

CHAPTER 1

INVITATION TO BIOLOGY

Multiple-Choice Questions

IMPACTS, ISSUES: LOST WORLDS AND OTHER WONDERS

- E 1. Recent expeditions into New Guinea found
- dozens of new species of animals.
 - plants that had plate-sized flowers.
 - a bird that was thought to be extinct.
 - New Guinea has a history of several billion years.
 - all of these.

Answer: e

Bloom's Taxonomy: Knowledge

- M 2. The logical scientific method for studying nature includes all of the following EXCEPT:
- observing nature
 - developing explanations
 - testing the explanations
 - genetically engineering test subjects

Answer: d

Bloom's Taxonomy: Comprehension/Analysis

LIFE'S LEVELS OF ORGANIZATION

- E 3. Which is the smallest unit of life that can exist as a separate entity?
- a cell
 - a molecule
 - an organ
 - a population
 - an ecosystem

Answer: a

Bloom's Taxonomy: Knowledge

- E 4. The most inclusive level of organization listed here is a(n)
- organ.
 - atom.
 - molecule.
 - multicelled organism.
 - cell.

Answer: d

Bloom's Taxonomy: Comprehension/Synthesis

- E 5. Nature is _____ in the universe except what humans have _____.
- living; destroyed
 - everything; manufactured
 - macromolecular; genetically engineered
 - verifiable life-forms; selectively bred
 - matter; artificially created

Answer: b

Bloom's Taxonomy: Comprehension/Synthesis

- M 6. A community
- includes all populations of all species in an area.
 - features the living organisms interacting with the physical and chemical environment.
 - is the sum of all places in Earth's atmosphere, crust, and waters where organisms live.
 - includes members of only one species.
 - is at a higher level than an ecosystem.

Answer: a

Bloom's Taxonomy: Knowledge/Evaluation



- E 7. The above figure represents a(n)
- atom.
 - tissue.
 - molecule.
 - organ.
 - cell.

Answer: e

Bloom's Taxonomy: Comprehension

- M 8. The level of organization where factors such as sunlight, rainfall, and temperature enter the picture is the
- organ system.
 - ecosystem.
 - biosphere.
 - molecule.
 - community.

Answer: b

Bloom's Taxonomy: Comprehension/Synthesis

- D 9. Living organisms are members of all of the levels listed below; however, rocks are components of
- the community.
 - the population.
 - the ecosystem.
 - the biosphere.
 - both the ecosystem and the biosphere.

Answer: e

Bloom's Taxonomy: Comprehension/Synthesis

- D 10. A(n) _____ property is a characteristic of a system that does not appear in any of its component parts.
- efferent
 - emergent
 - elective
 - energetic
 - living

Answer: b

Bloom's Taxonomy: Knowledge

OVERVIEW OF LIFE'S UNITY

- M 11. All organisms are alike in their
- requirements for energy.
 - participation in one or more nutrient cycles.
 - ultimate dependence on the sun.
 - interaction with other forms of life.
 - all of these.

Answer: e

Bloom's Taxonomy: Knowledge

- E 12. Which of the following is NOT a key characteristic of "life"?
- organization into cells
 - response to environmental change
 - reproduction
 - inability to change
 - using energy

Answer: d

Bloom's Taxonomy: Knowledge/Analysis

- M 13. Living organisms are different from inanimate objects because they
- react to environmental stimuli.
 - exhibit massive complexity.
 - possess molecules of deoxyribonucleic acid.
 - exhibit multiple levels of organization.
 - all of these

Answer: e

Bloom's Taxonomy: Analysis/Evaluation

- M 14. The conversion of solar energy to chemical energy is known as
- metabolism.
 - photosynthesis.
 - chemosynthesis.
 - catabolism.
 - anabolism.

Answer: b

Bloom's Taxonomy: Knowledge

- M 15. Organisms sense and respond to changes both inside and outside the body by way of
- metabolism.
 - photosynthesis.
 - receptors.
 - catabolism.
 - anabolism.

Answer: c

Bloom's Taxonomy: Knowledge

- M 16. DNA codes for the production of
- proteins.
 - minerals.
 - inorganic molecules.
 - vital gasses.
 - water.

Answer: a

Bloom's Taxonomy: Knowledge

- M 17. Which of the following do not depend directly on sunlight for energy?

I. **terrestrial producers**

II. **animal consumers**

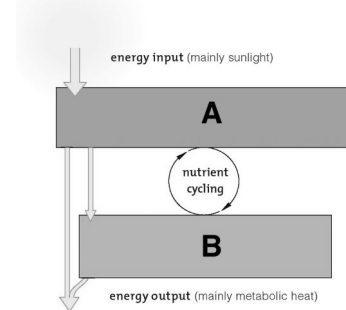
III. **decomposers**

- I only
- II and III only
- II only
- III only
- I and III

Answer: b

Bloom's Taxonomy: Knowledge

- E 18. On the illustration, "A" and "B" should be labeled respectively



- consumers; producers
- decomposers; producers
- producers; redistributors
- producers; consumers
- none of these

Answer: d

Bloom's Taxonomy: Comprehension

- M 19. Nonliving entities do NOT possess
- energetic interactions.
 - DNA.
 - atoms.
 - elements.
 - any of these.

Answer: b

Bloom's Taxonomy: Knowledge/Analysis

- E 20. The flow of energy among living organisms is best characterized as
- circular.
 - a ladder.
 - a lattice.
 - one way.
 - a funnel.

Answer: d

Bloom's Taxonomy: Knowledge/Comprehension

- E 21. Homeostasis provides what kind of environment?
- positive
 - relatively constant around a set point
 - limiting
 - changing
 - chemical and physical

Answer: b

Bloom's Taxonomy: Knowledge

- E 22. Each cell is able to maintain a constant internal environment. This condition is called
- metabolism.
 - homeostasis.
 - physiology.
 - adaptation.
 - evolution.

Answer: b

Bloom's Taxonomy: Knowledge/Comprehension

- M 23. 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/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
- adaptation.
 - inheritance.
 - metabolism.
 - homeostasis.
 - all of these.

Answer: d

Bloom's Taxonomy: Knowledge/Application/Evaluation

- D 24. For a cell to take up sugar from the bloodstream,
- sugars must bind to receptors on cells of the pancreas.
 - a person must have had a meal with sugar within the last twenty-four hours.
 - homeostatic mechanisms must activate the blood-brain barrier.
 - glycogen must be broken down to provide a supply of glucose.
 - the pancreas must supply the appropriate enzymes to make sugar available.

Answer: a

Bloom's Taxonomy: Knowledge

- D 25. Which of the following phrases would most likely be used in a discussion of homeostasis?
- respond to environmental stimuli
 - limited range of variation
 - rapid energy turnover
 - cycle of elements
 - structural and functional units of life

Answer: b

Bloom's Taxonomy: Knowledge

- M 26. The DNA molecule is most similar functionally to a
- pair of scissors.
 - flashlight battery.
 - computer memory chip.
 - ballpoint pen.
 - craft kit of ceramic tiles.

Answer: c

Bloom's Taxonomy: Knowledge

- E 27. A fertilized moth egg passes through which stages of development before becoming an adult?

I. larval

II. pupal

III. reproductive

- I only
- II only
- I and II
- I and III
- II and III

Answer: c

Bloom's Taxonomy: Knowledge/Synthesis

OVERVIEW OF LIFE'S DIVERSITY

- E 28. A scientific name consists of which of the following?

I. family name

II. genus name

III. species name

- I only
- II only
- III only
- I and II
- II and III

Answer: e

Bloom's Taxonomy: Knowledge/Synthesis

- E 29. The plural for genus is
- genus.
 - geni.
 - genera.
 - gena.
 - genae.

Answer: c

Bloom's Taxonomy: Knowledge

- M 30. The least inclusive of the taxonomic categories listed here is
- family.
 - phylum.
 - class.
 - order.
 - genus.

Answer: e

Bloom's Taxonomy: Knowledge

- E 31. Which group includes all of the other groups?
- domain
 - order
 - family
 - genus
 - species

Answer: a

Bloom's Taxonomy: Knowledge

- D 32. The hierarchical system of nomenclature
- allows diversity to be catalogued.
 - organizes knowledge about species relationships.
 - permits organisms to be identified.
 - sorts organisms into groups.
 - all of these.

Answer: e

Bloom's Taxonomy: Knowledge

- E 33. Members of what domain are evolutionarily closest to eukaryotes?
- Animalia
 - Protista
 - Fungi
 - Bacteria
 - Archaea

Answer: e

Bloom's Taxonomy: Comprehension/Analysis

- E 34. All of the following are domains of life except?
- Animalia
 - Bacteria
 - Archaea
 - Eukarya
 - none of these

Answer: a

Bloom's Taxonomy: Comprehension/Analysis

- E 35. Members of what group are multicellular producers?
- Animalia
 - Protista
 - Fungi
 - Plantae
 - none of these

Answer: d

Bloom's Taxonomy: Knowledge

- E 36. Which of the following groups are made up of almost exclusively decomposers?
- Plantae
 - Fungi
 - Animalia
 - Monera
 - Protista

Answer: b

Bloom's Taxonomy: Knowledge/Comprehension

- E 37. Which of the following are NOT eukaryotes?
- fungi
 - bacteria
 - plants
 - animals
 - protistans

Answer: b

Bloom's Taxonomy: Knowledge

- E 38. Plants produce sugars from
- oxygen and carbon dioxide.
 - sunlight and water.
 - oxygen and water.
 - carbon dioxide and water.
 - iron and water.

Answer: d

Bloom's Taxonomy: Knowledge

AN EVOLUTIONARY VIEW OF DIVERSITY

- E 39. A mutation is a change in
- homeostasis.
 - the developmental pattern in an organism.
 - metabolism.
 - DNA.
 - the life cycle of an organism.

Answer: d

Bloom's Taxonomy: Knowledge

- M 40. When different forms of a trait are becoming more or less common over successive generations, what is taking place?
- natural selection
 - adaptation
 - survival of the fittest
 - evolution
 - none of these

Answer: d

Bloom's Taxonomy: Knowledge

- D 41. The diversity of structure, function, and behavior in living organisms is primarily the result of
- reproduction.
 - heredity.
 - evolution.
 - chance variations in living organisms of the same generation.
 - artificial selection.

Answer: c

Bloom's Taxonomy: Comprehension/Analysis

- D 42. Which of the following ultimately accounts for variation in genetic traits?
- replication of DNA molecules
 - genetic mutation
 - asexual reproduction
 - ecological succession
 - homeostatic mechanisms

Answer: b

Bloom's Taxonomy: Knowledge/Comprehension

- D 43. An adaptive trait is a trait that has
- mutated.
 - survival value.
 - decreased in frequency in a population.
 - deleterious biological effects.
 - the potential to produce variation.

Answer: b

Bloom's Taxonomy: Knowledge

- E 44. The animals used in the text to show variation in domesticated forms are
- pigeons.
 - chickens.
 - pigs.
 - dogs.
 - cats.

Answer: a

Bloom's Taxonomy: Knowledge

- D 45. The principal point of Darwin's theory of evolution by natural selection is that
- long-term heritable changes in organisms are caused by use and disuse.
 - mutations that adapt an organism to a given environment always arise in the greatest frequency in the organisms that occupy that environment.
 - mutations are caused by all sorts of environmental influences.
 - survival of characteristics in a population depends on a favoring of some forms of a given trait over others in nature.
 - mutations mostly have favorable effects.

Answer: d

Bloom's Taxonomy: Knowledge/Comprehension

- M 46. Which premise used by Darwin in his theory is INCORRECTLY stated below?
- More offspring are produced than will survive to reproduce.
 - Members of populations show heritable variation.
 - Some varieties have a better chance to survive and reproduce.
 - Organisms that possess advantageous traits have a decreased chance of producing offspring.
 - Some traits become more common because their bearers contribute more offspring to the next generation.

Answer: d

Bloom's Taxonomy: Comprehension/Analysis

- D 47. Which of the following statements is NOT true?
- Natural selection is based upon differential reproduction and survival.
 - For evolution to occur in a population, there must be some variation.
 - Most mutations have beneficial effects on traits.
 - A population evolves when heritable change occurs in a line of descent.
 - Over time, some genetic traits are more adaptive than others.

Answer: c

Bloom's Taxonomy: Knowledge/Analysis

- M 48. The scientific explanation for the diversity seen in nature is
- based upon sexual differences.
 - divine creation of the many different forms of life.
 - found in the science of taxonomy.
 - natural selection.
 - artificial selection.

Answer: d

Bloom's Taxonomy: Knowledge/Comprehension

CRITICAL THINKING AND SCIENCE

- E 49. Science is based on
- faith.
 - authority.
 - evidence.
 - force.
 - consensus.

Answer: c

Bloom's Taxonomy: Knowledge

- M 50. Which of the following is NOT used in the development of science?
- evaluation of data
 - personal conviction
 - prediction
 - systematic observation
 - sharing ideas

Answer: b

Bloom's Taxonomy: Comprehension/Analysis

- M 51. _____ means judging information before accepting it as fact.
- Critical thinking
 - Law
 - Theory
 - Fact
 - Hypothesis

Answer: a

Bloom's Taxonomy: Knowledge

- E 52. The study of the observable is
- science.
 - optics.
 - hypothesis.
 - critical thinking.
 - visualization.

Answer: a

Bloom's Taxonomy: Knowledge/Comprehension

- M 53. Copernicus, Galileo, and Darwin found that _____ caused their science to be controversial.
- prevailing belief
 - objective data
 - astronomy
 - the supernatural
 - experimental design

Answer: a

Bloom's Taxonomy: Knowledge

- M 54. Testing subsets of a population allows scientists to make _____ about the whole population.
- theories
 - hypotheses
 - generalizations
 - conclusions
 - all of these

Answer: c

Bloom's Taxonomy: Knowledge/Comprehension

- E 55. The difference between results from the subset and results from the whole is
- the variable.
 - sampling error
 - the prediction.
 - the control.
 - the hypothesis.

Answer: b

Bloom's Taxonomy: Knowledge

HOW SCIENCE WORKS

- M 56. A well-tested hypothesis that has not been disproved is called a
- principle.
 - law.
 - theory.
 - fact.
 - hypothesis.

Answer: c

Bloom's Taxonomy: Knowledge

- E 57. Pigeon breeding is an example of
- natural selection.
 - evolution.
 - artificial selection.
 - adaptation.
 - mutation

Answer: c

Bloom's Taxonomy: Knowledge

- M 58. Of the following, which is the first explanation of a problem? (a testable answer to the question)
- principle
 - law
 - theory
 - fact
 - hypothesis

Answer: e

Bloom's Taxonomy: Knowledge

- E 59. All of the following will strengthen a theory EXCEPT
- repetitions of experiments.
 - increased observations.
 - time.
 - faith.
 - confirmation by many scientists.

Answer: d

Bloom's Taxonomy: Comprehension/Analysis

- E 60. The validity of scientific discoveries cannot be based on
- morality.
 - aesthetics.
 - philosophy.
 - economics.
 - any of these.

Answer: e

Bloom's Taxonomy: Knowledge

- E 61. A hypothesis is
- a statement of fact.
 - often expressed negatively.
 - a form of critical thinking.
 - a testable prediction.
 - none of these.

Answer: d

Bloom's Taxonomy: Knowledge/Comprehension

- E 62. In order to arrive at a solution to a problem, a scientist usually conducts one or more
- laws.
 - theories.
 - experiments.
 - principles.
 - facts.

Answer: c

Bloom's Taxonomy: Knowledge

- M 63. Which represents the lowest degree of certainty?
- hypothesis
 - conclusion
 - fact
 - principle
 - theory

Answer: a

Bloom's Taxonomy: Knowledge

- M 64. Which represents the highest degree of certainty?
- hypothesis
 - variable
 - assumption
 - theory
 - prediction

Answer: d

Bloom's Taxonomy: Knowledge

- M 65. The control in an experiment
- makes the experiment valid.
 - is an additional replicate for statistical purposes.
 - reduces the experimental errors.
 - minimizes experimental inaccuracy.
 - is identical to the experimental group, but eliminates the characteristic or treatment being tested.

Answer: e

Bloom's Taxonomy: Knowledge/Comprehension

- M 66. As a result of experimentation,
- more hypotheses may be developed.
 - more questions may be asked.
 - a new biological principle could emerge.
 - entire theories may be modified.
 - all of these.

Answer: e

Bloom's Taxonomy: Comprehension/Application

- M 67. In an experiment, the control group is
- not subjected to experimental error.
 - exposed to experimental treatments.
 - maintained under strict laboratory conditions.
 - treated exactly the same as the experimental group, except for one variable.
 - statistically the most important part of the experiment.

Answer: d

Bloom's Taxonomy: Knowledge/Comprehension

THE POWER OF EXPERIMENTAL TESTS

- D 68. Scientists are always thinking about ways to improve experimental design. In the text's potato chip experiment, which of these might do so?
- show a different movie
 - exclude teenagers as group members
 - collect uneaten chip remains and weigh them for both groups
 - provide free drinks
 - use a smaller theater

Answer: c

Bloom's Taxonomy: Comprehension/Application/Analysis

- E 69. Which of the following can be changed based on new evidence?
- hypothesis
 - theory
 - prediction
 - experiment
 - all of these

Answer: e

Bloom's Taxonomy: Comprehension

- D 70. In the experiment with Peacock butterflies, the working hypothesis is that
- mimicry confuses both predator and prey.
 - mimicry conveys a selective advantage to the prey.
 - birds are capable of learning.
 - birds are agents of evolution.
 - unpalatable species display distinctive wings.

Answer: b

Bloom's Taxonomy: Comprehension/Application

- E 71. The variable in the butterfly experiment is
- butterfly wing pattern color.
 - butterfly species.
 - bird predator species.
 - rainforest region used.
 - percentage of survivors.

Answer: a

Bloom's Taxonomy: Knowledge/Comprehension

- M 72. How did the control group differ from the experimental group in the butterfly experiment?
- They were different species.
 - Their native habitat area of the forest differed.
 - They tasted worse.
 - They had unmodified wing spots.
 - They preferred different flower species.

Answer: d

Bloom's Taxonomy: Comprehension/Analysis

- D 73. The data from the butterfly experiment reflected which of the following?
- natural selection
 - food choices by predators
 - the ability of birds to find the prey
 - the role of mimicry
 - all of these

Answer: e

Bloom's Taxonomy: Comprehension/Analysis

- M 74. The results of the butterfly experiment
- supported the hypothesis.
 - provided valuable quantitative data.
 - confirmed the prediction.
 - provided evidence of natural selection in action.
 - all of these.

Answer: e

Bloom's Taxonomy: Comprehension/Application

SAMPLING ERROR IN EXPERIMENTS

- E 75. Performing an experiment where the sample sizes are small may result in
- sampling error.
 - blind testing.
 - loss of evidence.
 - strong support of the experimental design.
 - consensus errors.

Answer: a

Bloom's Taxonomy: Knowledge/Comprehension

Matching

D **76-83.** Match the following letters to the number with which they best correspond.

- a. Observation, b. Question, c. Hypothesis, d. Prediction,
e. Observational experiment, f. Laboratory experiment,
g. Assess results, h. Report

- 76.** ___ Conduct a survey of individuals who smoke and individuals who do not smoke. Determine which group has the highest incidence of cancers.
77. ___ If smoking causes cancer, then individuals who smoke will get cancer more often than those who do not.
78. ___ Submit the results and the conclusions to the scientific.
79. ___ Establish identical groups of laboratory rats. Expose one group (the model system) to cigarette smoke and compare the incidence of new cancers (if any) with the incidence in the control group.
80. ___ Compile test results and draw conclusions from them.
81. ___ Smoking cigarettes may cause cancer.
82. ___ Why do people get cancer?
83. ___ People get cancer.

Answer(s) 76. e, 77. d, 78. h, 79. f, 80. g, 81. c, 82. b, 83. a

Bloom's Taxonomy: Application/Synthesis

Answer questions 88-94 by matching the descriptions with the most appropriate group listed below.

- a. Bacteria
b. Protista
c. Plantae
d. Fungi
e. Animalia

- E **88.** multicellular producers
E **89.** prokaryotic
M **90.** unicellular organisms of considerable internal complexity
M **91.** multicellular motile consumers
E **92.** oldest living organisms
M **93.** unicellular producers
M **94.** multicellular decomposers

Answers: 88. c, 89. a, 90. b, 91. e, 92. a, 93. b, 94. d

Bloom's Taxonomy: Knowledge/Comprehension

Classification Questions

Answer questions 84-87 by matching the descriptions to the most appropriate function, process, or trait listed below.

- a. evolution
b. reproduction
c. photosynthesis
d. growth
e. homeostasis

- M **84.** a process found only in plants and some bacteria and some protists
E **85.** a characteristic most organisms exhibit that tends to buffer the effects of environmental change
M **86.** heritable change occurs in a line of descent
E **87.** process in which one generation replaces another

Answers: 84. c, 85. e, 86. a, 87. b

Bloom's Taxonomy: Knowledge