

Ch. 1 Introduction: Ten Themes in the Study of Life

Questions for Chapter 1

- 1) Which of these is the *best* description of the science of biology?
 - A) the study of life
 - B) the study of rocks
 - C) the study of humans
 - D) the study of biodiversity
 - E) the study of the way humans interact with their environment

- 2) A maple leaf is at which level in the hierarchical organization of life?
 - A) tissue
 - B) organ
 - C) organelle
 - D) population
 - E) organism

- 3) Which of these is an example of an organelle?
 - A) amoeba
 - B) muscle
 - C) stomach
 - D) digestive system
 - E) chloroplast

- 4) Which of the following are molecules?
 - A) carbon
 - B) water
 - C) chlorophyll
 - D) A and B
 - E) B and C

- 5) What is a localized group of organisms that belong to the same species?
 - A) network
 - B) community
 - C) population
 - D) ecosystem
 - E) collection

- 6) In terms of the hierarchical organization of life, an amoeba is _____ level of organization, whereas a dog is at the _____ level of organization.
 - A) at the cell and organism ... multicellular organism
 - B) only at the cell ... organism
 - C) only at the organelle ... cell and multicellular organism
 - D) only at the tissue ... multicellular organism
 - E) only at the organelle ... unicellular organism

- 7) Which of these is a correct representation of the hierarchical organization of life from least to most complex?
 - A) hydrogen, water, heart muscle cell, nucleus, heart muscle tissue, heart, human
 - B) hydrogen, water, nucleus, heart muscle cell, heart muscle tissue, heart, human
 - C) hydrogen, water, nucleus, heart muscle cell, heart, heart muscle tissue, human
 - D) water, hydrogen, nucleus, heart muscle cell, heart muscle tissue, heart, human
 - E) nucleus, hydrogen, water, heart muscle cell, heart, heart muscle tissue, human

- 8) Which of the following is reflective of the phrase "the whole is greater than the sum of its parts"?
- A) the cell theory
 - B) emergent properties
 - C) homeostasis
 - D) reductionism
 - E) evolution
- 9) In order to understand the chemical basis of inheritance, one must understand the molecular structure of DNA. This is an example of the application of _____ to the study of biology.
- A) evolution
 - B) emergent properties
 - C) the cell theory
 - D) reductionism
 - E) natural selection
- 10) Who first named and described cells in 1665?
- A) Robert Hooke
 - B) Anton van Leeuwenhoek
 - C) Matthias Schleiden
 - D) Theodor Schwann
 - E) Charles Darwin
- 11) Which of these statements is one of the generalizations of the cell theory?
- A) Life is extraterrestrial in origin.
 - B) All cells contain a nucleus.
 - C) DNA is the genetic material of all cells.
 - D) Cells have homeostatic mechanisms that maintain their internal environment.
 - E) New cells arise from preexisting cells.
- 12) One of the key distinctions between prokaryotic and eukaryotic cells is the presence of _____ cells, which is lacking in _____ cells.
- A) a nucleus in eukaryotic ... prokaryotic
 - B) a nucleus in prokaryotic ... eukaryotic
 - C) DNA in prokaryotic ... eukaryotic
 - D) DNA in eukaryotic ... prokaryotic
 - E) a cytoplasmic organelle in prokaryotic ... eukaryotic
- 13) What are the basic "building blocks" of DNA?
- A) protein
 - B) carbohydrates and lipids
 - C) 20 amino acids
 - D) 26 nucleotides
 - E) four nucleotides

- 14) Which of the following utilize DNA as their genetic material?
A) prokaryotes B) eukaryotes C) archaea D) A and C only E) A, B, and C
- 15) For most ecosystems _____ is (are) the ultimate source of energy and energy leaves the ecosystem in the form of _____.
A) light ... heat
B) heat ... light
C) plants ... animals
D) plants ... heat
E) producers ... consumers
- 16) Which of the following is the main source of energy for producers such as plants?
A) light
B) carbon dioxide
C) minerals
D) heat
E) chemicals
- 17) As a result of photosynthesis, plants release _____ into the atmosphere.
A) methane
B) carbon dioxide
C) sugar
D) minerals
E) oxygen
- 18) Plants convert the energy of sunlight into
A) the energy of motion.
B) carbon dioxide and water.
C) the potential energy of chemical bonds.
D) minerals.
E) kinetic energy.
- 19) A rock rolling down a hill is exhibiting
A) photosynthesis.
B) kinetic energy.
C) chemical energy.
D) decomposition.
E) potential energy.

- 20) If a population of plants contains 10,000 kilocalories, what would be a reasonable estimate of the number of kilocalories found in a population of animals that feed on nothing but that population of plants?
- A) 1,000 kilocalories
 - B) 10,000 kilocalories
 - C) 20,000 kilocalories
 - D) 50,000 kilocalories
 - E) 100,000 kilocalories
- 21) Chemical reactions of metabolism within cells are regulated by organic catalysts. What are these catalysts called?
- A) kinetic transformers
 - B) enzymes
 - C) feedback inhibitors
 - D) analogs
 - E) nutrients
- 22) Once labor begins in childbirth, contractions increase in intensity and frequency until delivery. Therefore, the increasing labor contractions of childbirth are an example of
- A) a feedforward mechanism.
 - B) positive feedback.
 - C) negative feedback.
 - D) feedback inhibition.
 - E) both C and D.
- 23) When blood glucose levels rise, the pancreas secretes insulin and as a result blood glucose levels decline. When blood glucose levels are low, the pancreas secretes glucagon and as a result blood glucose levels rise. Such regulation of blood glucose levels is an example of
- A) a feedforward mechanism.
 - B) positive feedback.
 - C) negative feedback.
 - D) feedback inhibition.
 - E) both C and D.
- 24) The maintenance of a relatively stable internal environment is referred to as
- A) taxonomy.
 - B) natural selection.
 - C) evolution.
 - D) cell theory.
 - E) homeostasis.
- 25) There are approximately _____ identified and named species.
- A) 1,500
 - B) 150,000
 - C) 1,500,000
 - D) 15,000,000
 - E) 150,000,000
- 26) Which branch of biology is concerned with the naming and classifying of organisms?
- A) genetics
 - B) physiology
 - C) genomics
 - D) taxonomy
 - E) evolution

- 27) Species that are in the same _____ are more closely related than species that are only in the same _____.
- A) phylum ... class
 - B) family ... order
 - C) class ... order
 - D) family ... genus
 - E) kingdom ... phylum
- 28) Which of these is reflective of the hierarchical organization of life from most to least inclusive?
- A) kingdom, phylum, class, order, family, genus, species
 - B) phylum, class, order, kingdom, family, genus, species
 - C) kingdom, order, family, phylum, class, genus, species
 - D) genus, species, kingdom, phylum, class, order, family
 - E) class, order, kingdom, phylum, family, genus, species
- 29) Which of the following are characteristics shared by members of both Domain Bacteria and Domain Archaea?
- A) cytosol
 - B) nucleus
 - C) DNA
 - D) A and C only
 - E) A, B, and C
- 30) What are the two classifications of prokaryotes?
- A) Domain Bacteria and Domain Eukarya
 - B) Domain Archaea and Kingdom Monera
 - C) Domain Eukarya and Domain Archaea
 - D) Domain Bacteria and Kingdom Monera
 - E) Domain Bacteria and Domain Archaea
- 31) A water sample from a hot thermal vent contained a single-celled organism that lacked a nucleus. What is its most likely classification?
- A) Domain Eukarya
 - B) Domain Archaea
 - C) Domain Bacteria
 - D) Kingdom Protista
 - E) Kingdom Fungi
- 32) A rose bush is classified into Domain _____ and Kingdom _____.
- A) Eukarya ... Animalia
 - B) Eukarya ... Fungi
 - C) Eukarya ... Plantae
 - D) Eukarya ... Protista
 - E) Bacteria ... Archaea

- 33) A new species was discovered. Individuals of this species are multicellular eukaryotes that obtain nutrients from decomposing organic matter. How should this species be classified?
- A) Eukarya, Archaea
 - B) Eukarya, Bacteria
 - C) Eukarya, Plantae
 - D) Eukarya, Protista
 - E) Eukarya, Fungi
- 34) How are most unicellular eukaryotes classified?
- A) Monera
 - B) Protista
 - C) Bacteria
 - D) Archaea
 - E) Eukarya
- 35) A new species has been discovered. Individuals of this species are multicellular eukaryotes that obtain nutrients by ingesting other organisms. How should this species be classified?
- A) Domain Bacteria
 - B) Kingdom Protista
 - C) Kingdom Plantae
 - D) Kingdom Animalia
 - E) Domain Archaea
- 36) You have just discovered a new species that has starch, rather than DNA, as its genetic material. You are elated because you may have just discovered a new
- A) member of Kingdom Protista.
 - B) member of Domain Bacteria.
 - C) member of Domain Archaea.
 - D) member of Domain Eukarya.
 - E) domain of life.
- 37) The fact that there is strong genetic similarity among species is strong evidence in support of
- A) multiple independent origins of life.
 - B) the extraterrestrial origin of life.
 - C) creationism.
 - D) evolution.
 - E) intelligent design.
- 38) Which of these provides evidence of the common ancestry of *all* life?
- A) the ubiquitous use of catalysts by living systems
 - B) the universality of the genetic code
 - C) the structure of the nucleus
 - D) the structure of cilia
 - E) the structure of chloroplasts

- 39) Which of these individuals is *most* likely to be successful in an evolutionary sense?
- A) a reproductively sterile individual who never falls ill
 - B) an individual who dies after 5 days of life but leaves 10 offspring, all of whom survive to reproduce
 - C) a male who mates with 20 females and fathers 1 offspring
 - D) an individual who lives 100 years and leaves 2 offspring, both of whom survive to reproduce
 - E) a female who mates with 20 males and produces 1 offspring
- 40) Natural selection
- A) does not require genetic variation.
 - B) does not require inheritance.
 - C) is differential reproductive success.
 - D) is not descent with modification.
 - E) requires a small population size.
- 41) In a hypothetical world, every 50 years people over 6 feet tall are eliminated from the population. Based on your knowledge of natural selection, you would predict that the average height of the human population will
- A) remain unchanged.
 - B) gradually decline.
 - C) rapidly decline.
 - D) gradually increase.
 - E) rapidly increase.
- 42) Through time, the lineage that led to modern whales shows a change from four-limbed land animals to aquatic animals with two limbs that function as flippers. This change is best explained by
- A) the cell theory.
 - B) creationism.
 - C) the hierarchical organization of life.
 - D) natural selection.
 - E) homeostasis.
- 43) Which of the following questions is outside the realm of science?
- A) How did humans arise?
 - B) Why do humans have a finite life span?
 - C) How do red blood cells carry oxygen?
 - D) What is the basis of heredity?
 - E) Does God exist?
- 44) Collecting data based on observation is an example of _____; analyzing this data to reach a conclusion is an example of _____ reasoning.
- A) discovery science ... inductive
 - B) the process of science ... deductive
 - C) hypothesis testing ... deductive
 - D) descriptive science ... deductive
 - E) hypothesis generation ... deductive

- 45) What is a hypothesis?
- A) the same thing as a theory
 - B) an untestable idea
 - C) a verifiable observation
 - D) a tentative explanation
 - E) a fact
- 46) Which of these is a deduction?
- A) My car won't start.
 - B) My car's battery is dead.
 - C) If I turn the key in the ignition while stepping on the gas pedal, then my car will start.
 - D) I lost my car key.
 - E) My car is out of gas.
- 47) When applying the process of science, which of these is tested?
- A) a question
 - B) a result
 - C) an observation
 - D) a prediction
 - E) a hypothesis
- 48) The statement "If you show your dog affection then your dog will seek your company" is an example of
- A) a statement that can be tested.
 - B) a statement derived from a hypothesis.
 - C) a prediction.
 - D) deductive reasoning.
 - E) all of the above.
- 49) A controlled experiment is one in which
- A) the experiment is repeated many times to ensure that the results are accurate.
 - B) the experiment proceeds at a slow pace to guarantee that the scientist can carefully observe all reactions and process all experimental data.
 - C) there are at least two groups, one of which does not receive the experimental treatment.
 - D) there are at least two groups, one differing from the other by two or more variables.
 - E) there is one group for which the scientist controls all variables.
- 50) Why is it important that an experiment include a control group?
- A) The control group is the group that the researcher is in control of; it is the group in which the researcher predetermines the nature of the results.
 - B) The control group provides a reserve of experimental subjects.
 - C) A control group is required for the development of an "if ... then" statement.
 - D) A control group assures that an experiment will be repeatable.
 - E) Without a control group, there is no basis for knowing if a particular result is due to the variable being tested or to some other factor.