CHAPTER 1
INVITATION TO BIOLOGY

Multiple-Choice Questions

IMPACT, ISSUES: THE SECRET LIFE OF EARTH

E **1.** In 2005, a team of explorers found that an Indonesian cloud forest
   a. was home to unknown animals.
   b. was home to unknown plants.
   c. was home to species that were thought to be extinct.
   d. contained swampy areas covered with moss.
   e. was home to all of these.

Answer: e
Bloom's Taxonomy: Knowledge

E **2.** Recent expeditions into an Indonesian cloud forest revealed the presence of
   a. a frog the size of a pea.
   b. a cat-sized rat.
   c. a mouse-sized opossum.
   d. plants that had plate-size flowers.
   e. all of these.

Answer: e
Bloom's Taxonomy: Knowledge

M **3.** It is thought that about _____ species become extinct every minute in rain forests.
   a. 5
   b. 10
   c. 15
   d. 20
   e. 25

Answer: d
Bloom's Taxonomy: Knowledge

LIFE'S LEVELS OF ORGANIZATION

M **4.** Nature is every _____ and _____in the universe except what humans have _____.
   a. ion; macromolecule; genetically engineered
   b. substance; macromolecule; modified
   c. substance; energy; manufactured
   d. animal; plant; domesticated
   e. form of life; nonliving thing; cultivated

Answer: c
Bloom's Taxonomy: Knowledge

D **5.** Which of the following schemas represent the most accurate organization of life?
   a. biosphere → ecosystems → communities → populations → organisms → cells → molecules → atoms
   b. ecosystems → biosphere → communities → populations → organisms → cells → molecules → atoms
   c. ecosystems → biosphere → communities → organisms → populations → cells → molecules → atoms
   d. communities → biosphere → organisms → ecosystems → populations → cells → molecules → atoms
   e. communities → biosphere → organisms → ecosystems → populations → molecules → atoms → cells

Answer: a
Bloom's Taxonomy: Comprehension/Analysis

M **6.** Which of the following organization levels is the most inclusive?
   a. population
   b. community
   c. cell
   d. atom
   e. molecule

Answer: b
Bloom's Taxonomy: Knowledge/Comprehension

M **7.** Which of the following statements are accurate?
   a. A cell is the lowest level of structure that can perform all functions essential for life.
   b. A cell is the basic unit of structure and function of an organism.
   c. Cells are subunits of animals and plants.
   d. Cells contain molecules that are themselves made up of atoms.
   e. All of these are accurate.

Answer: e
Bloom's Taxonomy: Knowledge

M **8.** An ecosystem such as a woodland in Central Park (New York) is made up of
   a. plants, animals and fungi.
   b. organisms and nonliving things.
   c. rocks and minerals.
   d. plants, protozoa, and fungi.
   e. all of these.

Answer: b
Bloom's Taxonomy: Knowledge

E **9.** Which of the following molecules are molecules of life?
I. carbohydrates
II. lipids and proteins
III. nucleic acids
a. I only
b. I and II
c. I and III
d. II and III
e. I, II, and III

Answer: e
Bloom's Taxonomy: Knowledge

M **10.** Animal cells may be organized as _____, _____, and organ _____.
a. systems; organs; tissues
b. organs; tissues; systems
c. tissues; organs; systems
d. organs; limbs; tissues
e. limbs; organs; tissues

Answer: c
Bloom's Taxonomy: Knowledge/Comprehension

E **11.** A population is composed of individuals of
a. the same species.
b. two different species.
c. three different species.
d. four different species.
e. more than four different species.

Answer: a
Bloom's Taxonomy: Knowledge

D **12.** Living organisms are members of all of the levels listed below. However, rocks can only be components of
a. the community.
b. the population.
c. the ecosystem.
d. the biosphere.
e. both the ecosystem and the biosphere.

Answer: e
Bloom's Taxonomy: Knowledge/Analysis

D **13.** A(n) _____ property is a characteristic of a system that does not appear in any of its component parts.
a. efferent
b. emergent
c. elective
d. energetic
e. living

Answer: b
Bloom's Taxonomy: Knowledge

D **14.** In a living system, an emergent property appears the first time at the level of the
a. cell.
b. tissue.
c. organ.
d. organ system.
e. organism.

Answer: a
Bloom's Taxonomy: Knowledge/Analysis

OVERVIEW OF LIFE'S UNITY

D **15.** Which of the following characteristics are shared by all living organisms?
I. organization into cell and need of energy
II. adaptation and metamorphosis
III. need of nutrients and reproduction
a. I and II
b. I and III
c. II and III
d. I, II, and III
e. III only

Answer: b
Bloom's Taxonomy: Knowledge/Comprehension

E **16.** Which of the following is true about energy?
a. Energy is used by nonliving systems.
b. Energy is used by all living systems.
c. Energy is the capacity to do work.
d. Energy is found within molecules of life.
e. All of these are true.

Answer: e
Bloom's Taxonomy: Knowledge

E **17.** All living organisms can be classified into _____ categories.
a. 1
b. 2
c. 3
d. 4
e. 5

Answer: b
Bloom's Taxonomy: Knowledge

M **18.** All organisms fit into one of the two following categories.
a. consumers and decomposers
b. producers and decomposers
c. producers and consumers
d. scavengers and detritivores
e. none of these

Answer: c
Bloom's Taxonomy: Knowledge

M **19.** The dynamics of an ecosystem depends on two main processes:
   a. the cycling of energy and the unidirectional flow of nutrients.
   b. the unidirectional flow of energy and the cycling of nutrients.
   c. the multidirectional flow of both energy and nutrients.
   d. the unidirectional flow of both energy and nutrients.
   e. the cycling of both energy and nutrients.

Answer: b
Bloom's Taxonomy: Knowledge

D **20.** Which of the following statements is NOT correct?
   a. All plants are producers.
   b. All animals are consumers.
   c. Fungi are detritivores.
   d. Some bacteria are producers.
   e. None of these are correct.

Answer: a
Bloom's Taxonomy: Knowledge

M **21.** About twelve to twenty-four hours after the previous meal, a person's blood-sugar level normally varies from 60 to 90 milligrams per 100 milliliters of blood, though it may rise to 130 mg per 100 ml after meals high in carbohydrates. That the blood-sugar level is maintained within a fairly narrow range despite uneven intake of sugar is due to the body's ability to carry out
   a. adaptation.
   b. inheritance.
   c. metabolism.
   d. homeostasis.
   e. all of these.

Answer: a
Bloom's Taxonomy: Knowledge/Application/Evaluation

D **22.** Nonliving entities do NOT possess
   a. energetic interactions.
   b. deoxyribonucleic acid.
   c. atoms.
   d. elements.
   e. any of these.

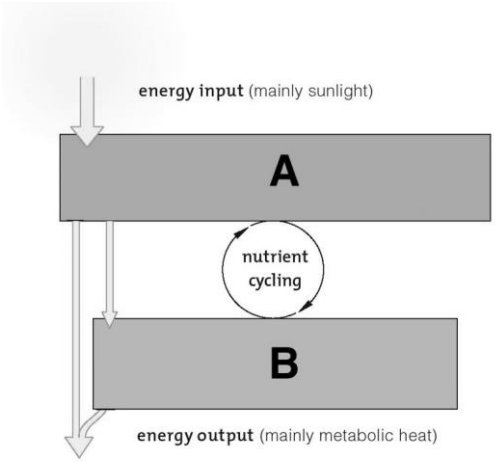
Answer: b
Bloom's Taxonomy: Knowledge/Analysis

M **23.** Energy sources are needed for which of the following processes?
   I. reproduction
   II. growth
   III. development
   a. I and II
   b. I and III
   c. II only
   d. II and III
   e. I, II, and III

Answer: e
Bloom's Taxonomy: Knowledge/Comprehension

M **24.** The DNA molecule is most similar functionally to a
   a. pair of scissors.
   b. flash light battery.
   c. computer memory chip.
   d. ballpoint pen.
   e. craft kit of ceramic tiles.

Answer: c
Bloom's Taxonomy: Knowledge



E **25.** On the illustration, "A" and "B" should be labeled respectively
   a. consumers; producers.
   b. decomposers; producers.
   c. producers; decomposers.
   d. producers; consumers.
   e. none of these.

Answer: d
Bloom's Taxonomy: Comprehension

INTRODUCTION TO LIFE'S DIVERSITY

E **26.** Each new organism discovered by biologists is given a scientific name. That scientific name consists of which of the following?

I. family name
II. genus name
III. species name

a. I only
b. II only
c. III only
d. I and II
e. II and III

Answer: e
Bloom's Taxonomy: Knowledge/Synthesis

E **27.** _____ and _____ names are always italicized.

a. family; genus
b. genus; species
c. family; species
d. division; species
e. division; family

Answer: b
Bloom's Taxonomy: Knowledge

E **28.** The plural for genus is

a. genus.
b. geni.
c. genera.
d. gena.
e. genae.

Answer: c
Bloom's Taxonomy: Knowledge

E **29.** In *Panthera leo*, *Panthera* represents the name of the _____ while *leo* represents the name of the _____.

a. family; species.
b. family; genus.
c. genus; species.
d. species; genus.
e. genus; family.

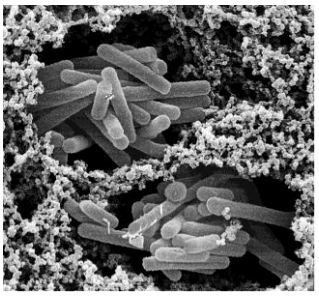
Answer: c
Bloom's Taxonomy: Comprehension/Application

E **30.** All known species can be grouped into three domains:

a. prokaryotes, bacteria, and eukarya.
b. prokaryotes, archaea, and eukarya.
c. plantae, bacteria, and archaea.
d. bacteria, archaea, and eukarya.
e. bacteria, archaea, and protista.

Answer: d
Bloom's Taxonomy: Knowledge

Please, refer to figures I, II, and III to answer questions 31-32.



I

II

III

M **31.** Organisms in figure I and II belong to the domain(s) of

a. prokaryotes and plantae respectively.
b. archaea.
c. archaea and plantae respectively.
d. eukarya.
e. bacteria and eukarya respectively.

Answer: e
Bloom's Taxonomy: Knowledge/Application

M **32.** Organisms in figure II and III belong to domain(s) of

a. eukarya.
b. archaea.
c. bacteria.
d. plantae and animalia respectively.
e. bacteria and eukarya respectively.

Answer: a
Bloom's Taxonomy: Knowledge/Application

E **33.** Members of what group are multicellular producers?

a. animalia
b. protista
c. fungi
d. plantae
e. none of these

Answer: d
Bloom's Taxonomy: Knowledge

E **34.** Which of the following groups are made up almost exclusively of decomposers?
a. plantae
b. fungi
c. animalia
d. monera
e. protista

Answer: b
Bloom's Taxonomy: Knowledge/Comprehension

E **35.** Plants perform photosynthesis by using the energy of _____ to power production of sugars from _____ and _____ molecules.
a. organic molecules; oxygen; water
b. organic molecules; carbon dioxide; water
c. sunlight; carbon dioxide and oxygen; water
d. sunlight; oxygen; water
e. sunlight; carbon dioxide; water

Answer: e
Bloom's Taxonomy: Knowledge/Comprehension

M **36.** Select the INCORRECT sentence.
a. Animals grow and develop through a series of stages that lead to adult form.
b. Animals ingest tissues or juices of other organisms.
c. All known plants produce their own food.
d. Most bacteria feed on other organisms.
e. All fungi secrete enzymes that digest food.

Answer: c
Bloom's Taxonomy: Knowledge/Comprehension

THE NATURE OF SCIENTIFIC INQUIRY

E **37.** Critical thinking implies
a. being aware of bias.
b. deciding whether ideas are based on opinion or evidence.
c. judging information before accepting it.
d. considering what you want to believe.
e. all of the these.

Answer: e
Bloom's Taxonomy: Knowledge/Comprehension

E **38.** Science
a. is the systematic study of nature.
b. limits to what is observable.
c. requires quantification.
d. does not address subjective questions.
e. is all of these.

Answer: e
Bloom's Taxonomy: Knowledge/Comprehension

E **39.** Science is based on
a. faith.
b. authority.
c. evidence.
d. forces.
e. consensus.

Answer: c
Bloom's Taxonomy: Knowledge

E **40.** The validities of scientific discoveries CANNOT be based on
a. morality.
b. aesthetics.
c. philosophy.
d. economics.
e. any of these.

Answer: e
Bloom's Taxonomy: Knowledge/Comprehension/Analysis

HOW SCIENCE WORKS

M **41.** Which of the following words describes a tentative explanation to a given question?
a. law
b. theory
c. hypothesis
d. fact
e. principle

Answer: c
Bloom's Taxonomy: Knowledge

E **42.** In order to verify a hypothesis, scientists
a. perform experiments.
b. consider facts.
c. establish law.
d. develop theories.
e. make predictions.

Answer: a
Bloom's Taxonomy: Knowledge

M **43.** What is the right sequence of events applied in the scientific method?
a. question; hypothesis; observation; data; test; conclusion
b. observation; hypothesis; question; data; test; conclusion
c. observation; hypothesis; question; test; data; conclusion
d. observation; question; hypothesis; test; data; conclusion
e. question; hypothesis; data; observation; test; conclusion

Answer: d
Bloom's Taxonomy: Knowledge/Analysis

M **44.** Which represents the lowest degree of certainty?
a. hypothesis
b. conclusion
c. fact
d. principle
e. theory

Answer: a
Bloom's Taxonomy: Knowledge

M **45.** Which represents the highest degree of certainty?
a. hypothesis
b. fact
c. principle
d. prediction
e. theory

Answer: d
Bloom's Taxonomy: Knowledge

E **46.** Experimental procedures
I. are ways to collect data
II. are ways to test a hypothesis
III. involve use of a model
a. I only
b. II only
c. I, II, and III
d. II and III
e. III only

Answer: c
Bloom's Taxonomy: Knowledge

M **47.** A scientific theory
a. is widely accepted and supported by several evidences.
b. is widely accepted but not necessarily supported by several evidences.
c. is sometimes accepted and supported by several evidences.
d. is sometimes accepted and not necessarily supported by several evidences.
e. is always a "truth."

Answer: a
Bloom's Taxonomy: Knowledge/Comprehension

THE POWER OF EXPERIMENTS

E **48.** Scientists perform _____ in order to _____ a given _____.
a. experiments; test; hypothesis.
b. tests; experiment; law.
c. tests; experiment; variable.
d. facts; test; variable.
e. hypotheses; try; experiment.

Answer: a
Bloom's Taxonomy: Knowledge

M **49.** An experimental group is a group of individuals that
a. has received an approval from the FDA.
b. always supports predictions.
c. is exposed to a certain treatment.
d. is used as reference.
e. is responsible for observations.

Answer: c
Bloom's Taxonomy: Knowledge/Comprehension

M **50.** A control group
a. receives the same treatment as the experimental group.
b. is an untreated group of individuals or subjects.
c. is sometimes exposed to harsh conditions.
d. is often an unnecessary waste of material.
e. is not subjected to experimental error.

Answer: b
Bloom's Taxonomy: Knowledge/Comprehension

M **51.** As a result of experimentation,
a. more hypotheses may be developed.
b. more questions may be asked.
c. a new biological principle could emerge.
d. an entire theory may be modified or discarded.
e. all of these may occur.

Answer: e
Bloom's Taxonomy: Comprehension/Application

M **52.** The control in an experiment
a. makes the experiment valid.
b. is an additional replicate for statistical purposes.
c. reduces the experimental errors.
d. minimizes experimental inaccuracy.
e. allows a mixed group of comparisons among different organisms for the experimental group.

Answer: e
Bloom's Taxonomy: Knowledge/Comprehension

M **53.** In the experiment with peacock butterflies the working hypothesis is that
a. mimicry confuses both predator and prey.
b. mimicry protects butterflies from being eaten by predatory birds.
c. birds are capable of learning.
d. birds are agents of evolution.
e. unpalatable species display distinctive wings.

Answer: b
Bloom's Taxonomy: Comprehension/Analysis

M **54.** The variable(s) in the butterfly experiment is(are) the
a. butterfly wings pattern color.
b. butterfly species.
c. butterfly wings pattern color and sounds emitted.
d. rainforest region used.
e. percentage of survivors.

Answer: c
Bloom's Taxonomy: Knowledge/Comprehension

M **55.** How did the control group differ from the experimental group in the butterfly experiment?
a. They were different species.
b. Their native habitat of the forest differed.
c. They were spotless and soundless.
d. They tasted worse.
e. They preferred different flowers species.

Answer: c
Bloom's Taxonomy: Comprehension/Analysis

M **56.** In the study with peacock butterflies, the number of survivors in each case represents the
a. statistics.
b. basis of comparison.
c. conclusion.
d. report.
e. result.

Answer: e
Bloom's Taxonomy: Comprehension/Analysis

D **57.** A result is statistically significant if
a. it is unlikely to have occurred by chance.
b. it is likely to have occurred by chance.
c. it is likely to have occurred in 50% of the cases.
d. it is consistent with predictions.
e. it is widely accepted.

Answer: a
Bloom's Taxonomy: Comprehension/Analysis

Selecting the Exception

D **58.** Which of the following statements IS NOT true about biology?
a. Biology is the scientific study of life.
b. Biology involves identification of new species.
c. Biology has several subdiciplines including paleontology and geophysics.
d. Biology strives to understand interspecific and intraspecific interactions.
e. Biology tries to understand the scope of life.

Answer: c
Bloom's Taxonomy: Knowledge/Comprehension

M **59.** All of the following elements are enclosed in the biosphere EXCEPT
a. mountains.
b. waters.
c. atmosphere surrounding living organisms.
d. space.
e. earth's crust.

Answer: d
Bloom's Taxonomy: Knowledge/Analysis

D **60.** Which of the following would NOT be characteristic of living organisms?
a. complex structural organization
b. dependence on other organisms for energy and nutrients
c. capacity to reproduce
d. uniformity of size and form
e. capacity to change

Answer: d
Bloom's Taxonomy: Knowledge/Comprehension/Analysis

M **61.** Which of the following do NOT depend directly on sunlight for energy?
I. producers
II. consumers
III. decomposers
a. I only
b. II and III
c. II only
d. III only
e. I and III

Answer: b
Bloom's Taxonomy: Knowledge

D **62.** Which of the following statements is NOT correct about bacteria?
a. Bacteria are always single-celled organisms.
b. All bacteria are prokaryotes.
c. The DNA of bacteria is often enclosed within a nucleus.
d. Some bacteria can live in extreme environments.
e. Some bacteria are producers while others are consumers.

Answer: c
Bloom's Taxonomy: Knowledge/Comprehension

D **63.** All of the following statements are true about eukaryotes, EXCEPT
a. eukaryotes have a nucleus.
b. eukaryotes are similar to prokaryotes at a molecular level.
c. eukaryotes are sometimes unicellular organisms.
d. eukaryotes are similar to prokaryotes at a structural level.
e. eukaryotes include plants, fungi, and protists.

Answer: d
Bloom's Taxonomy: Knowledge/Comprehension

E **64.** All of the following are domains of life EXCEPT
a. animalia.
b. bacteria.
c. archaea.
d. eukarya.
e. none of these.

Answer: a
Bloom's Taxonomy: Knowledge/Comprehension

M **65.** Which of the following is NOT used in the development of science?
a. evaluation of data
b. personal conviction
c. prediction
d. systematic observation
e. experiments

Answer: b
Bloom's Taxonomy: Knowledge/Comprehension/Analysis

E **66.** All of the following will strengthen a theory EXCEPT
a. repetitions of experiments.
b. increased observations.
c. time.
d. faith.
e. confirmation by many scientists.

Answer: d
Bloom's Taxonomy: Knowledge

D **67.** Which of the following statements is NOT correct about sampling error?
a. Repeating an experiment many times has the same effect on sampling error as working on a large sample.
b. A large sample would help minimize sampling error.
c. Sampling error is increased when a sample size is small.
d. A sampling error results from a mistake made by a researcher during experimentation.
e. Sampling error is the difference between results derived from testing an entire group of individuals, and results derived from testing of a subset of the group.

Answer: d
Bloom's Taxonomy: Knowledge/Comprehension/Analysis

Matching Questions

D **68-74**. Match the following letters to the number with which they best correspond.
a. Consumer, b. Receptor, c. Homeostasis, d. Deoxyribonucleic acid, e. Growth, f. Development, g. Reproduction

68. ____ Set of processes by which an organism keeps its internal conditions within tolerable range
69. ____ Multistep process by which the first cell of a new individual becomes a multicelled adult
70. ____ Process by which parents produce offspring
71. ____ Organism that obtains energy and carbon source by feeding on other organisms
72. ____ Molecule that carries hereditary information in an organism
73. ____ Increase in the number, size, and volume of cells in multicelled species
74. ____ Molecule or structure that can respond to a form of stimulation

Answers: 68. c, 69. f, 70. g, 71. a, 72. d, 73. e, 74. b
Bloom's Taxonomy: Knowledge

D **75-83.** Match the following letters to the number with which they best correspond
a. Observation
b. Hypothesis
c. Prediction
d. Experiment,
e. Control group
f. Experimental group
g. Variable
h. Assess results
i. Conclusion

75. ____ People who eat potato chips with Olestra will be more likely to get intestinal cramps than those who eat potato chips made without Olestra.
76. ____ Olestra.
77. ____ Percentages are about equal. Therefore, Olestra is not the cause of intestinal cramps observed in some people who have ingested Olestra-containing food.
78. ____ Olestra causes intestinal cramps.
79. ____ A set of people got regular potato chips.
80. ____ 1,100 people between the ages of thirteen and thirty-eight were asked to watch a movie and eat potato chips.
81. ____ Some people complained of intestinal problems after eating chips containing Olestra.
82. ____ A subset of people got Olestra-containing chips.

83. ____ In the control group, 17.6% of people get cramps later, while in the experimental group, 15.8% of people get cramps later.

Answers: 75. c, 76. g, 77. i, 78. b, 79. e, 80. d, 81. a, 82. f. 83. h
Bloom's Taxonomy: Application/Synthesis

Classification Questions

Answer questions 84-93 in reference to the levels of organization of life. Choose only the most correct answer.

a. organisms
b. living cells
c. molecules
d. biosphere
e. ecosystem
f. organs
g. tissues

E **84.** Squirrels, frogs, rocks, and streams are part of it.

M **85.** Several of these associate together to form organs.

M **86.** These structures are highly specialized in function.

D **87.** These are found in both eukaryotic and prokaryotic cells.

E **88.** These are the smallest units of an organism that are able to perform all functions of life.

M **89.** These are more inclusive than cells but less than organs.

D **90.** This represents all ecosystems on earth.

D **91.** These make the molecules of life.

E **92.** A zebra in the Bronx zoo is one of them.

D **93.** A one-way flow of energy and cycling of nutrients is essential for its dynamic.

Answers: 84. e, 85. g, 86. f, 87. c, 88. b, 89. f, 90. d, 91. b, 92. a, 93. e
Bloom's Taxonomy: Knowledge/Application/Synthesis

Answer questions 94-103 in reference to life's diversity. Choose only the most correct answer.

a. archaea
b. prokaryotes
c. eukaryotes
d. plants
e. fungi
f. animals
g. protists

M **94.** Along with bacteria, they belong to the category of organisms lacking a true nucleus.

E **95.** Most of them are "self-feeders."

E **96.** Herbivores are part of this group of organisms.

M **97.** Their genetic material is not enclosed within a membranous sac.

E **98.** Mushrooms belong to this group.

M **99.** These contain a nucleus and numerous membrane-bound organelles.

D **100.** These are able to colonize extreme environments such as boiling, sulfur-clogged lakes.

E **101.** Through a series of reactions, they transform light energy into chemical energy.

E **102.** Cadavers and other dead organisms or dead tissues are their main source of food.

D **103.** At a structural level, these are the simplest kind of eukaryote.

Answers: 94. a, 95. d, 96. f, 97. b, 98. e, 99. c, 100. b, 101. d, 102. e, 103. g
Bloom's Taxonomy: Knowledge/Application/Synthesis