Chapter 01 - Invitation to Biology

Multiple Choice

1. Approximately how many rainforest species become extinct every minute?
   a. one
   b. two
   c. five
   d. ten
   e. twenty

   ANSWER: e

2. The smallest unit of life that can exist as a separate entity is a(n)
   a. cell.
   b. molecule.
   c. organ.
   d. population.
   e. ecosystem.

   ANSWER: a

3. Of the options listed, which item represents the most inclusive level of organization?
   a. the heart
   b. a carbon atom
   c. a strand of DNA
   d. a zebra.
   e. a red blood cell

   ANSWER: d

4. What is the correct ordering in the hierarchical levels of the organization of life?
   a. tissues, cells, populations, organisms, and organs
   b. molecules, cells, organs, tissues, and organisms
   c. ecosystems, populations, tissues, cells, and organs
   d. cells, tissues, organs, communities, and populations
   e. cells, tissues, organs, organisms, and ecosystems

   ANSWER: e
Refer to the above figure for questions 5 and 6.

5. In the accompanying figure illustrating the levels of life’s organization, what is represented in frame 2?
   a. atom
   b. tissue
   c. molecule
   d. organ
   e. cell

   **ANSWER:** c

6. In the accompanying figure illustrating the levels of life’s organization, what is represented in frame 3?
   a. atom
   b. tissue
   c. molecule
   d. organ
   e. cell

   **ANSWER:** e

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

   **ANSWER:** a
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8. At what level of organization does life begin?
   a. digestive system
   b. Cell
   c. molecule (water)
   d. molecule (water)
   e. population

   ANSWER:  b

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

   ANSWER:  e

10. 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

11. How are living organisms alike?
    a. The cells of all living organisms have nuclei.
    b. All living organisms participate in nutrient cycles that allow the multi-directional transfer of energy.
    c. All living organisms are multicellular.
    d. All living organisms must reproduce.
    e. All living organisms capture energy directly from the sun.

   ANSWER:  d

12. Four of the following are key characteristics for the survival of a species. Which one is the exception?
    a. organization into cells
    b. response to environmental change
    c. reproduction
    d. inability to change
    e. ability to grow and adapt through DNA

   ANSWER:  d
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13. Four of the following characteristics are required for the life of an individual organism to continue. Which is the exception?
   a. To maintain chemical uniqueness and organization
   b. To respond to stimuli
   c. To possess a genetic program to control cell processes
   d. To reproduce
   e. To evolve

   ANSWER: e

14. The conversion of solar energy to chemical energy is known as
   a. metabolism.
   b. photosynthesis.
   c. chemosynthesis.
   d. catabolism.
   e. anabolism.

   ANSWER: b

15. Organisms sense and respond to changes both inside and outside the body by way of
   a. metabolism.
   b. photosynthesis.
   c. receptors.
   d. catabolism.
   e. anabolism.

   ANSWER: c

16. DNA codes for the production of
   a. proteins.
   b. minerals.
   c. inorganic molecules.
   d. vital gasses.
   e. water.

   ANSWER: a
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17. Which group of organisms does not depend directly on sunlight for energy?
   I. terrestrial producers
   II. animal consumers
   III. decomposers
   a. I only
   b. II and III only
   c. II only
   d. III only
   e. I and III

   **ANSWER:** b

![Diagram](image.png)

Figure 1.3

18. On the accompanying illustration, "A" and "B" should be labeled, respectively, ____ and _____.
   a. consumers; producers
   b. decomposers; producers
   c. producers; redistributors
   d. producers; consumers
   e. consumers; decomposers

   **ANSWER:** d
19. Which characteristic is NOT found in nonliving entities?
   a. energetic interactions
   b. DNA
   c. atoms
   d. heat energy
   e. complexity

   ANSWER: b

20. The flow of nutrients through living organisms is best characterized as
   a. circular.
   b. a ladder.
   c. a lattice.
   d. one way.
   e. a funnel.

   ANSWER: a

21. Homeostasis maintains the internal environment within a range that _____.
   a. favors survival
   b. favors heat as an energy source
   c. is always changing
   d. supports decomposition
   e. limits survival

   ANSWER: a

22. Each cell is able to maintain an internal environment within a range that favors survival. This condition is called
   a. metabolism.
   b. homeostasis.
   c. physiology.
   d. adaptation.
   e. evolution.

   ANSWER: b
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

a. adaptation.
b. inheritance.
c. metabolism.
d. homeostasis.
e. evolution.

**ANSWER:** d

24. Which phrase would most likely be used in a discussion of homeostasis?

a. respond to environmental stimuli
b. limited range of variation
c. rapid energy turnover
d. cycle of elements
e. structural and functional units of life

**ANSWER:** b

25. What characteristic is common to all living things?

a. All living things eat.
b. All living things are producers.
c. All living things sense and respond to change.
d. All living things have a nucleus.
e. All living things are consumers.

**ANSWER:** c

26. Energy sources are needed for which of the following processes?

I. reproduction
II. growth
III. development

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

**ANSWER:** e
27. Which cell lacks a nucleus?
   a. bacterial cell
   b. fungus cell
   c. animal cell
   d. protist cell
   e. plant cell

   ANSWER: a

28. Members of what domain are evolutionarily closest to eukaryotes?
   a. animals
   b. protists
   c. fungi
   d. bacteria
   e. archaea

   ANSWER: e

29. Which of the following is a domain of life?
   a. eukaryotes
   b. plants
   c. animals
   d. protists
   e. fungi

   ANSWER: a

30. Members of what group are multicellular producers?
   a. animals
   b. protists
   c. fungi
   d. plants
   e. bacteria

   ANSWER: d

31. Which group is made up of almost exclusively decomposers?
   a. plants
   b. fungi
   c. animals
   d. bacteria
   e. protists

   ANSWER: b
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32. Which organisms are NOT eukaryotes?
   a. fungi
   b. bacteria
   c. plants
   d. animals
   e. protists

   ANSWER:  b

33. A 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

34. The plural for genus is
   a. genus.
   b. geni.
   c. genera.
   d. gena.
   e. genae.

   ANSWER:  c

35. Which is the least inclusive of the taxonomic categories listed below?
   a. family
   b. phylum
   c. class
   d. order
   e. genus

   ANSWER:  e
36. Which group includes all of the other groups?
   a. domain
   b. order
   c. family
   d. genus
   e. species

   ANSWER: a

37. Which renowned biologist defined species as a group of individuals that potentially can interbreed, produce fertile offspring, and do not interbreed with other groups?
   a. Charles Darwin
   b. E. O. Wilson
   c. Carl Linnaeus
   d. Jean-Baptiste Lamarck.
   e. Ernst Mayr

   ANSWER: e

38. Which term refers to judging information before accepting it as fact?
   a. critical thinking
   b. Law
   c. theory
   d. fact
   e. hypothesis

   ANSWER: a

39. Which term refers to the first explanation of a problem (sometimes referred to an "educated guess")?
   a. principle
   b. law
   c. theory
   d. fact
   e. hypothesis

   ANSWER: e
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40. What is a hypothesis?
   a. a report of the findings of scientific experiments
   b. a specific conclusion of an experiment in an "if . . . then" format
   c. a way of using isolated facts to reach a general idea that may explain a phenomenon
   d. the summary of the outcomes of scientific findings
   e. a testable explanation of a natural phenomenon

   ANSWER:  e

41. Which concept represents the lowest degree of certainty?
   a. hypothesis
   b. conclusion
   c. fact
   d. principle
   e. theory

   ANSWER:  a

42. Which concept represents the highest degree of certainty?
   a. hypothesis
   b. deduction
   c. assumption
   d. theory
   e. prediction

   ANSWER:  d

43. 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 for comparisons to the experimental group.

   ANSWER:  e

44. In an experiment, the control group is:
   a. not subjected to experimental error.
   b. exposed to experimental treatments.
   c. maintained under strict laboratory conditions.
   d. treated exactly the same as the experimental group, except for one variable.
   e. statistically the most important part of the experiment.

   ANSWER:  d
45. The choice of whether a particular organism belongs to the experimental group or the control group should be based on
   a. age.
   b. size.
   c. chance.
   d. history.
   e. gender.

   **ANSWER:** c

46. Scientists are always thinking about ways to improve experimental design. In the text's potato chip experiment, which of these changes would produce the most effective design?
   a. Show a different movie.
   b. Exclude teenagers as group members.
   c. Collect uneaten chip remains and weigh them for both groups.
   d. Provide free drinks before the experiment.
   e. Use a smaller theater.

   **ANSWER:** c

47. Olestra chips did not cause cramps at a higher rate than normal chips. This is known as the ____ of this experiment.
   a. hypothesis
   b. prediction
   c. control
   d. conclusion
   e. data

   **ANSWER:** d

48. In the experiment with peacock butterflies, the working hypothesis is that
   a. silence confuses both predator and prey.
   b. making sounds can provide a selective advantage to the prey.
   c. birds are capable of learning.
   d. birds are agents of evolution.
   e. unpalatable species display distinctive wings.

   **ANSWER:** b
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49. What is one of the major variables in the peacock butterfly experiment?
   a. pattern/color of the wings  
   b. range of migration  
   c. species of bird predator  
   d. experimental location  
   e. percentage of survivors  

   **ANSWER:** a

50. Which group in the peacock butterfly experiment had the highest survival rates?
   a. Those with more nocturnal habits  
   b. Those without spots and without hissing/clicking sounds  
   c. Those without spots but with hissing/clicking sounds  
   d. Those with spots and hissing/clicking sounds  
   e. Those with the same flower habitat as the birds  

   **ANSWER:** d

51. What was the dependent variable in the peacock butterfly experiments?
   a. changing predators  
   b. changing habitats  
   c. painting the wings  
   d. clipping the hindwings  
   e. getting eaten  

   **ANSWER:** e

52. Which of the following is NOT true about the peacock butterfly?
   a. The dark underside of their wings provide camouflage.  
   b. The spots on the wings may resemble owl eyes, which help deter predation.  
   c. The butterflies remain still when a predator is near so as not to draw attention.  
   d. The rapid movement of their wings produces a hissing sound.  
   e. A resting butterfly’s closed wing resembles a dead leaf.  

   **ANSWER:** c

53. Which experiment would be the least effective follow-up to the peacock butterfly studies?
   a. Repeat in a forest area totally devoid of native butterflies.  
   b. Repeat in a wildlife sanctuary aviary after giving birds a chance to learn about yellow *H. eleuchia*.  
   c. Repeat using young, inexperienced birds.  
   d. Repeat, and count survivors for three weeks.  
   e. Repeat using more butterflies and more blue tits in a larger area.  

   **ANSWER:** a
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54. Randomly selecting samples of experimental units from an environment can result in
   a. sampling error.
   b. blind testing.
   c. evidence.
   d. experimental design.
   e. consensus.

   ANSWER: a

55. What is an acceptable probability of sampling error that may have skewed the results in most scientific studies?
   a. 80%
   b. 50%
   c. 25%
   d. 10%
   e. 5%

   ANSWER: e

56. Science is based on
   a. faith.
   b. authority.
   c. evidence.
   d. force.
   e. conjecture.

   ANSWER: c

57. Which characteristic is least applicable to the development of science?
   a. evaluation of data
   b. personal conviction
   c. prediction
   d. systematic observation
   e. sharing of ideas

   ANSWER: b

58. Which characteristic will NOT strengthen the validity of a theory?
   a. repetitions of experiments
   b. increased observations
   c. time after the experiment
   d. faith in the experiment
   e. confirmation by many scientists

   ANSWER: d
59. Scientific work involves
   a. natural and supernatural world.
   b. retesting theories frequently for verification.
   c. proving theories with absolute certainty.
   d. testing hypotheses under every possible circumstance
   e. coming up with the best descriptions of the natural world.

   ANSWER: e

60. Copernicus, Galileo, and Darwin found that ____ caused their science to be controversial.
   a. prevailing belief
   b. objective data
   c. astronomical theories
   d. supernatural influences
   e. experimental design

   ANSWER: a

Numeric Response

   Matching. Match the following letters to the number with which they best correspond.
   a. Observation
   b. Question
   c. Hypothesis
   d. Prediction
   e. Law of nature
   f. Scientific theory
   g. Assessment
   h. Report

   61. This is a generalization that describes a consistent natural phenomenon for which there is incomplete scientific explanation.

   ANSWER: e

   62. If smoking causes cancer, then individuals who smoke will get cancer more often than those who do not.

   ANSWER: d

   63. Submit the results and the conclusions to the scientific community.

   ANSWER: h

   64. Hypothesis that has not been disproven after many years of rigorous testing.

   ANSWER: f
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65. Compile test results and draw conclusions from them.

   ANSWER: g

66. Smoking cigarettes causes cancer.

   ANSWER: c

67. Why do people get cancer?

   ANSWER: b

68. People get cancer.

   ANSWER: a

Classification. Match the following descriptions to the most appropriate function, process, or trait listed below.

   a. inheritance
   b. reproduction
   c. photosynthesis
   d. growth
   e. homeostasis

69. A process found only in plants, some bacteria, and some protists

   ANSWER: c

70. A characteristic most organisms exhibit that tends to keep their internal environment within a range that favors survival

   ANSWER: e

71. The transmission of DNA from parent to offspring

   ANSWER: a

72. Process by which individuals produce offspring

   ANSWER: b

Classification. Match the following descriptions with the most appropriate group listed below.

   a. bacteria
   b. protists
   c. plants
   d. fungi
   e. animals

73. Multicellular producers

   ANSWER: c

74. Prokaryotic

   ANSWER: a
75. unicellular organisms of considerable internal complexity

   **ANSWER:** b

76. multicelled mobile consumers

   **ANSWER:** e

77. based on fossils, oldest, still living organisms

   **ANSWER:** a

78. unicellular eukaryotic producers

   **ANSWER:** b

79. most common multicellular decomposers

   **ANSWER:** d