application

TOP: 1.4 BIOLOGICAL RESEARCH

66. When conducting descriptive research, a scientist primarily uses:
- a. control data.
 - b. data.
 - c. experiments.
 - d. observational data.
 - e. experimental data.

ANS: D PTS: 1 DIF: Moderate

OBJ: Bloom's Taxonomy: Analysis | Bloom's Taxonomy: Application
TOP: 1.4 BIOLOGICAL RESEARCH

67. When a student manipulates a system under study, he or she is collecting:
- empirical data.
 - experimental data.
 - observational data.
 - data.
 - facts.

ANS: B PTS: 1 DIF: Moderate
OBJ: Bloom's Taxonomy: Analysis | Bloom's Taxonomy: Application
TOP: 1.4 BIOLOGICAL RESEARCH

68. You are studying an ecosystem in your campus; after a solid base of carefully observed and described facts, your next step would be to:
- make more observations.
 - share your data with others.
 - design an experiment.
 - wait for instructions.
 - make a hypothesis.

ANS: E PTS: 1 DIF: Moderate
OBJ: Bloom's Taxonomy: Analysis | Bloom's Taxonomy: Application
TOP: 1.4 BIOLOGICAL RESEARCH

69. Hypotheses that are falsifiable fall within the realm of:
- science.
 - history.
 - not science.
 - philosophy.
 - English.

ANS: A PTS: 1 DIF: Easy
OBJ: Bloom's Taxonomy: Knowledge TOP: 1.4 BIOLOGICAL RESEARCH

SHORT ANSWER

70. You are at a stage in your research in which you must design an experiment to test your hypothesis. What factors must you include to insure that your experimental data is good valid data?

ANS:

Any experimental design must include a control group, an experimental group or variable, and must include replicates to validate data.

PTS: 1 DIF: Moderate REF: Section 1.4
OBJ: Bloom's Taxonomy: Analysis | Bloom's Taxonomy: Application

71. Explain the need for a null hypothesis, especially in ecology and evolution. What does a null hypothesis accomplish?

ANS:

A null hypothesis is a statement of what a researcher would see if the hypothesis being tested is wrong. Ecologists usually tackle systems that are too complex to control, so a null hypothesis anticipates, or provides alternative hypothesis to answer questions.

PTS: 1 DIF: Moderate REF: Section 1.4
OBJ: Bloom's Taxonomy: Analysis | Bloom's Taxonomy: Application

72. Why do scientists use model organisms?

ANS:

Model organisms have rapid development, short life cycles, and small adult sizes, making them ideal to work with in the laboratory setting.

PTS: 1 DIF: Moderate REF: Section 1.4
OBJ: Bloom's Taxonomy: Analysis | Bloom's Taxonomy: Application

73. What are the contributions of Beadle, Tatum, Watson, and Crick to biology? What techniques did they use to revolutionize biological science?

ANS:

Beadle and Tatum demonstrated that genes provide cells with instructions needed for the production of proteins, whereas Watson and Crick determined the structure of DNA. Molecular technologies have transformed biology.

PTS: 1 DIF: Moderate REF: Section 1.4
OBJ: Bloom's Taxonomy: Analysis | Bloom's Taxonomy: Application

74. Scientific theories are of fundamental importance in science. Explain the difference between the term "theory" as employed in science versus "theory" as employed in everyday language.

ANS:

Scientific theories have withstood the test of time and have been extensively confirmed by repeated experiments. The term as used in science has validity whereas in everyday context it takes the form of an opinion or a guess.

PTS: 1 DIF: Moderate REF: Section 1.4
OBJ: Bloom's Taxonomy: Analysis | Bloom's Taxonomy: Application

MODIFIED TRUE/FALSE

If the statement is true, answer "T". If the statement is false, answer "F" and make it correct by changing the underlined word(s) and writing the correct word(s) in the answer blank(s).

75. Populations can be described in terms of their diversity and stability

ANS: F, Communities

PTS: 1 DIF: Moderate REF: Section 1.1
OBJ: Bloom's Taxonomy: Knowledge

76. Although Darwin and Wallace understood the central importance of heritability among organisms to the process of evolution, they could not explain how new variations arose or how they were passed to the next generation.

ANS: F, variability

PTS: 1 DIF: Moderate REF: Section 1.1 | Section 1.2
OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Comprehension

77. The example of an adaptation provided by the rock pocket mice illustrates the observation that genetic differences often develop between individuals.

ANS: F, populations

PTS: 1 DIF: Moderate REF: Section 1.2
OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Comprehension

78. Protists do not constitute a kingdom because they do not share a unique common ancestor.

ANS: T PTS: 1 DIF: Easy
REF: Section 1.3 OBJ: Bloom's Taxonomy: Knowledge

79. If the results of a set of experiments match predictions, the hypothesis must be rejected or revised.

ANS: F, do not match

PTS: 1 DIF: Moderate REF: Section 1.4
OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Comprehension

80. Much of our understanding of how large organisms respond to environmental variation is based on using model species.

ANS: T PTS: 1 DIF: Moderate
REF: Section 1.4 OBJ: Bloom's Taxonomy: Knowledge

81. Temperatures in all animal species are regulated primarily by behavioral mechanisms.

ANS: F, homeostatic

PTS: 1 DIF: Difficult REF: Section 1.1 | Section 1.4
OBJ: Bloom's Taxonomy: Knowledge

ESSAY

82. Use the following organisms to describe energy flow and nutrient cycling: fungal decomposer, caterpillar, deciduous tree, and carnivorous bird.

ANS:

The sun drives the photosynthetic process in the leaves of the tree, allowing the tree to maintain itself and resulting in growth and reproduction. The leaves are shed once per year, which feed the fungal decomposer. The tree will eventually die and provide nutrients and energy for the fungal decomposer. Some of the energy contained in the biomass of the leaves is transferred to caterpillars for maintenance, growth and reproduction, while most of the chemical energy in the tree not stored in the biomass is lost as heat as a result of cellular respiration. Caterpillars provide nutrients and energy to the fungal decomposer for maintenance, growth and reproduction via their waste and pupal cases (cocoon), and waste and pupal cases provide nutrients directly and indirectly for tree growth and reproduction. A portion of the energy in caterpillars is transferred to the bird, while most of the energy in the caterpillar is lost as heat as a result of cellular respiration. Bird waste provides nutrients to the fungal decomposer and can indirectly provide nutrients for tree maintenance, growth and reproduction. Most of the energy in each organism is lost as heat, while nutrients are recycled between the tree, caterpillar and fungal decomposer.

PTS: 1 DIF: Moderate REF: Section 1.1
OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Comprehension

83. How you keep body temperature from dropping below its optimal level and how *Anolis* lizards regulate body temperatures is different in some ways but not others. Explain.

ANS:

Metabolism in both humans and lizards is temperature sensitive, and therefore temperature regulation is related to maintenance, growth and reproduction. Humans mostly use receptors in the skin to send signals to the brain, which elicits a response such as shivering. Humans can use behavior to also regulate body temperature, for example, layering clothes. Lizard body temperatures vary with environmental temperatures. The lizards use behavior to position themselves in sun or shade to regulate body temperature. Presumably, the internal range of body temperatures is greater in lizards than in humans. Nonetheless, both humans and lizards maintain body temperatures using homeostatic mechanisms and both have mechanisms for compensating for temperatures that drop below optimal.

PTS: 1 DIF: Moderate REF: Section 1.1 | Section 1.4
OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Comprehension | Bloom's taxonomy: Synthesis